Municipality of Anchorage

Anchorage Regional ITS Architecture Update

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Revision History

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	June 25, 2015			AMATS Policy Committee Approval

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AASHTO	American Association of State Highway and Transportation Officials	IEEE	Institute of Electrical and Electronics Engineers
ADA	Americans with Disabilities Act	IM	Incident Management
ADOT&PF	Alaska Department of Transportation & Public Facilities	ISP	Information Service Provider
AFD	Anchorage Fire Department	ITE	Institute of Transportation Engineers
AKIA	Alaska Iways Architecture	ITS	Intelligent Transportation Systems
AMATS	Anchorage Metropolitan Area Transportation Solutions	IVR	Interactive Voice Response
ANSI	American National Standards Institute	JBER	Joint Base Elmendorf-Richardson
APD	Anchorage Police Department	MCM	Maintenance and Construction Management
APTA	American Public Transportation Association	MCV	Maintenance and Construction Vehicle
ARIA	Anchorage Regional ITS Architecture	MDC	Mobile Data Computers
ARRC	Alaska Railroad Corporation	MOA	Municipality of Anchorage
ASC	Actuated Signal Controller	MPO	Metropolitan Planning Organization
ASTM	American Society for Testing and Materials	MS	Message Sets

ATIS	Advanced Traveler Information Systems	MSCVE	Measurement Standards and Commercial Vehicle Enforcement
AVL	Automated Vehicle Location	MTP	Metropolitan Transportation Plan
C2C	Center-to-Center	NEMA	National Electrical Manufacturers Association
C2F	Center-to-Field	NOAA	National Oceanic and Atmospheric Administration
CBERRRSA	Chugiak/Birchwood/Eagle River Rural Road Service Area	NTCIP	National Transportation Communications for ITS Protocol
CCTV	Closed Circuit Television	NWS	National Weather Service
CIP	Capital Improvement Projects	OEM	Office of Emergency Management
CMP	Congestion Management Plan	PTD	Public Transportation Department
CMU	Conflict Monitor Units	RWIS	Roadway Weather Information Systems
CV	Commercial Vehicle	SAE	Society of Automotive Engineers
DMS	Dynamic Message Signs	SCP	Signal Control and Prioritization
DOT&PF	Department of Transportation & Public Facilities	SDO	Standards Development Organization
DSRC	Dedicated Short-Range Communications	SPP	Stakeholder Participation Plan
EMS	Emergency Medical Services	TCIP	Transit Communications Interface Profiles
EOC	Emergency Operations center	TIP	Transportation improvement Program

ETMCC	External TMC Communications	TMC	Traffic Management Center
FHWA	Federal Highway Administration	TMCC	TMC Communications
FMS	Field Management Stations	TMDD	Traffic Management Data Dictionary
FTA	Federal Transit Administration	TOC	Transportation Operations Center
GFI	General Farebox Inc.	TSS	Transportation Sensor Systems
GIS	Geographic Information System	UPWP	Unified Planning Work Program
GPS	Global Positioning System	USDOT	United States Department of Transportation
GTFS	Google Transit Feed Specification	WIMS	Weigh-In-Motion Systems
HAR	Highway Advisory Radio		

1 Introduction

This report documents the update to the Anchorage Regional (Intelligent Transportation Systems (ITS) Architecture (ARIA) for the Municipality of Anchorage (MOA). The original ARIA was completed in 2003 and adopted in 2004. This update reflects changes since that time including:

- Technologies in place, deployed by the regional partners.
- Updates to the National ITS Architecture
- The regional stakeholder's understanding and assessment of the needs that can be met using ITS technology.
- The availability of a database tool to support documenting the regional ITS architecture – Turbo Architecture.

A second document, the Use and Maintenance Guide for the ARIA, is a companion to this report. While this report describes the ITS Architecture itself, the Use and Maintenance document provides guidance that supports the use of the architecture and outlines how the architecture will be kept up-to-date.

1.1 What is ITS?

Intelligent Transportation Systems (ITS) include advanced sensor, computer, electronic, and communication technologies integrated with the built transportation infrastructure, and deployed to improve overall transportation system operations and safety. Some examples of ITS already in place within the MOA include:

- Computerized traffic signals, including those that can be managed from an central computer platform;
- Traffic detectors and traffic cameras that provide real-time information to support operations;
- Public information websites such as the MOA's site showing the status of snow plow-out by sub-area; and
- Transit bus location and dispatch systems.

1.2 What is an ITS Architecture?

The term 'architecture', when applied to computerized systems and technology, is a model or framework used to describe these inherently complex systems. For ITS, architectures are focused on identifying the data flows between systems that may be owned and operated by different agencies or departments in support of transportation operations improvements. ITS architectures include:

- The requirements for defining the connections;
- Documenting the connections; and
- Documenting any supporting resources, such as interagency agreements, that will enable the architecture to be implemented as planned

1.3 FHWA Rule 940 on ITS Architecture Compliance

When ITS was first broadly funded by the Federal Highway Administration (FHWA) in the 1990s, many of the systems that were implemented were not designed to enable access to the data that was used within them. When agencies wanted to use the source or processed data for other purposes, they were not able to do so without either replacing the system, or making a large investment to modify their existing system.

For example, many agencies wanted to extract traffic data from freeway management and traffic signal control computer systems so that the data could be used for other functions such as performance monitoring or planning. However, when the systems were specified, the project requirements only identified the organization's management/operations functions. The systems were thus designed to pull traffic data *into* the system from detectors. Data could not be easily exported from the system. In addition, not all the coordination and integration needs with other systems, such as sharing camera images or dynamic message sign control, were identified or known. Computerized systems and software were new ground for many agencies, and the project development processes in place were not designed to support planning for technologies that might be called upon in the future to provide functions not needed in the original core system.

FHWA responded to this issue by recommending that systems engineering processes, developed for computerized technologies, be applied to plan for potential future integration and data connections. Systems engineering processes include the development of systems architectures.

Because these processes provide such long-term added value, the USDOT further instituted the National ITS Architecture conformity rule (23 CRF Part 940) (and the FTA National ITS Architecture Policy on Transit Projects) requiring that ITS Architectures be completed for certain 'regionally significant' ITS projects if the projects are to be eligible for Federal transportation funding. Today, developing, documenting, and using an ITS Architecture is considered a best practice in the transportation/ITS industry.

1.4 Document Overview

This report is organized to address the key requirements of the FHWA Rule 940, relating to ITS Architectures, and includes:

- Chapter 2 – Background
  - This chapter provides an overview of Municipality of Anchorage's ITS program.
- Chapter 3 – Processes and Outcomes
  - This chapter focuses on stakeholder activities conducted as a part of the ITS Architecture project.
- Chapter 4 – Operational Concept
  - This chapter describes the MOA ITS Architecture with service area descriptions and data flow diagrams. It includes information on which agencies will fund, own, operate, and maintain the ITS systems as described in the service areas.
- Chapter 5 - Interfaces and Information Exchanges
  - This chapter provides an overview of the data flows within the Architecture.
- Chapter 6 – Standards
  - This chapter discusses the standards that may be applicable to the data flows identified in the ITS Architecture.
- Chapter 7 – Agreements

- This chapter identifies existing and future agreements that will be required to implement the service areas described in the ITS Architecture.

1.5 Scope of the ITS Architecture

The following defines the scope of the ITS Architecture in terms of geography, timeframe, and purpose & objectives.

1.5.1 Description of the Region

The ITS Architecture is focused on the region covered by the boundary of the Municipality of Anchorage, shown in Figure 1 below.

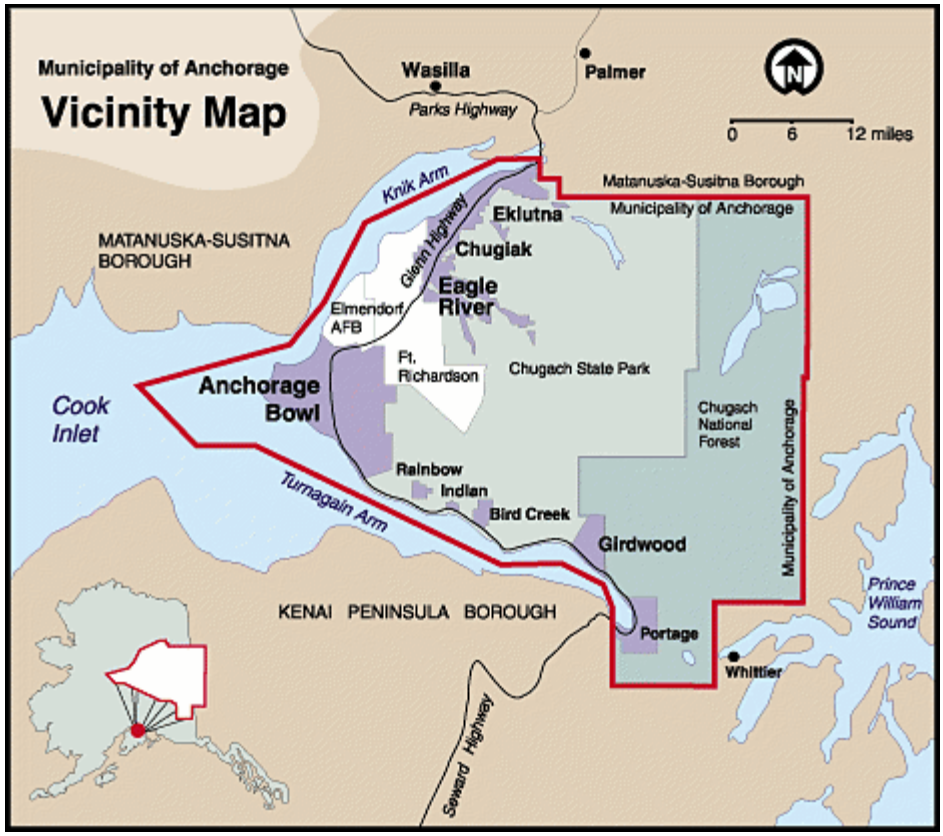


Figure 1. Region Covered by the Anchorage Regional ITS Architecture

The MOA comprises 1,961 square miles and is home to an estimated population of approximately 300,000[1]. This accounts for more than 40% of the state of Alaska's population, making it the most populous city in the state.

[1] "2013 Population Estimates Quickfacts", US Census Bureau, www.cwensus.gov, retrieved 1/13/2015

Anchorage is a hub for statewide transportation including:

- Ted Stevens International Airport
- Port of Anchorage – where over 90% of the state's goods are received
- Alaska Railroad Corporation, which serves both passenger and freight

The surface transportation system includes:

- 1,281 miles of Municipal roads.
- The Seward and Glenn Highways (Alaska Route 1, that meet within Anchorage, connecting via city streets).
- 277 signalized intersections managed by the MOA on its arterial network and State-managed traffic signals on State-owned facilities.
- Anchorage's PeopleMover transit system which manages a fleet of 52 coaches to provide fixed-route services, as well as shared ride services (AnchorRIDES), paratransit services, (Connect) and Share-A-Ride, which coordinates commuter vanpools and provides carpool matching services. In addition, Valley Mover also provides public transportation services.

Also located within the municipality is Joint Base Elmendorf-Richardson (JBER). The region averages 79 inches of snowfall each year. Winter maintenance, including snow and ice removal, is core to maintaining the transportation network.

1.5.2 Timeframe

The timeframe for this ITS Architecture is approximately 10 years, with an emphasis on the first five years. This timeframe allows the stakeholders to consider ITS systems and connections that may not be feasible today, but are not so far beyond today's capabilities and needs to be considered "stretch" goals. In addition, the rapid change of technology capabilities limits any organization's ability to plan technology for the very long term beyond planning to meet functional needs.

1.5.3 Purpose and Objectives of the Update

The 2004 ARIA comprehensively documented the ITS goals and the potential regional ITS functions and connections between systems that could support those functions. The work included a broad base of stakeholders and potential system connections. While the resulting architecture was comprehensive, it was somewhat difficult to use and understand, largely due to its scale, scope, and complexity.

The focus of this ITS Architecture update is to:

- Improve the ability to access and understand the ITS Architecture
- Modify the ARIA to reflect any updates to systems deployed, and the regional partner's vision and goals for ITS over the 10-year timeframe of this update
- Make the ARIA easier to maintain by converting it to a Turbo Architecture file

This update follows the procedures from the Anchorage Regional ITS Architecture Maintenance Process developed in 2003 and adopted by the AMATS Policy Committee in 2004. The architecture also meets Federal Rule 940 requirements, and is consistent with both the National ITS Architecture and the Statewide Alaska Iways Architecture (AKIA).

The primary purpose of the ARIA itself is to document potential technology system and agency/departmental connections that can improve the effective and safe delivery of transportation operations. By doing so, future systems that are implemented will be compatible with the identified data connections.

Additional objectives for the ARIA update are to integrate with regional planning processes, including the Anchorage Metropolitan Area Transportation Solutions (AMATS) regional transportation planning process and the AMATS Congestion Management Process. AMATS is a federally recognized Metropolitan Planning Organization (MPO). AMATS works to plan, fund, and coordinate the transportation system in the Anchorage and Chugiak-Eagle River areas when federal funds are used. During the course of this project, meetings were held with the AMATS committee responsible for the regional plan to solicit input.

In addition, the project aims to coordinate with the AMATS Congestion Management Process update initiated in 2014. The original Congestion Management Program (CMP) for MOA was first published in 1994. The goal of the CMP is to reduce congestion and improve system reliability and the ITS architecture update can work in tandem with that goal. In this project, teams were combined for both projects in order to coordinate the two efforts and identify candidate strategies. The Metropolitan Transportation Plan (MTP) is another planning process that should be consistent to the extent that is practicable with the ARIA.

Stakeholder involvement is another important objective for this project. Coordination of stakeholders improved the process in terms of idea exchange and understanding of the needs of each party.

2 Background

In 2000, Alaska DOT&PF initiated the development of a statewide ITS architecture. As the architecture development process progressed, the benefits attainable from ITS initiatives for the state made it clear that a regionally focused architecture would be beneficial for the Anchorage region. By developing an architecture that is regionally focused, the needs and requirements of travelers in Anchorage can be better represented than in the statewide architecture. A regional ITS architecture also serves as a logical extension of the statewide initiative to focus on the needs, systems, and integration requirements specific to the Anchorage metropolitan area.

In the 2004 ARIA, user needs were identified based on stakeholder input in the Anchorage metropolitan area. ITS solutions were identified that could satisfy the user needs. The ITS solutions were grouped into user services, which are documented in the National ITS Architecture. The user services describe the benefits and/or services that travelers and agencies could anticipate resulting from completion of the ITS architecture. The user services provided the groundwork for the development of the ITS Long Range Vision and Concept of Operations. With the ITS Long Range Vision and Concept of Operations, four key program areas were identified: Year-Round Operations, Traveler Information, Internal Operations, and Incident/Emergency Management. These program areas consist of ITS elements and corresponding user services that help satisfy user needs. The mapping of these program areas to user needs, user services, and services packages from the National ITS architecture was one of the principal steps in the development of the ARIA.

With the development of the Anchorage Region ITS Architecture in 2004, the needs and requirements of the region were accounted for. However, as time progressed and technology changed, the architecture had to be adjusted accordingly. The update to the ARIA aims to accommodate for the changes in the needs and requirements since the initiative development. Since the original ARIA, the National ITS Architecture has been updated with new services, elements, and flows to account for technological innovations. The previous ARIA was made up of several lengthy documents, which made it difficult to comprehend and navigate. The ARIA update condenses all of the required architecture components into one concise and easy-to-understand report. By eliminating unnecessary text, the updated ARIA becomes more coherent and it will also make the maintenance process more manageable. The update follows the Maintenance Plan adopted in 2012, but as changes have been made, the Maintenance Plan was also updated and is now called the Use & Maintenance Guide.

3 Processes and Outcomes

The ARIA update relies heavily on stakeholder input and coordination to ensure that the architecture reflected their needs. Interviews were conducted with key stakeholders to gather information on their existing systems and plans. A workshop was held with key stakeholders to exchange ideas and information and further define user needs and the structure of the architecture. Periodic status updates and communication were completed throughout the process. Figure 2 displays the architecture update process with an emphasis on stakeholder involvement. The interviews were conducted first to draft the operational concept based on stakeholder input. The workshop then took place to confirm the agreement on the operational concept so that the ARIA update could be completed. After the update was completed, stakeholders were given the opportunity to review the architecture to guarantee that all their needs were met. The described stakeholder involvement process was a part of the Stakeholder Participation Plan created for this project. More information on the Stakeholder Participation Plan can be found in Section 3.2 Stakeholder Outreach.

Figure 2. ARIA Update Process

3.1 Turbo Architecture™

Turbo Architecture™ is a software application that aids in the development of regional and project ITS architectures based on the National ITS Architecture. This program became available after the 2004 ARIA, and was used to document the ARIA update. This program is widely used throughout the US in the development and maintenance of regional ITS architectures, and supports better usability and accessibility to the ITS Architecture. The update to the Anchorage Regional ITS Architecture was implemented in Turbo Architecture™ (version 7.0). The software is free and available for download at

http://www.iteris.com/itsarch/html/turbo/turbomain.htm

Turbo Architecture™ supports the FHWA Rule 940 and the FTA National ITS Architecture Policy on Transit Projects; specifically, it provides:

- Support for defining and documenting Functional Requirements
- Support for documenting Operational Concepts (i.e. Roles and Responsibilities)
- Additional fields in Regional Description to fully define an architecture's scope
- Support for documenting any required or existing Agreements
- Support for identifying any ITS Standards available to support the implementation of the architecture

3.2 Stakeholder Outreach

The ARIA update supports the AMATS transportation planning process as well as the Congestion Management Process update. Stakeholder involvement is a critical constituent of the update process. The Anchorage ITS Architecture Update Stakeholder Participation Plan (SPP) was created to educate and engage stakeholders in the project. The SPP also created an opportunity to strengthen regional stakeholder relationships where ITS operations are involved.

The first component of the SPP is Project Management Team participation. This involved the coordination of MOA, ADOT&PF, and the consultant project manager in regards to the project progress. This included conference calls, web conferences, phone calls, emails, and in-person meetings.

As mentioned, AMATS processes were integrated into this project. The second component of the SPP is AMATS Briefings. These in-person meetings are a part of the AMATS Technical Advisory Committee briefings. These meetings occur at project milestones. The final ITS architecture will also be presented at an AMATS Policy Committee meeting.

Another form of stakeholder outreach in the SPP is the stakeholder workshops. These occur during three technical stages of the architecture project. These were in-person workshops that include interested stakeholders. The three workshops are:

- Regional ITS Architecture: Operational Concept and Existing Architecture
- Use and Maintenance of the ITS Architecture
- MOA Transportation Operations Center (TOC) Concept of Operations

The fourth component for stakeholder outreach is the stakeholder interviews. The interview participants focused only on the key stakeholders who would provide input into the ITS architecture update. These interviews ranged from one-on-one to small group phone calls or teleconferences.

The following provides overviews of the key stakeholder agencies reflected in the original ARIA, and in this update.

3.2.1 Office of Emergency Management

The Office of Emergency Management (OEM) is a coordinating agency that supports operations and readiness of the Emergency Operations Center (EOC). This facility serves as the primary coordination center during emergencies that require multiple agency response. Agencies can come together to develop and maintain operational plans to efficiently react to an emergency or disaster within the Anchorage region.

Currently, the EOC has several levels of operation. Normal operations include the daily activities of using existing resources, plans, and policies to coordinate the monitoring of current roadway conditions amongst the appropriate agencies. The EOC also has three levels of "Response Operations." Level 1 involves opening the EOC with OEM staff as needed in response to a situation that requires increased public information. Information sharing networks are active in this level. Level 2 involves the opening of the EOC with OEM staff concurrently with staff from other agencies. Round the clock monitoring occurs during in this level. Finally, Level 3 involves opening the EOC on a 24 hour rotational basis with trained staff. This is typically in response to a local disaster where property damage and threat to human life is possible. The EOC also has recovery operations where the EOC begins the process of returning to normal operations after a coordinated emergency response operations level was activated.

In terms of internal communications, the EOC maintains radio communications using common equipment that can be deployed at any time in response to an incident. Satellite phones are used by key emergency officials and a Hospital Emergency Alert Response Network (HEARNet) is used to establish a link to emergency responders and hospitals to provide aid in emergency situations. The EOC also uses a phone and computer system to communicate internally.

In the event of an emergency, the EOC disseminates information to the public through a variety of means. Anchorage maintains an emergency hotline at 907-343-4701 and a website at

www.muni.org/oem/status.cfm

3.2.2 Anchorage Police Department

The Anchorage Police Department (APD) is the largest law enforcement department in the state. Their mission is to protect and serve the region in a professional and compassionate manner. APD interacts with other agencies such as the Fire Department, Anchorage traffic offices, and Alaska State Patrol to provide collision data and criminal reports. The department also frequently interacts with the media to provide information to the public.

The general public can sign up for alert services by text, email, or web at no cost. This is completed using an iPhone application called Nixle where the public can customize how alerts are sent to their mobile device. Participants can tailor the type of information sent and set it based on the user's address. Users can sign up for this alert service by visiting

http://local.nixle.com/anchorage-police-department/

Other forms of ITS used by the APD include mobile devices, vehicle on-board cameras, and dispatch communications. When callers dial 911, they will be directed to the 911 center operated by APD. Callers can be dispatched to APD, the Anchorage Fire Department, and Emergency Medical Services depending on the situation. In addition, APD also operates a data support office with mapping and GIS capabilities.

APD also maintains social media accounts as a way of dispersing information to the public in a timely manner. Accounts they maintain include Facebook and Twitter:

- Facebook
  - https://www.facebook.com/APDInfo
- Twitter
  - https://twitter.com/apdinfo

3.2.3 Anchorage Fire Department

The Anchorage Fire Department (AFD) maintains 13 fire stations and the department consists of over 300 firefighters. To deal with unique incidents, the Fire Department has specialized units such as dive, foam, hazmat, front-country/rope rescue, urban search & rescue, and water rescue.

AFD has a mission to serve the community, before, during, and after an emergency event. As with other agencies, providing public information is an important responsibility for AFD. One of the ways AFD provides information to the public is by maintaining social media accounts to share information with the public about major events, public safety, and fire awareness. Accounts they maintain include Facebook and Twitter:

- Facebook
  - https://www.facebook.com/pages/The-Anchorage-Fire-Department/55160352015
- Twitter
  - https://twitter.com/afdinfo

Other support services include Fire and Emergency Medical Services (EMS) billing and reports which the public can access online at the municipality department website. AFD also has a Data Systems division that is responsible for providing technical support with information needs such as Fire Incident Reports, GIS data, and web-based information sharing using a variety of hardware and software systems. Often times, AFD uses its GIS mapping technology for live routing purposes. AFD also uses real-time closure information from Anchorage's Public Works Department to ensure operations are as efficient as possible.

3.2.4 Public Transportation

MOA's Public Transportation Department's (PTD's) mission is to connect the community with safe and reliable public transportation options that have an emphasis on customer service while providing economic, social, and environmental benefits.

People Mover is the service that consists of the MOA's fixed route bus system. Users can access information from the People Mover website such as schedules and maps, bus tracking, fares and passes, rider tools, detours, and others. Users can also plan their trip by entering the origin and destination information in the web interface. The People Mover website can be accessed at

http://www.muni.org/departments/transit/peoplemover/Pages/default.aspx

MOA's PTD also offers *AnchorRides*, a paratransit and coordinated transportation system. This is a shared ride service that supports transportation under the Americans with Disabilities Act (ADA) for individuals who are unable to access the fixed route system due to a disability. Users can find information such as eligibility, fares, policies, and a service calendar on the department website.

MOA also operates a *Share A Ride* program which works to reduce congestion by promoting alternatives to driving alone. One example of this is their Vanpool program where 8-13 people can share a ride which can reduce travel costs. The Carpool program is another alternative where participants are matched based on home and work locations once that information is provided. Users can then review the potential matches to determine the best fit.

ITS technology used within MOA's Public Transportation section includes

- DriveCam on fixed and paratransit fleets,
- Transit Estimated Bus Arrival (BusTracker), ,
- Next Bus Arrival Signs,
- Automated Passenger Counters on fixed route,
- CommandPoint/DataPoint/Replay
- BusLine IVR
- Trapeze scheduling software for paratransit
- Enghouse Sched21 scheduling software for fixed route
- Trapeze Ranger MDC's
- M-5 fleet fueling
- GFI validating fareboxes
- PCIT Point of Sale Software
- Mobotix CCTV Cameras
- Annunciators
- Ticket Vending Machine

The PTD utilizes Municipal GIS resources that interface to both Sched21 and Trapeze software systems. All bus stops are geocoded to provide users with more meaningful data. DriveCam is an on-board camera system that captures video surveillance on the bus. Transit Real Time Bus Arrival allows for users to access bus arrival information on the web using automatic vehicle location (AVL) and global positioning technology installed on transit vehicles. A computer system is installed at the Alaska Center for Deaf & Blind adults to aid in AnchorRide scheduling. Next Bus Arrival Signs are installed at major transit stations to support transit riders. Automated Passenger Counters are used to determine which bus stops should get shelters, benches, and trash cans. Finally, the CommandPoint system is used to manage the day-to-day transit operations. Operators can identify buses that are running behind schedule and provide support to get them back on track. PTD provides a GTFS (Google Transit Feed Specification) feed on their website (interfaces with Google Transit and other application developers).

Although not a direct part of MOA's PTD, Valley Mover is a private company that provides public transportation services in the area. More specifically, Valley Mover provides transit service between the Mat-Su Valley and the Anchorage region.

3.2.5 Anchorage Metropolitan Area Transportation Solutions (AMATS)

AMATS is a federally mandated team that consists of staff from multiple agencies responsible for planning and funding the transportation system within the Anchorage region. Some approved projects and plans developed by AMATS include the Transportation Improvement Program (TIP), the Unified Planning Work Program (UPWP), and the Metropolitan Transportation Plan (MTP).

The TIP, planned for 2015-18, consists of capital and operational improvement projects. The purpose of this plan is to meet the goals and objectives of the Metropolitan Transportation Plan. The UPWP is a document that is produced twice a year. This document describes all of the regionally significant surface transportation projects within Anchorage. The MTP is a 20 year plan for the MOA transportation system. These plans include roadway connections, transit vehicle additions, sidewalks, and other roadway improvements. The plan includes both long-range and short-range strategies.

3.2.6 Public Works Traffic Division

The Municipality's Public Works Department consists of an Administration Division, a Maintenance & Operations Division, a Project Management & Engineering Division, and a Traffic Division. The Traffic Division is responsible for the day-to-day operations of the region's traffic signals and street signs. They promote safe and efficient transportation with a focus on neighborhood traffic concerns and maximizing public safety. Within the Traffic Division, there are subsections that specialize in different aspects of traffic, such as the Safety Section, Signals Section, and Data Section.

The Safety Section designs Capital Improvement Projects (CIP), intersection channelization, and safety improvement projects. They are also responsible for investigating and maintaining roadway signs such as regulatory signage and street name signs.

The Signals Section is tasked with managing traffic signal operations and signal timing for all municipal and state signals within the Municipality. The responsibilities of the Signals Section also include installation, inspection, maintenance, and construction support for the system.

The Data Section collects data from roadway sensors and analyzes the data to extract traffic flow information. The information gathered is used for traffic analysis, design, planning, statistic generation, and tracking traffic trends. From this, improvements can be made to increase roadway safety and efficiency.

Other ways users can obtain traffic information is by calling 511 or accessing www.anchorageroads.org, which is linked to the 511 system. By accessing the Anchorage Roads website, the public can view planned closures, obtain project/event details, and make travel decisions based upon this information through MOA's interactive Envista map.

3.2.7 Public Works Maintenance and Operations Division

Another major division within MOA's Public Works department is the Public Maintenance and Operations Division. This division is responsible for street maintenance, facility and fleet maintenance, managing capital improvement projects, and other maintenance operations.

Street maintenance is one of the largest responsibilities of the MOA, and snow and ice removal is a core function.

Users can view street maintenance updates by visiting the Street Maintenance section of the division. Users can see when each section of the street system has been plowed or swept. The website provides a map that shows what sectors have been completed, and sectors remain to be cleared.

3.2.8 Chugiak-Birchwood-Eagle River Rural Road Service Area

The Chugiak-Birchwood-Eagle River Rural Road Service Area (CBERRRSA) maintains over 350 miles of roadways in the Chugiak, Birchwood, and Eagle River areas. They work closely with MOA's Public Works Maintenance and Operations Division. They currently have no technology on their snow removal equipment. Information from RWIS sites and camera images on the Glenn Highway would provide many benefits to the operations of this small service provider.

3.2.9 Alaska DOT&PF

The Alaska Department of Transportation and Public Facilities (ADOT&PF) has an overall mission to "Keep Alaska Moving through service and infrastructure." ADOT&PF is organized into Statewide and three regional offices in Juneau, Fairbanks, and Anchorage. Each Regional Office has planning, engineering, traffic data, and maintenance & operations staff that work to achieve the goals and objectives of the region. Statewide also consists of similar staff. Statewide functions also include commercial vehicle operations and enforcement (Measurement Standards and Commercial Vehicle Enforcement) and Alaska Marine Highways staff to support the Regional Offices in meeting the overall mission statement.

DOT&PF, Measurement Standards and Commercial Vehicle Enforcement

ADOT&PF's Measurement Standards and Commercial Vehicle Enforcement (MSCVE) Division's purpose is to ensure accurate trade measurements and to enforce commercial vehicle regulations. The division can be broken down into a Measurements Standards subdivision and a Commercial Vehicle Enforcement subdivision.

The Measurements Standards subdivision is responsible for certifying the accuracy of weighing and measuring devices used in commercial trade. This ensures that there is a level playing field for businesses operating in the state. An example of this is the usage of high capacity vehicle scales, which have specific requirements for design, installation, and calibration for commercial use. Installation of these scales can fall into permanent, temporary, on-road, or off-road categories for different situations. An example of ADOT&PF scales used to measure weights of commercial vehicles is the Weigh-in-Motion System (WIMS). WIMSs allow for vehicle weights to be captured without vehicles having to stop, which allows for more efficient operations.

The Commercial Vehicle Enforcement subdivision enforces federal and state commercial vehicle regulations. The ultimate goal is to improve safety by reducing the number of crashes in fatalities relating to commercial vehicles in the state. Enforcement of commercial vehicle regulations could involve inspection at weigh stations, terminal locations, or other applicable sites for size and weight compliancy.

DOT&PF, Maintenance and Operations Division

The state Maintenance and Operations Division is in charge of the daily maintenance and operations of over 5,600 miles of state owned roadways and many other transportation infrastructures. ADOT&PF manages 80 maintenance facilities across the state which are involved in anti-icing, deicing, snowplowing, snow hauling, avalanche control, sign repair, drainage structures, and many other maintenance related responsibilities.

ADOT&PF utilizes ITS in their everyday operations. One example is the usage of Road Weather Information stations (RWIS) to improve efficiency of maintenance processes. RWIS are sensors installed within roadway pavement to collect weather information and conditions. This can be useful for deicing purposes when the pavement reaches certain temperatures. Knowing this, ADOT&PF can take the appropriate actions to combat icy conditions. In some cases, more advanced systems can be utilized. For example, an automatic deicing system on the Glenn Highway Bridge over the Knik River is used to address known icing problems. The department also implements a High Accuracy Differential Global Positioning System (GPS) on many snowplows and snow blowers. This helps with maintenance and operations by providing operators and dispatch real-time information on vehicle location and status so efficiency can be achieved and traveler information can be publicized.

DOT&PF, Traffic and Safety Office

Traffic and Safety personnel focus on improving highway safety and operation. Staff is grouped into statewide and regional offices.

The Statewide Traffic and Safety Office manages the Highway Safety Improvement Program (HSIP) and develops and implements policy on traffic safety, operation, and traffic control devices.

They produce and maintain the Alaska Traffic Manual, Alaska Sign Design Specifications Manual, traffic-related standard drawings, and the Alaska Highway Safety Improvement Program Handbook. They provide traffic engineering support to regional staff and complete special projects for headquarters management.

The regional Traffic and Safety offices manage regional components of the HSIP and provide traffic engineering support to Planning, Preliminary Design, Design, Construction, and Maintenance staff. They see that regional plans and activities comply with applicable traffic control device standards, and provide expertise on safety countermeasures, traffic signals, street lighting, signs, striping, crashworthy hardware, work zone traffic control, capacity analysis, and railroad crossings.

Alaska Railroad Corporation

The Alaska Railroad Corporation (ARRC) is owned by Alaska DOT&PF since 1985, but functions like a private business. The ARRC does not operate on funds coming from the state and employees are not state employees. Rather, ARRC generates revenue through its freight, passenger, and real estate services.

The ARRC has been in operation since 1923 and operates freight and passenger railroad that ranges from Seward to Fairbanks-North Pole. The passenger railroad service operates year-round and serves more than 500,000 users every year. Although ARRC is primarily a public transportation service provider, freight is a large part of their operations as they link ports to major metropolitan areas such as Anchorage.

3.2.10 National Weather Service (NWS) Alaska Region

The National Weather Service (NWS) is an agency belonging to the National Oceanic and Atmospheric Administration (NOAA). The purpose of the NWS is to provide weather, water, and climate data. This includes forecasts and warnings to protect life and property while enhancing the economy. One way NWS achieves this is by presenting the information on their website at

http://www.arh.noaa.gov/

From there, users can examine a hazards map, satellite map, radar map, and surface analysis map. On top of that, users can explore forecasts, climate information, weather data, and etc.

The NWS specific to Anchorage also has its own site at

http://pafc.arh.noaa.gov/index.php

At the NWS Anchorage site, users can find more regionally specific weather data. They also cater to social media users by posting weather information to services such as Facebook, Twitter and YouTube:

- Facebook

- https://www.facebook.com/NWSAlaska
- Twitter
  - https://twitter.com/NWSAnchorage
- YouTube
  - https://www.youtube.com/user/NWSAnchorage

On the NWS Anchorage YouTube site, users can watch short videos of daily weather briefings for Alaska.

4 Operational Concept

An operational concept describes how systems, personnel, and data interact to deliver transportation services. FHWA Rule 940 and the FTA policy requires that stakeholder roles and responsibilities be identified in the regional ITS Architecture. These roles and responsibilities are found within the operational concepts.

This ARIA update uses a combination of the previous Anchorage Regional ITS Architecture, the Alaska Statewide (Iways) Architecture, and the National ITS Architecture as a base to describe the current regional ITS architecture.

4.1 Service Areas of the ARIA Update

In the National ITS Architecture, the term "service package" is used to described the flow of data amongst a collection of systems, equipment, and people. This ARIA update uses a combination of the previous Anchorage Regional ITS Architecture, the Alaska Statewide (Iways) Architecture, and the National ITS Architecture as a base to describe the current regional ITS architecture. The information was tailored and customized in a way that incorporates aspects from multiple National ITS service packages. Each group of service package components is named a "service area" to reflect that they are distinct from the National ITS Architecture service packages, and that they incorporate the region's needs. The MOA ITS Architecture is described using the following service areas:

4.1.1 Archive Data Services

This service area is centered on collecting transportation data from various sources and archiving them for future use. Types of archive data could include traffic data, weather, emergency, transit, and etc. Geographic Information System (GIS) data is also an integral component of this service area as the Archive Data Services element would be communicating with a GIS data update provider.

4.1.2 Arterial Management

This service area supports arterial traffic management and focuses on the communication processes amongst center and field systems involved in arterial operations. This includes data flow amongst systems such as traffic cameras, traffic signal controllers, DMS, traffic signal preemption and priority systems, vehicular on-board systems, traffic detectors and other elements.

4.1.3 Traveler Information

This service area provides two key functions – public traveler information and internal agency traveler information. On the general public side, it enables stakeholders to provide automated real-time or static public information regarding traffic conditions, parking conditions, events, emergencies, or construction via the internet and phone. On the internal agency side, the proposed system may be accessed by authorized users from the stakeholder agencies. The service area also provides remote access for authorized users to data that is only suitable for internal agency use, and for viewing CCTV, DMS, and other systems and equipment to support traffic and emergency operations.

4.1.4 Roadway Maintenance and Construction

This service area outlines the distribution of maintenance and construction data amongst applicable ITS elements. Weather, work zone, environmental conditions, and traffic images are some of the data flows exchanged within this service area. Information is also distributed to be archived for future use as well as to public/private information service providers (ISPs) for traveler use.

4.1.5 Transit Operations

The Transit Operations service area presents the external flows connecting to and from internal transit operations. Internal transit operations include flows amongst transit management centers, transit vehicles, field support, and demand response services. These internal flows aren't shown. In other words, only flows that are linked to transit related elements and subsystems outside of internal transit operations are highlighted. The exception to this is flows to and from transit service information providers such as transit agency websites.

4.2 Data Flows and Service Areas

Data flows and service areas were customized to meet the specific needs and requirements of MOA stakeholders. Each of the service areas outlined in this chapter is presented with the following:

- Narrative
  - A description of the operations concept for the service area;
- Data Flow Diagram
  - A graphical illustration of how data flows amongst computer systems, roadway devices, equipment, and people;
- Roles and Responsibilities Table
  - Summarizes and identifies the roles of each stakeholder involved in the service area in terms of design, implementation, operation, and maintenance;

The operational concepts are also described in the Functional Requirements tables. These tables identify the requirements of each system and element within a service area as well as the status of each requirement within the regional architecture. Although they are called Functional Requirements by the National ITS Architecture, they are more like a list of options users can select from when developing their ITS projects. These tables are found in Appendix C: Functional Requirements.

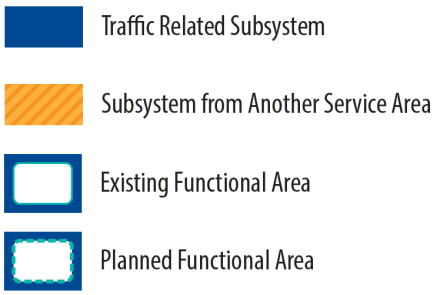
Together, these service areas will contribute to the improvement of traffic operations and safety within the MOA now, and into the future.

4.3 Definitions

The National ITS Architecture provides a common language and framework for all ITS. The following provides key definitions to aid in the comprehension of the diagrams presented in this document. Specifically, subsystems and functional areas, architecture (data) flows, and terminators are defined in the list that follows. A more complete list of definitions from the National ITS Architecture can be found in Appendix A: Glossary of Terms.

- Subsystems and Functional Areas

- Subsystems and Functional Areas are principal structural elements of an ITS Architecture. Subsystems can contain one or more Functional Areas. The Functional Areas represent equipment or data processing components. Subsystems are grouped into four classes: Centers, Fields, Vehicles, and Travelers. An example of how a subsystem and functional areas are related:
  - Subsystem: Roadway Devices (field subsystem)
  - Functional Areas: Surveillance Cameras, DMS, Signal Controllers



- Terminator
  - Representations of the people, systems, or general environment that interacts with ITS

- Architecture Flows
  - Representations of data and/or information that is exchanged between subsystems or between a subsystem and a terminator. They are represented by arrows in the diagrams presented in this document.

4.4 Archive Data Services

Currently, agencies in the region maintain their own data repositories. This makes it convenient for internal operations in terms of accessing historic data within one's agency, but not as convenient for obtaining data from others. The aim of this service area is to support multi-agency data sharing. By creating a central Archive Data Services system that different agencies can contribute to, access to a more abundant amount of historic data becomes streamlined and readily attainable for the participating agencies. Some of the data exchanged and archived is protected and access controlled. This is to protect privacy and sensitive data that is being exchanged. Sharing is also subject to permissions from the data source.

Potential stakeholders that can contribute to this centralized data repository from the MOA side include the Municipality's Department of Public Works (especially the signals section), the Anchorage Police

Department (APD), the GIS Center of Excellence, and the Public Transportation Department. Other potential contributors could include ADOT&PF, the National Weather Service (NWS), other transit agencies, and third-party public/private sector agencies.

MOA's Public Works Department would be responsible for providing roadway environmental conditions data, maintenance and construction work plans, road weather information, and work zone information. MOA's signal section and APD would then be responsible for covering the traffic and emergency archive data respectively.

Alaska DOT&PF is another stakeholder that could make a significant contribution to MOA's Archive Data Services. Their Measurement Standards and Commercial Vehicle Enforcement (MSCVE) Division could provide useful information relating to commercial vehicles within the state jurisdiction. DOT&PF is proposed to contribute traffic data as well.

Transit agencies could also provide an extensive amount of transit data to the system. Transit agencies that could be involved include, but are not limited to, Valley Mover and MOA's PeopleMover.

Finally, there would need to be a GIS Update Provider to assist in the maintenance of the archive database. The Archive Data Services center can request GIS archive information from the GIS provider (currently the Municipality's GIS Services group) and data can be exchanged accordingly. With the contribution from these parties, an extensive data repository could be developed for easy access across multiple agencies.

Table 1. Archived Data Services Roles and Responsibilities

Stakeholder	RR Description	RR Status
ADOTPF/	Send information describing traffic on transportation facilities and traffic control strategies employed.	Planned
ADOTPF/ Measurement Standards and Commercial Vehicle Enforcement	Send information describing commercial vehicle travel and flow characteristics.	Planned
Combined/ Anchorage Transit Agencies	Send data that describes transit operations, performance, demand, and fares.	Planned
Combined/ Traffic Signal Owners and Operators	Send information describing traffic on transportation facilities and traffic control strategies employed.	Planned
MOA/ Anchorage Police Department	Send logged emergency information data such as incident response, evacuation, surveillance, and etc.	Planned
MOA/ Data Section	Collect information from various sources and archive them for later use.	Planned
MOA/ Data Section	Request updated GIS information.	Planned
MOA/ Street Maintenance	Send future construction and maintenance work schedules and activities information.	Planned
MOA/ Street Maintenance	Send road conditions and weather information.	Planned
MOA/ Street Maintenance	Send current maintenance and construction work zone activities information affecting road networks.	Planned

Stakeholder	RR Description	RR Status
NOAA/ National Weather Service (NWS) Alaska Region	Send forecasted and current weather information and environmental sensor data.	Planned
Public or Private Sector Agency/	Receive and process GIS archive data request.	Planned
Public or Private Sector Agency/	Send requested GIS traveler archive data.	Planned

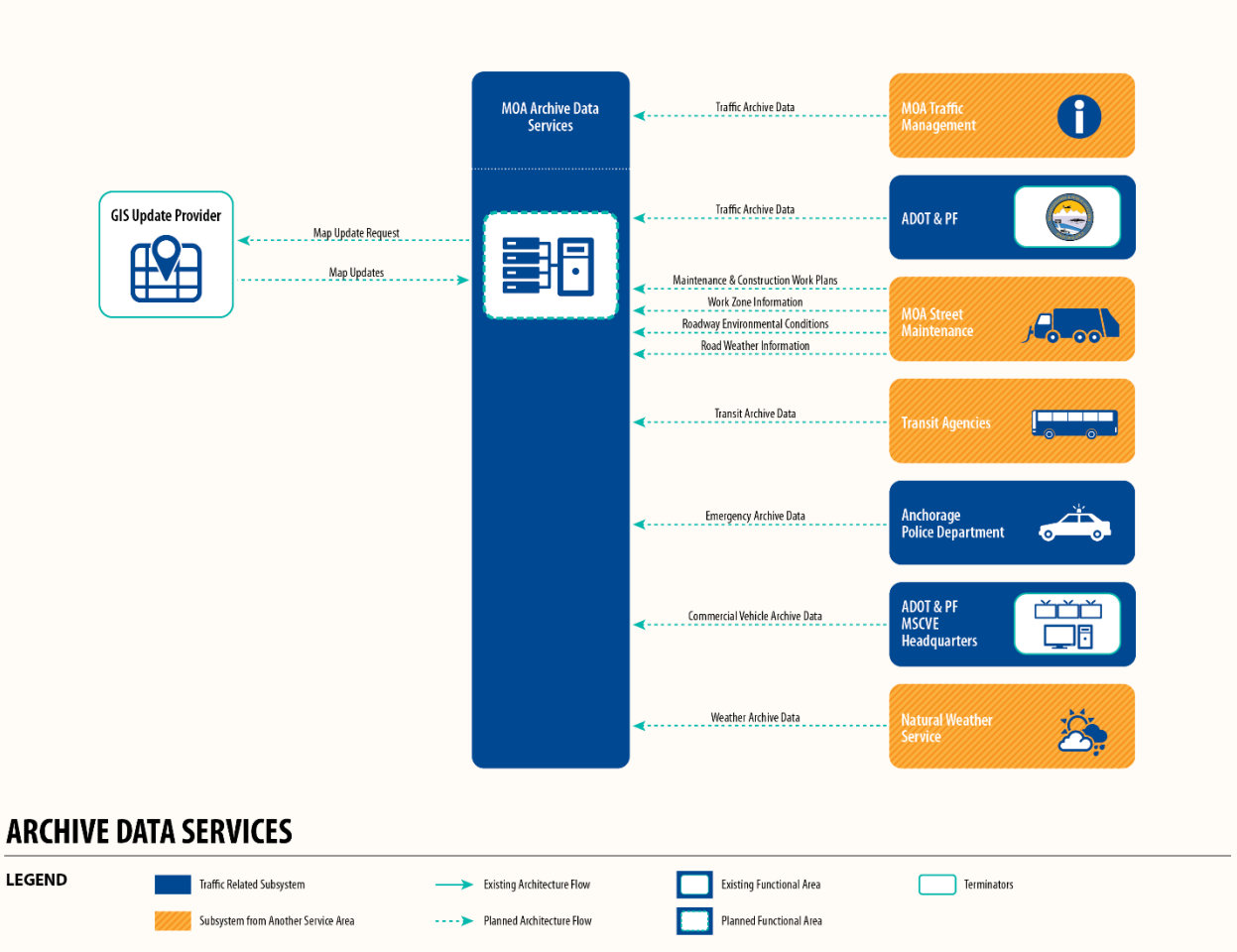


Figure 3. Archived Data Services Flow Diagram

A larger version of this flow diagram can be found in Appendix D: Architecture (Data) Flows & Flow Diagrams.

4.5 Arterial Management

The existing arterial management and operations in the Anchorage region consists of communications between centralized computers and roadway equipment such as traffic signals, traffic detectors, and traffic surveillance cameras. Data is exchanged amongst these existing systems to adjust signal timings, collect traffic data, transmit camera images, and alter device configurations. This service area aims to improve on this system by proposing that MOA incorporates the use of DMS into their traffic management and operations, integrate signal priority for maintenance vehicles, collect and distribute vehicle probe data, provide train arrival information to the public, and initiate stronger efforts to distribute data to outside sources.

DOT&PF owns and maintains four permanent DMS and 15 portable DMS. Two of the permanent signs are located on Glenn and Seward Highway in the Anchorage Region. Although DOT&PF maintains these permanent signs, APD is responsible for their operations through a joint agreement with DOT&PF. The portable DMS are all operated by DOT&PF. MOA has yet to implement the usage of DMS in their traffic operations. This service area proposes that MOA maintains and operates DMS throughout Anchorage for the purposes of traffic management.

Another key factor this service area addresses is the proposal to consolidate signal priority and preemption for transit and maintenance vehicles in Anchorage. Transit vehicles already communicate with traffic signals using on-board systems. Allowing maintenance vehicles such as snow plows the same ability allows for maintenance work to be completed more quickly and therefore cause fewer disruptions to traffic flow. The usage of signal priority systems could also include automatic vehicle location (AVL) capabilities and turn-signal linkage.

With the implementation of signal priority and preemption, the process would become more effective with field equipment coordination between the priority/preemption system and the signal controllers. With field to field communications, the extra step of processing the priority requests via a center can be eliminated and the process simplified.

Railroad information collected from ARRC wayside equipment and detectors is also reflected in this service area. It is proposed that ARRC uses railroad equipment for advanced train detection to collect data such as train speed, location, arrival times, and crossing delays. By collecting and distributing this information to MOA, higher levels of efficiency in traffic management can be achieved to minimize delays caused by rail crossings.

Finally, this service area proposes that information gathered from the traffic centers be distributed to public/private information service providers (ISPs). The information sent could include, but is not limited to, incident information, road network conditions, and traffic images.

Table 2. Arterial Management Roles and Responsibilities

Stakeholder	RR Description	RR Status
ADOTPF/ Alaska Railroad Corporation	Operate and maintain railroad wayside equipment.	Planned
ADOTPF/ Alaska Railroad Corporation	Collect railroad crossing information such as estimated arrival times, crossing delays, and train speed.	Planned
ADOTPF/ Alaska Railroad Corporation	Send advanced railroad detection such as blocking information and delays to traffic centers.	Planned
ADOTPF/ Signal Section	Initialize, configure, maintain, and establish operation policy for DMS.	Existing
ADOTPF/ Signal Section	Collect operating status of DMS.	Existing
ADOTPF/ Signal Section	Send traffic information to drivers via DMS.	Existing
Combined/ Anchorage Transit Agencies	Request signal priority for transit vehicles.	Existing
Combined/ Traffic Signal Owners and Operators	Initialize, configure, operate, and maintain field devices such as signals, traffic cameras, and preemption/priority systems.	Existing
Combined/ Traffic Signal Owners and Operators	Collect traffic information from field devices.	Existing
Combined/ Traffic Signal Owners and Operators	Receive and process signal preemption/priority requests.	Existing
Combined/ Traffic Signal Owners and Operators	Send traffic information to ISPs including incident information, road network conditions, and traffic images.	Planned
MOA/ Data Section	Collect traffic information and archive them for later use.	Planned
MOA/ Signal Section	Collect operating status of DMS.	Planned
MOA/ Signal Section	Initialize, configure, maintain, and establish operation police for DMS.	Planned
MOA/ Signal Section	Send traffic information to drivers via DMS.	Planned
MOA/ Street Maintenance	Request signal priority for street maintenance vehicles.	Planned
Public or Private Sector Agency/ ISP	Collect traffic information such as traffic images, incident information, and road network conditions.	Planned
Public/ Travelers		

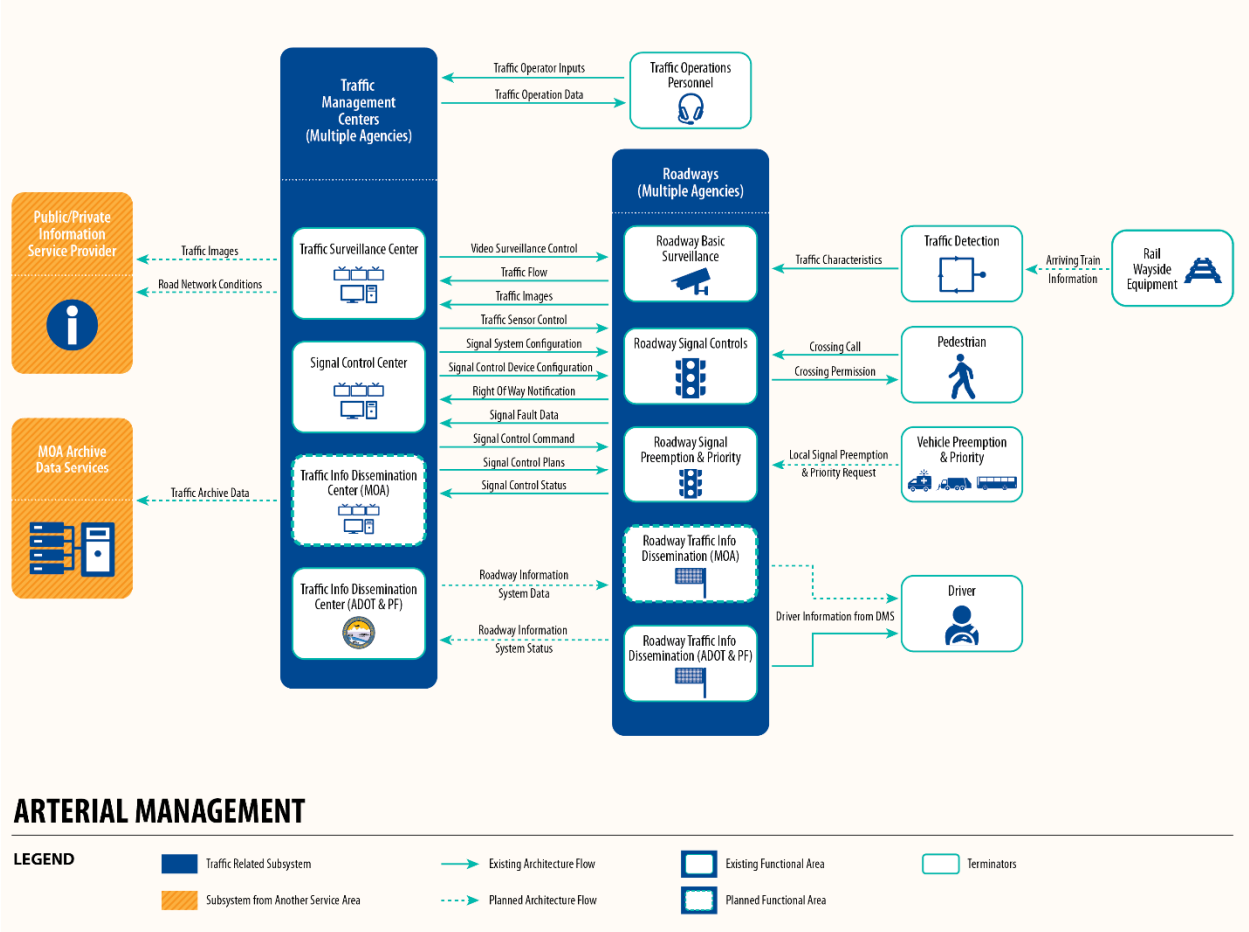


Figure 4. Arterial Management Flow Diagram

A larger version of this flow diagram can be found in Appendix D: Architecture (Data) Flows & Flow Diagrams.

4.6 Roadway Maintenance and Construction

This service area aims to improve maintenance and construction processes by proposing the consolidation of Road Weather Information Systems (RWIS) into daily operations, providing maintenance vehicles with signal priority capabilities, and distributing information to public/private ISPs and the centralized archiving data service.

The current system involves the MOA maintenance supervisors that communicate with maintenance vehicles to perform daily operations. The office also receives environmental and weather data from the NWS and uses that information to perform maintenance activities as needed.

Incorporating RWIS into maintenance operations would provide the Maintenance Dispatch Office with more accurate and real-time information on current road conditions. The RWIS consists of sensors placed

at strategic locations to observe environmental conditions. It makes sense to combine this into maintenance activities as better performance is to be expected.

RWIS information would also be accessible by maintenance supervisors to help them determine how best to allocate resources and what snow and ice control strategies would be most effective.

By assimilating signal priority capabilities into maintenance operations, activities such as deicing and snow removal using snow plows can become more efficient by limiting the number of stops at intersections. The benefits include faster job completion, fewer delays to regular traffic, and opportunities for future on-board systems alongside signal priorities.

Finally distribution of maintenance information is also important as maintenance is a key recurring process in the region. By distributing information to public/private ISPs, news can be spread more quickly to a wide range of destinations that could be impacted by maintenance activities. For example, school districts can benefit from this information by adjusting bus schedules and routes in response to this information. Archiving the data in a central repository benefits not only the maintenance sector, but others as well in terms of accessibly.

Table 3. Roadway Maintenance & Construction Roles and Responsibilities

Stakeholder	RR Description	RR Status
ADOTPF/ Regional Maintenance and Operations Departments	Send road conditions and traffic information.	Planned
Combined/ Traffic Signal Owners and Operators	Operate roadway preemption and priority systems.	Planned
MOA/ Data Section	Collect and archive roadway conditions, weather, maintenance, and work zone information.	Planned
MOA/ Street Maintenance	Send maintenance and construction information.	Existing
MOA/ Street Maintenance	Send roadway conditions and weather information.	Existing
MOA/ Street Maintenance	Collect and process roadway conditions and weather information.	Existing
MOA/ Street Maintenance	Communicate with roadway systems such as preemption/priority.	Planned
MOA/ Street Maintenance	Collect environmental data and traffic images.	Planned
MOA/ Street Maintenance	Send environmental, weather, and traffic information.	Planned
NOAA/ National Weather Service (NWS) Alaska Region	Send weather and environmental data.	Existing
Public or Private Sector Agency/ ISP	Collect environmental, weather, and traffic information.	Planned

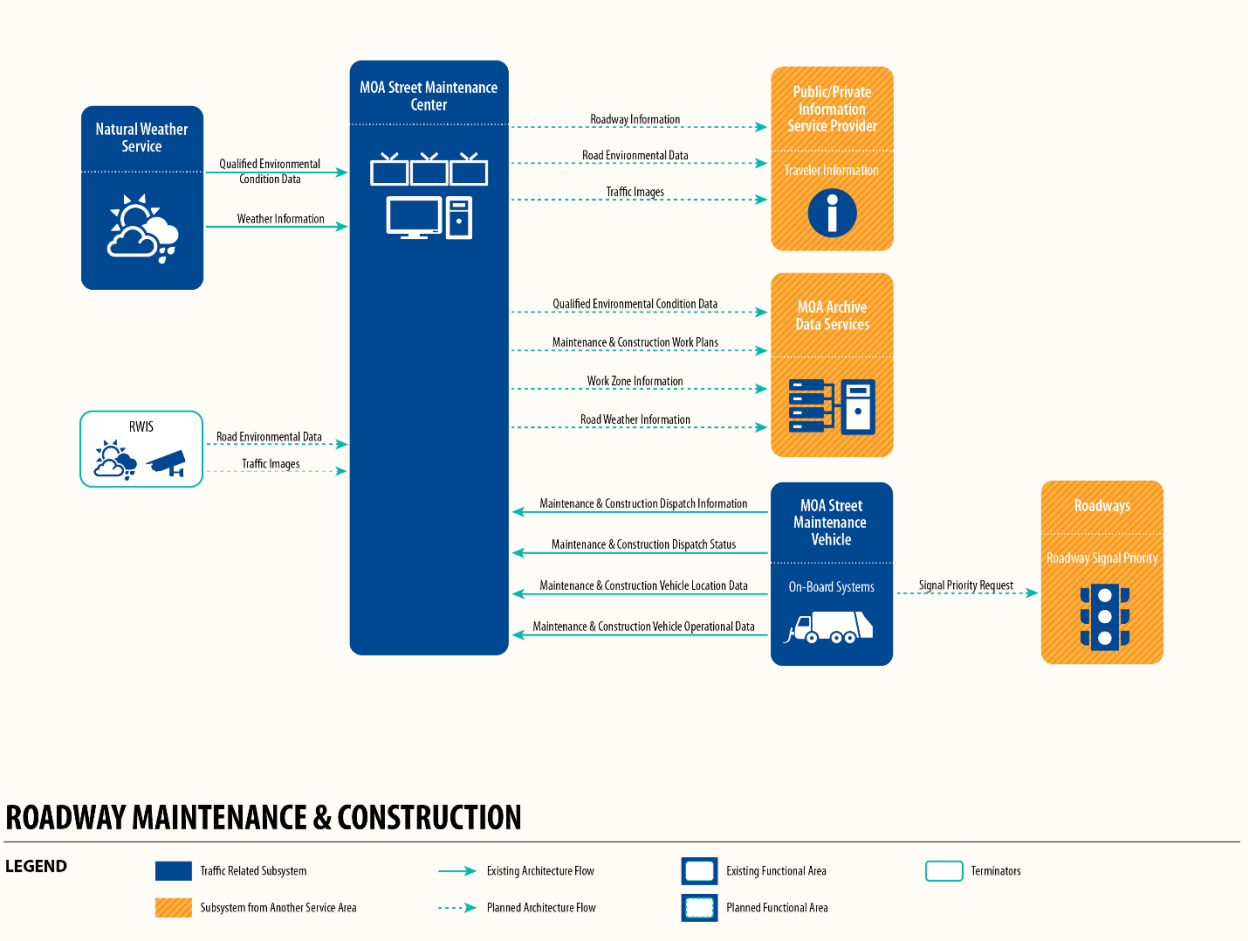


Figure 5. Roadway Maintenance & Construction Flow Diagram

A larger version of this flow diagram can be found in Appendix D: Architecture (Data) Flows & Flow Diagrams.

4.7 Transit Operations

The purpose of this service area is not to highlight the existing internal operations between transit agency centers and their respective transit vehicles. Rather, the purpose is to outline the proposed processes and flows that could connect and support other agencies and other service areas. The existing internal connections within the transit agencies include support for vehicle tracking, fixed-route operations, fare management, passenger counting, and others. One exception to not displaying internal connections is with the transit agency websites.

The service area highlights that MOA's website includes information for the public regarding emergency transit schedule information, demand responsive transit plans, transit and fare schedules, incident information, and schedule adherence information. Additional capabilities that exist on the website include requesting for paratransit information, viewing selected routes, and requesting additional transit information. For example, MOA's BusTracker allows for viewing bus arrival information for selected

fixed-routes. An example of paratransit information includes MOA's incorporation of Spider Reports into AnchorRides, which allows for destination organizations to receive information regarding riders.

Connections to outside sources should also be implemented in transit operations. For instance, more data exchange with public/private ISPs, MOA's EOC, and MOA's Street Maintenance.

Transit agencies can coordinate with public/private organizations to distribute transit information to a wider audience. In some cases, means other than websites are more convenient, and that is where public/private organizations or service providers can be useful. This is especially true in emergency situations, where ISPs can distribute information in a more accessible manner compared to a website. APD has a service similar to this called Nixle to provide subscribers with public agency announcements. This organization/service or ISP would provide users with the exact transit information they want such as transit fares and schedules, demand responsive plans, and etc. Essentially, this is a service for the public where they can select the type of information they want sent to them instead of having to look for relevant information the website.

Communications with the MOA's EOC is a key factor. Currently, MOA plays a key role in disaster response, including providing accessible transportation to individuals in need. This service area proposes coordination with the EOC, which can result in benefits such as faster response times, more accurate information, and more efficient operations. When users dial 911 for emergencies, they are directed to APD dispatch. In the Transit Operations service area, it is proposed that APD receives secure transit surveillance data to deal with emergencies and incidents. As a result of this, APD dispatch and the EOC were combined into a single element for transit related emergency operations and coordination.

In addition, coordination with MOA's parking management can allow for parking and transit operations to exist cohesively. This service area proposes that parking information be shared with transit agencies so that users can better plan their trips. This could also include shared fares, where users can pay for parking and transit service through a single payment process.

Finally, signal priority capabilities currently existing on transit vehicles' on-board systems and MOA's traffic signal controllers are included in this area. MOA has TSP integrated into some of its traffic controllers. As of the time of this writing, MOA is in the process of upgrading traffic signal controllers in the region. Further integration of TSP with controllers will continue when all the signals have been upgraded.

Table 4. Transit Operations Roles and Responsibilities

Stakeholder	RR Description	RR Status
Combined/ Anchorage Transit Agencies	Send signal priority requests for transit vehicles.	Existing
Combined/ Anchorage Transit Agencies	Receive emergency, threat, and incident information.	Planned
Combined/ Anchorage Transit Agencies	Send emergency, threat, and incident information.	Planned
Combined/ Anchorage Transit Agencies	Collect and send surveillance data.	Planned
Combined/ Traffic Signal Owners and Operators	Operate traffic signal controllers.	Planned

Stakeholder	RR Description	RR Status
MOA/ Anchorage Office of Emergency Management	Send emergency, incident, and threat information.	Planned
MOA/ Anchorage Office of Emergency Management	Collect emergency, incident, and threat information.	Planned
MOA/ Anchorage Office of Emergency Management	Receive surveillance data.	Planned
MOA/ Street Maintenance	Send parking information.	Planned
NOAA/ National Weather Service (NWS) Alaska Region	Send weather information.	Existing
Public or Private Sector Agency/ ISP	Receive emergency, parking, and transit information.	Planned
Public or Private Sector Agency/ ISP	Send transit information.	Planned

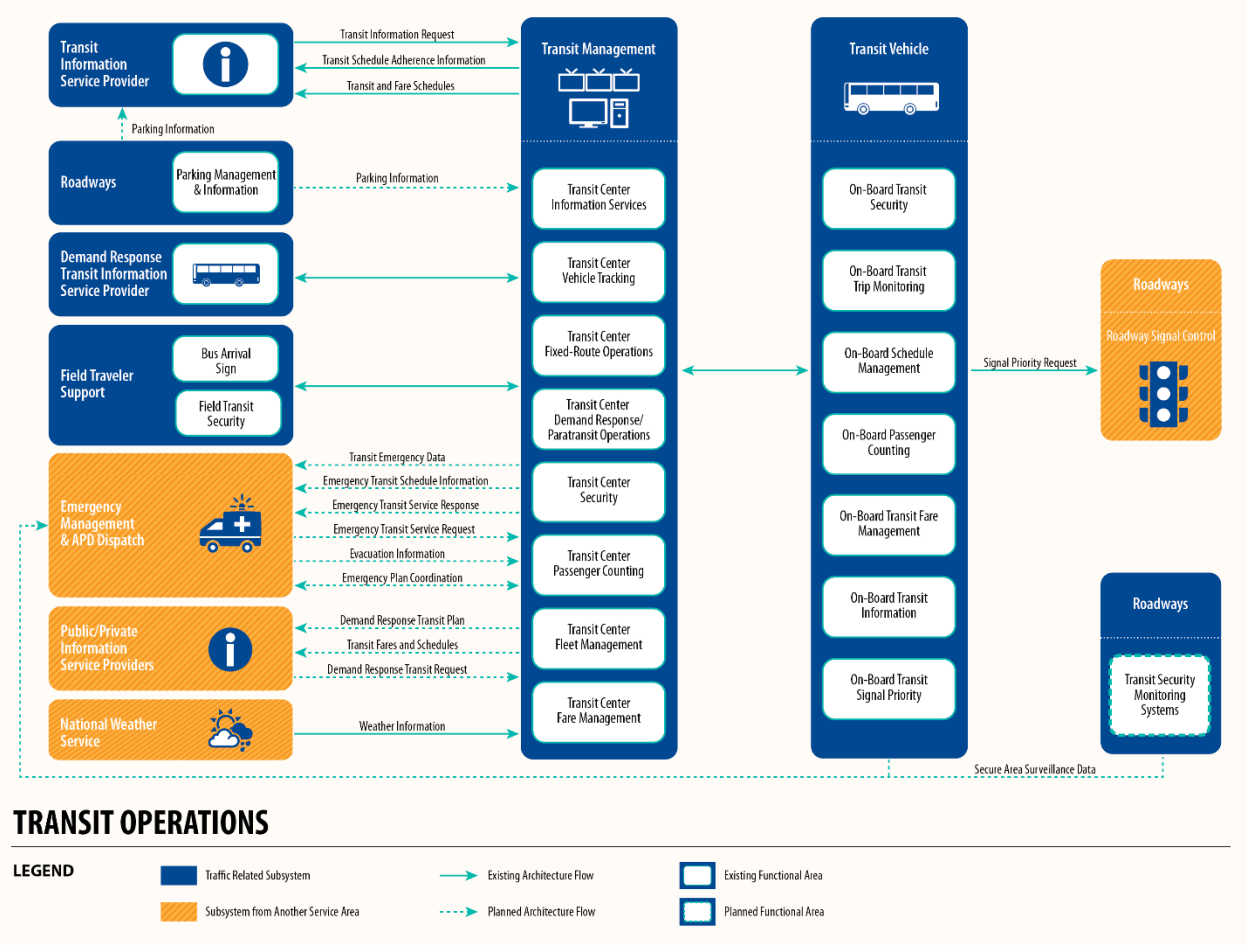


Figure 6. Transit Operations Flow Diagram

A larger version of this flow diagram can be found in Appendix D: Architecture (Data) Flows & Flow Diagrams.

4.8 Traveler Information

The Traveler Information service area supports both public and internal agency traveler information through various means. A proposed public/private information service provider is the core of this service area, whose responsibility is to collect information from various sources and circulate that information to the applicable destinations.

This service area proposes more information to be accessible to the public. Currently, the public can access the traffic section's website and call 511 to get information. The www.anchorageroads.org website allows for users to view project details, events, and other traffic impacts using their Envista platform. Essentially, only maintenance and construction impact information are available to the public on the website. Additional information that could be made available to the public includes traffic images, road network conditions, parking management information, and incident information.

A public broadcast emergency system managed by MOA's Office of Emergency Management is also proposed. This provides the public with an additional source of information, especially for emergency, incident, and road network information.

The service area also proposes that authorized users be able to gain additional information that may not be available to the public. These authorized users could include staff of agencies such as DOT&PF, MOA, transit agencies, and others. Additional information could include transportation facility system status, emergency information, and camera images. This also involves giving authorized users the capability to request remote surveillance control of CCTV to be able to get more real-time data to be able to provide assistance during incidents as necessary.

Finally, distributing the information to other ISPs can be beneficial in terms of spreading critical traveler information to a wider audience. Critical information can include emergency information, incident information, and roadway conditions.

Table 5. Traveler Information Roles and Responsibilities

Stakeholder	RR Description	RR Status
Combined/ Public Sector Agencies	Access controlled agency traffic, emergency, road conditions, maintenance evacuation, and other transportation information.	Existing
Combined/ Public Sector Agencies	Provide evacuation, incident, and transportation system information.	Existing
Combined/ Traffic Signal Owners and Operators	Provide road network conditions and traffic images.	Planned
MOA/ Anchorage Office of Emergency Management	Collect emergency, incident, and road network information to broadcast.	Planned
MOA/ Street Maintenance	Provide roadway maintenance status.	Existing
MOA/ Street Maintenance	Provide road network conditions and parking and weather information.	Planned
Public or Private Sector Agency/ ISP	Collect traveler information from various sources.	Planned
Public or Private Sector Agency/ ISP	Distribute traveler information to other sources.	Planned

Stakeholder	RR Description	RR Status
Public or Private Sector Agency/ Other ISP	Collect traveler, traffic, parking, emergency, incident, and road network information.	Planned
Public/ Travelers	Access roadway maintenance information.	Existing
Public/ Travelers	Access public traveler, incident, road network, parking, and traffic information.	Planned

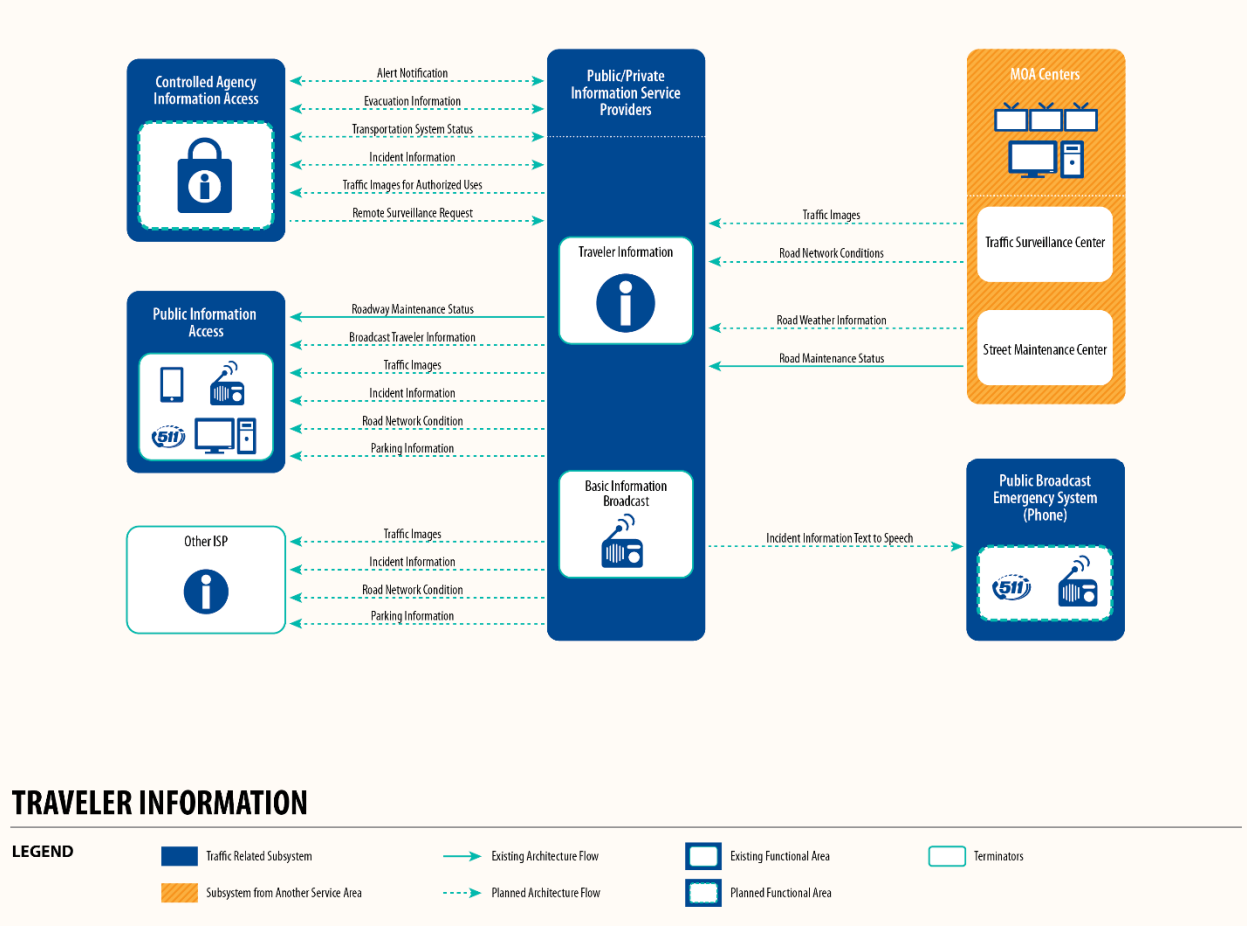


Figure 7. Traveler Information Flow Diagram

A larger version of this flow diagram can be found in Appendix D: Architecture (Data) Flows & Flow Diagrams.

5 Interfaces and Information Exchanges

This chapter provides the interface requirements and information exchanges with planned and existing elements.

5.1 Identification of Interconnects

The regional architecture set of interconnects is an accumulation of all existing and planned connections between ITS elements within the ARIA. At a high level, the interconnect diagram (otherwise known as the 'sausage diagram') displays the regional systems and their connections to one another. Figure 8 presents the sausage diagram for the Anchorage Regional ITS Architecture update, which has been tailored to reflect the planned and existing ITS elements within the Anchorage Region. The white boxes represent planned/existing elements or subsystems for Anchorage; while those that are grayed out are not planned. Out of the possible 22 subsystems, the ARIA update includes 12 subsystems.

The pink rounded rectangles represent the types of communications used to interconnect the elements and subsystems. Each type of communication is listed:

- Field – Vehicle Communications:
  - A wireless communications link that is used between vehicles and infrastructure on the field. The channel is used for close-proximity communications and supports location-specific capabilities such as toll collection, transit vehicle management, driver information, signal pre-emption/priority, and automated commercial vehicle operations.
- Fixed Point – Fixed Point Communications:
  - Also known as FP2FP. This is a communication link that serves stationary subsystems/elements. A variety of public or private communication networks and technologies can be implemented. The network can be made up of twisted pair, coaxial cable, fiber optic, microwave relay networks, spread spectrum, etc. The most important issue of FP2FP is that it serves stationary entities. This link supports both dedicated and shared communication resources.
- Wide Area Wireless (Mobile) Communications:
  - A type of communication link that connects a wireless device between a user and an infrastructure-based system. This is considered a wide area communication link because both broadcast (one-way) and interactive (two-way) communications services are grouped into this category. This link supports a wide range of services in the National ITS Architecture including real-time traveler information and fleet communications.
- Vehicle – Vehicle Communications (not used):
  - A dedicated wireless system that is capable of transferring high data rates with a low probability of error. This link is a type of line of sight communication between vehicles. Advanced vehicle services may use this link in the future to support advanced collision avoidance technologies, road condition information sharing, and active coordination to advanced control systems.

As shown in the diagram in Figure 8, communications are a core part of subsystem and element connections in the architecture. The success of the ITS implementation will be dependent on the continued development and implementation of new communications links in the public realm and shared communications links with privately held systems.

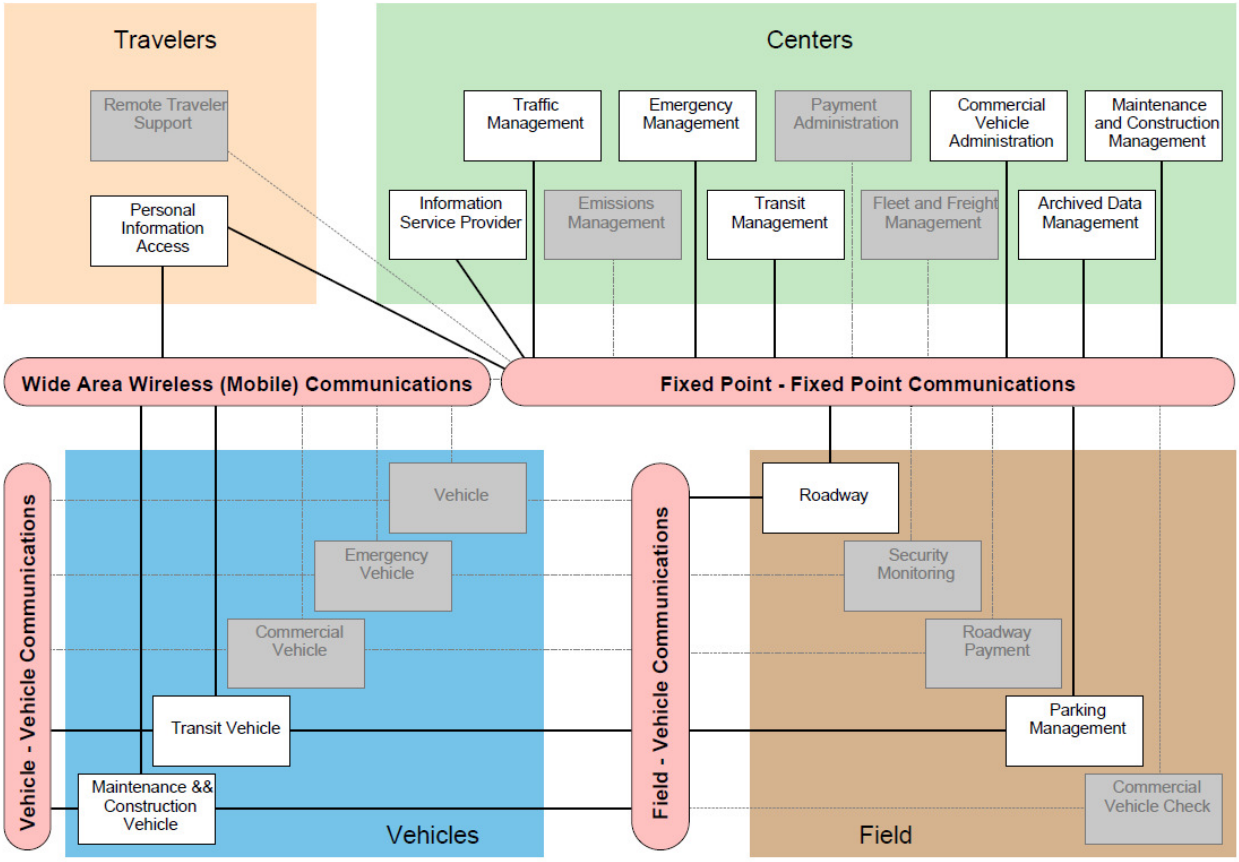


Figure 8. ARIA Interconnect Diagram

5.2 Information Flows

The National ITS architecture defines information flows as the information exchanges and requirements between planned and existing subsystems and terminators in the physical architecture. Information flow and architecture flow are terms that are used interchangeably. Information flows are also the primary tool used to define the ITS architecture interfaces. Each information flow is defined by the source element (where the information originates), a destination element (where the information is sent), and a descriptive name for the flow itself. The status of the information flow (e.g. existing vs. planned) is also documented. For example the flow "traffic images" may have a source element of "Field/ Cameras" and a destination element of "Center/ Cameras." The status would be "existing" for MOA because this flow already exists in the region.

The ARIA update defines all existing and planned flows between ITS elements. A table that presents all of the architecture flows can be found in Appendix D: Architecture (Data) Flows & Flow Diagrams. The flows have been shown graphically in the service area diagrams presented earlier in this report as well as in Appendix D: Architecture (Data) Flows & Flow Diagrams along with the flows in a tabular format as generated from the Turbo Architecture™ database. A glossary of the flow name definitions is also provided in Appendix B: Architecture (Data) Flow Definitions.

6 Standards

Standards are technical specifications that define how system components interconnect and interact. Because ITS standards are based on open, non-proprietary technology, their use can facilitate the deployment of interoperable ITS systems, and make it easier for state and local ITS deployers to develop and deploy regionally integrated transportation systems.

Standards are established by the consensus of manufacturers, regulators, and users to provide guidelines for data interfaces of transportation system components. Essentially, standards allow for different systems to communicate using a common language, data elements, structures, and protocols.

There are currently eight Standards Development Organizations (SDOs) participating in ITS standards development processes:

- AASHTO (American Association of State Highway and Transportation Officials)
- ANSI (American National Standards Institute)
- APTA (American Public Transportation Association)
- ASTM (American Society for Testing and Materials)
- IEEE (Institute of Electrical and Electronics Engineers)
- ITE (Institute of Transportation Engineers)
- NEMA (National Electrical Manufacturers Association)
- SAE (Society of Automotive Engineers)

The life cycle of a standard begins with its publication. The standard is then reviewed and revised until it is ready for approval by the SDO. The standard is then tested over time and refined based on real-world implementation. The standard would then, over time, become broadly adopted by the industry. When a standard becomes widespread, stable, and available from a variety of manufacturers, they are considered mature. Once this occurs, the USDOT will consider the official adoption of the standard. According to Rule 940, if an ITS project receives Federal funds, the project must use applicable standards that have been adopted by USDOT. However, there are no standards that have been officially adopted by the USDOT at the time of this writing.

Currently, there are 86 standards that have been published by SDOs. Standards are continuously being developed and changed as technology continues to evolve and change. This list of standards may change dramatically within the foreseeable future. To see the most up to date list of published standards, please refer to the following link:

http://www.standards.its.dot.gov/DevelopmentActivities/PublishedStandards

Appendix E: Standards presents a table showing which standards are relevant for each architecture flow so that they may be considered in the project design phases. . It is anticipated that many of the standards will eventually be adopted by USDOT and that their use will be made mandatory at some point in the future. Therefore, in the interim, it makes sense to consider using relevant published ITS standards in system design and implementation regardless of the status of USDOT adoption. This approach will facilitate future integration opportunities.

7 Agreements

It is not anticipated that any agreements are required to implement the systems outlined in the ARIA. There is one existing agreement in place that must be maintained to support existing and future traffic signal joint operations between the MOA and the DOT&PF.

7.1 Traffic Signal Memorandum of Agreement

The Traffic Signal Memorandum of Agreement addresses the operations and maintenance of public agency owned traffic signals. There is an agreement between DOT&PF and MOA in which MOA operations and responsibilities extend beyond the municipality owned signals. The MOA signal section has control of all state owned traffic signals with the municipality boundaries. This also includes the monitoring and maintenance of signal pre-emption equipment and operating and maintaining traffic detection systems.

8 Appendix A: Glossary of Terms

This glossary of terms is compiled from the National ITS Architecture website: http://www.iteris.com/itsarch/.

Architecture: A framework within which a system can be built. Requirements dictate what functionality the architecture must satisfy. An architecture functionally defines what the pieces of the system are and the information that is exchanged between them. An architecture is functionally oriented and not technology-specific which allows the architecture to remain effective over time. It defines "what must be done," not "how it will be done."

Architecture Flow: Information that is exchanged between subsystems and terminators in the physical architecture of the National ITS Architecture. Architecture flows are the primary tool that is used to define interfaces in regional ITS architectures and project ITS architectures. Architecture flows and their communication requirements define the interfaces which form the basis for much of the ongoing standards work in the national ITS program. The terms "information flow" and "architecture flow" are used interchangeably.

Architecture Interconnect: Communications paths that carry information between subsystems and terminators in the physical architecture of the National ITS Architecture. Several different types of interconnects are defined in the National ITS Architecture to reflect the range of interface requirements in ITS. The majority of the interconnects are various types of communications links that are defined in the communications layer. Four different types of communications links are defined: Fixed Point - Fixed Point Communications, Wide Area Wireless (Mobile) Communications, Field - Vehicle Communications, and Vehicle - Vehicle Communications. In addition to these types, several specialized interconnects are also defined to reflect other interface requirements. These include human interface (e.g., what the system user sees and hears) and physical/environmental (e.g., what the ITS sensors sense).

Center Subsystems: Subsystems that provide management, administrative, and support functions for the transportation system. The center subsystems each communicate with other centers to enable coordination between modes and across jurisdictions. Some examples of center subsystems are Traffic Management, Transit Management, Commercial Vehicle Administration, Archived Data Management, Emissions Management, Toll Administration, Emergency Management, Information Service Provider, and Fleet and Freight Management. The Center subsystems class is one of four general subsystem classes defined in the National ITS Architecture.

Data Flow: Representations of data flowing between processes or between a process and a terminator in the logical architecture of the National ITS Architecture. A data flow is shown as an arrow on a data flow diagram and is defined in a data dictionary entry in the logical architecture. Data flows are aggregated together to form high-level architecture flows in the physical architecture of the National ITS Architecture.

Element: An ITS system or piece of a system named as the name used by stakeholders. Elements are the basic building blocks of regional ITS architectures and project ITS architectures.

Equipment Package: The building blocks of the subsystems of the physical architecture subsystems. Equipment packages group similar processes of a particular subsystem together into an "implementable" package. The grouping also takes into account the user services and the need to accommodate various levels of functionality. The equipment packages were used as a basis for estimating deployment costs (as part of the evaluation that was performed). Since equipment packages are both the most detailed elements of the physical architecture of the National ITS Architecture and tied to specific service packages, they provide the common link between the interface-oriented architecture definition and the deployment-oriented service packages.

Federal Highway Administration (FHWA): An agency of the United States Department of Transportation. FHWA administers the Federal-aid Highway Program, which provides financial assistance to States to construct and improve highways, urban and rural roads, and bridges. FHWA also administers the Federal Lands Highway Program, which provides access to and within national forests, national parks, Indian Tribal lands, and other public lands. FHWA is headquartered in Washington, DC, with field offices across the country, including one in or near each State capital.

Federal Transit Administration (FTA): An agency of the United States Department of Transportation. FTA is the principal source of Federal financial assistance to America's communities for the planning, development, and improvement of public or mass transportation systems. FTA provides leadership, technical assistance, and financial resources for safe, technologically advanced public transportation that enhances mobility and accessibility, improves the nation's communities and natural environment, and strengthens the national economy. FTA is headquartered in Washington, DC, with regional offices in Atlanta, Boston, Chicago, Dallas, Denver, Kansas City, New York, Philadelphia, San Francisco, and Seattle.

Field Subsystems: Intelligent infrastructure distributed along the transportation network which performs surveillance, information provision, and plan execution control functions and whose operation is governed by center subsystems. Field subsystems also directly interface to vehicle subsystems. The Field subsystems class is one of the four general subsystem classes defined in the National ITS Architecture.

Field – Vehicle Communications: A wireless communications channel used for close-proximity communications between vehicles and the immediate infrastructure. It supports location-specific communications for ITS capabilities such as toll collection, transit vehicle management, driver information, and automated commercial vehicle operations. One of the types of architecture interconnects defined in the National ITS Architecture.

Fixed Point – Fixed Point Communications: A communication link serving stationary entities. It may be implemented using a variety of public or private communication networks and technologies. It can include, but is not limited to, twisted pair, coaxial cable, fiber optic, microwave relay networks, spread spectrum, etc. In Fixed Point - Fixed Point (FP2FP) communication the important issue is that it serves stationary entities. Both dedicated and shared communication resources may be used. One of the types of architecture interconnects defined in the National ITS Architecture.

Field – Vehicle Communications: A wireless communications channel used for close-proximity communications between vehicles and the immediate infrastructure. It supports location-specific communications for ITS capabilities such as toll collection, transit vehicle management, driver information, and automated commercial vehicle operations. One of the types of architecture interconnects defined in the National ITS Architecture.

Functional Requirement: A statement that specifies WHAT a system must do. The statement should use formal "shall" language and specify a function in terms that the stakeholders, particularly the system implementers, will understand. In the National ITS Architecture, functional requirements have been defined for each Equipment Package that focus on the high-level requirements that support regional integration.

Information Flow: Information that is exchanged between subsystems and terminators in the physical architecture of the National ITS Architecture. The terms "information flow" and "architecture flow" are used interchangeably. Information flows are the primary tool that is used to define the ITS architecture interfaces. These information flows and their communication requirements define the interfaces which form the basis for much of the ongoing standards work in the national ITS program.

Intelligent Transportation Systems: The system defined as the electronics, communications or information processing in transportation infrastructure and in vehicles used singly or integrated to improve transportation safety and mobility and enhance productivity. Intelligent transportation systems (ITS) encompass a broad range of wireless and wire line communications-based information and electronics technologies.

Logical Architecture: The part of the National ITS Architecture that defines what has to be done to support the ITS user services. It defines the processes that perform ITS functions and the information or data flows that are shared between these processes. The logical architecture was developed using Structured Analysis techniques and consists of data flow diagrams, process specifications, and data dictionary entries. The logical architecture has also been called an "Essential Model" because it is not technology specific, nor does it dictate a particular implementation. This implementation independence makes the logical architecture accommodating to innovation, scalable from small scale implementations to large regional systems, and supportive of widely varied system designs.

National ITS Architecture: A common, established framework for developing integrated transportation systems. The National ITS Architecture is comprised of the logical architecture and the physical architecture, which satisfy a defined set of user service requirements. The National ITS Architecture is maintained by the United States Department of Transportation (USDOT).

Operational Concept: A component of a regional architecture that identifies the roles and responsibilities of participating agencies and stakeholders. It defines the institutional and technical vision for the region and describes how ITS will work at a very high-level, frequently using operational scenarios as a basis.

Physical Architecture: The part of the National ITS Architecture that provides agencies with a physical representation (though not a detailed design) of the important ITS interfaces and major system components. It provides a high-level structure around the processes and data flows defined in the logical architecture. The principal elements in the physical architecture are the subsystems and architecture flows that connect

these subsystems and terminators into an overall structure. The physical architecture takes the processes identified in the logical architecture and assigns them to subsystems. In addition, the data flows (also from the logical architecture) are grouped together into architecture flows. These architecture flows and their communication requirements define the interfaces required between subsystems, which form the basis for much of the ongoing standards work in the ITS program.

Project ITS Architecture: A framework that identifies the institutional agreement and technical integration necessary to interface a major ITS project with other ITS projects and systems.

Region: The geographical area that identifies the boundaries of the regional ITS architecture and is defined by and based on the needs of the participating agencies and other stakeholders. In metropolitan areas, a region should be no less than the boundaries of the metropolitan planning area.

Regional ITS Architecture: A specific, tailored framework for ensuring institutional agreement and technical integration for the implementation of ITS projects or groups of projects in a particular region. It functionally defines what pieces of the system are linked to others and what information is exchanged between them.

Service Package: The service packages, formerly known as market packages, provide an accessible, service-oriented perspective to the National ITS Architecture. They are tailored to fit, separately or in combination, real world transportation problems and needs. Service packages collect together one or more equipment packages that must work together to deliver a given ITS service and the architecture flows that connect them and other important external systems. In other words, they identify the pieces of the physical architecture that are required to implement a particular ITS service. Service packages are implemented through projects (or groups of projects, aka programs) and in transportation planning, are directly related to ITS strategies used to meet regional goals and objectives.

Stakeholders: A widely used term that notates a public agency, private organization or the traveling public with a vested interest, or a "stake" in one or more transportation elements within a regional ITS architecture or project ITS architecture.

Standards: Documented technical specifications sponsored by a Standards Development Organization (SDO) to be used consistently as rules, guidelines, or definitions of characteristics for the interchange of data. A broad array of ITS standards is currently under development that will specifically define the interfaces identified in the National ITS Architecture.

Subsystem: The principle structural element of the physical architecture of the National ITS Architecture. Subsystems are individual pieces of the Intelligent Transportation System defined by the National ITS Architecture. Subsystems are grouped into four classes: Centers, Field, Vehicles, and Travelers. Example subsystems are the Traffic Management Subsystem, the Vehicle Subsystem, and the Roadway Subsystem. These correspond to the physical world: respectively traffic operations centers, automobiles, and roadside signal controllers. Due to this close correspondence between the physical world and the subsystems, the subsystem interfaces are prime candidates for standardization.

System: A collection of hardware, software, data, processes, and people that work together to achieve a common goal. Note the scope of a "system" depends on one's viewpoint. To a sign manufacturer, a dynamic message sign is a "system". To a state DOT, the same sign is only a component of a larger Freeway Management "System". In a regional ITS architecture or project ITS architecture, a Freeway Management System is a part of the overall surface transportation "system" for the region.

System Inventory: The list of all ITS-related elements in a regional ITS architecture or project ITS architecture.

Terminator: Terminators define the boundary of an architecture. The National ITS Architecture terminators represent the people, systems, and general environment that interface to ITS. The interfaces between terminators and the subsystems and processes within the National ITS Architecture are defined, but no functional requirements are allocated to terminators. The logical architecture and physical architecture of the National ITS Architecture both contain the same set of terminators.

Traveler Subsystem: Equipment used by travelers to access ITS services pre-trip and en-route. This includes equipment that are owned and operated by the traveler as well as equipment that are owned by transportation and information providers. The Traveler subsystems class is one of four general subsystem classes defined in the National ITS Architecture.

Turbo Architecture: An automated software tool used to input and manage system inventory, service packages, architecture flows and interconnects of a regional ITS architecture and/or multiple project ITS architectures.

Vehicle – Vehicle Communications: Dedicated wireless system handling high data rate, low probability of error, line of sight communications between vehicles. Advanced vehicle services may use this link in the future to support advanced collision avoidance implementations, road condition information sharing, and active coordination to advanced control systems. One of the types of architecture interconnects defined in the National ITS Architecture

Vehicle Subsystem: Covers ITS related elements on vehicle platforms. Vehicle subsystems include general driver information and safety systems applicable to all vehicle types. Four fleet vehicle subsystems (Transit, Emergency, Commercial and Maintenance and Construction Vehicles) add ITS capabilities unique to these special vehicle types. The Vehicle subsystems class is one of four general subsystem classes defined in the National ITS Architecture.

Wide Area Wireless (mobile) Communications: A communications link that provides communications via a wireless device between a user and an infrastructure-based system. Both broadcast (one-way) and interactive (two-way) communications services are grouped into wide-area wireless communications in the National ITS Architecture. These links support a range of services in the National ITS Architecture including real-time traveler information and various forms of fleet communications. One of the types of architecture interconnects defined in the National ITS Architecture.

9 Appendix B: Architecture (Data) Flow Definitions

This list of architecture flow definitions is compiled from the National ITS Architecture website: http://www.iteris.com/itsarch/. For more flow definitions, please review the National ITS Architecture website. "User-defined" flows, or flows that were tailored for the ARIA update, are identified as such.

9.1 User-Defined Flows

User-defined flows created in the ARIA update are identified with a period at the beginning and end of each flow name. This makes it easier to find user-defined flows in the Turbo Architecture database because flow names beginning with the period appear at the top when sorted in alphabetical order.

.regional/local roadway environmental conditions.: Current road conditions and surface weather conditions.

.remote surveillance request.: Request to access surveillance equipment such as CCTV to get up-to-date traffic information.

.roadway information (plow status).: Summary of snow plow maintenance operations.

.signal priority request.: Signal priority request for non-transit vehicles such as snow plows and other maintenance vehicles.

9.2 National ITS Architecture Flows

alert notification: Notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction for distribution to the public. The flow identifies the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, and information and instructions necessary for the public to respond to the alert. This flow may also identify specific information that should not be released to the public.

alert status: Information indicating the current status of the emergency alert including identification of the traveler and driver information systems that are being used to provide the alert.

arriving train information: Information for a train approaching a highway-rail intersection that may include direction and allow calculation of approximate arrival time and closure duration.

broadcast traveler information: General traveler information that contains traffic and road conditions, link travel times, incidents, advisories, restrictions, transit service information, weather information, parking information, and other related traveler information.

commercial vehicle archive data: Information describing commercial vehicle travel and commodity flow characteristics. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.

crossing call: Pedestrian request to cross the roadway. This may be an overt (e.g., push button) request from a pedestrian or the physical presence of a pedestrian that can be detected by sensors or surveillance systems.

crossing permission: Signal to pedestrians indicating permission to cross roadway.

demand responsive transit plan: Plan regarding overall demand responsive transit schedules and deployment.

demand responsive transit request: Request for paratransit support.

driver information: Regulatory, warning, and guidance information provided to the driver while en route to support safe and efficient vehicle operation.

emergency archive data: Logged emergency information including information that characterizes identified incidents (routine highway incidents through disasters), corresponding incident response information, evacuation information, surveillance data, threat data, and resource information. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.

emergency plan coordination: Information that supports coordination of emergency management plans, continuity of operations plans, emergency response and recovery plans, evacuation plans, and other emergency plans between agencies. This includes general plans that are coordinated prior to an incident and shorter duration tactical plans that are prepared during an incident.

emergency transit schedule information: Information on transit schedule and service changes that adapt the service to better meet needs of responders and the general public in an emergency situation, including special service schedules supporting evacuation.

emergency transit service request: Request to modify transit service and fare schedules to address emergencies, including requests for transit services to evacuate people from and/or deploy response agency personnel to an emergency scene. The request may poll for resource availability or request pre-staging, staging, or immediate dispatch of transit resources.

emergency transit service response: Response indicating changes to transit service, fares, and/or restrictions that will be made and status of transit resources to be deployed to support emergency response and/or evacuation.

emergency traveler information: Public notification of an emergency such as a natural or man-made disaster, civil emergency, or child abduction. This flow also includes evacuation information including evacuation instructions, evacuation zones, recommended evacuation times, tailored evacuation routes and destinations, traffic and road conditions along the evacuation routes, traveler services and shelter information, and reentry times and instructions.

environmental conditions data: Current road conditions (e.g., surface temperature, subsurface temperature, moisture, icing, treatment status) and surface weather conditions (e.g., air temperature, wind speed, precipitation, visibility) as measured and reported by fixed and/or mobile environmental sensors and aggregated by the data collector. Attributes relating to the data collection (and aggregation) are also included.

environmental sensor data: Current road conditions (e.g., surface temperature, subsurface temperature, moisture, icing, treatment status) and surface weather conditions (e.g., air temperature, wind speed, precipitation, visibility) as measured and reported by fixed and/or mobile environmental sensors. Operational status of the sensors is also included.

evacuation information: Evacuation instructions and information including evacuation zones, evacuation times, and reentry times.

hri control data: Data required for HRI information transmitted at railroad grade crossings and within railroad operations.

hri operational status: Status of the highway-rail grade crossing equipment including both the current state or mode of operation and the current equipment condition.

hri request: A request for highway-rail intersection status or a specific control request intended to modify HRI operation.

hri status: Status of the highway-rail intersection equipment including both the current state or mode of operation and the current equipment condition.

incident information: Notification of existence of incident and expected severity, location, time and nature of incident. As additional information is gathered and the incident evolves, updated incident information is provided. Incidents include any event that impacts transportation system operation ranging from routine incidents (e.g., disabled vehicle at the side of the road) through large-scale natural or human-caused disasters that involve loss of life, injuries, extensive property damage, and multi-jurisdictional response. This also includes special events, closures, and other planned events that may impact the transportation system.

incident response status: Status of the current incident response including a summary of incident status and its impact on the transportation system, traffic management strategies implemented at the site (e.g., closures, diversions, traffic signal control overrides), and current and planned response activities.

intersection blockage notification: Notification that a highway-rail intersection is obstructed and supporting information.

local signal priority request: Request from a vehicle to a signalized intersection for priority at that intersection.

maint and constr dispatch information: Information used to dispatch maintenance and construction vehicles, equipment, and crews and information used to keep work zone crews informed. This information includes routing information, traffic information, road restrictions, incident information, environmental information, decision support information, maintenance schedule data, dispatch instructions, personnel assignments, alert notifications, and corrective actions.

maint and constr dispatch status: Current maintenance and construction status including work data, operator status, crew status, and equipment status.

maint and constr vehicle location data: The current location and related status (e.g., direction and speed) of the maintenance/construction vehicle.

maint and constr vehicle operational data: Data that describes the maintenance and construction activity performed by the vehicle. Operational data includes materials usage (amount stored and current application rate), operational state of the maintenance equipment (e.g., blade up/down, spreader pattern), vehicle safety status, and other measures associated with the operation of a maintenance, construction, or other special purpose vehicle. Operational data may include basic operational status of the vehicle equipment or a more precise record of the work performed (e.g., application of crack sealant with precise locations and application characteristics).

maint and constr work plans: Future construction and maintenance work schedules and activities including anticipated closures with anticipated impact to the roadway, alternate routes, anticipated delays, closure times, and durations.

map update request: Request for a map update which could include a new underlying map or map layer updates.

map updates: Map update which could include a new underlying static or real-time map or map layer(s) update.

parking information: General parking information and status, including current parking availability.

qualified environmental conditions data: Current road conditions (e.g., surface temperature, subsurface temperature, moisture, icing, treatment status) and surface weather conditions (e.g., air temperature, wind speed, precipitation, visibility) that has had quality checks performed on it and has been formatted and consolidated by the Clarus system. Attributes relating to the data collection (and aggregation) are also included.

right-of-way request notification: Notice that a request has occurred for signal prioritization, signal preemption, pedestrian call, multi-modal crossing activation, or other source for right-of-way.

road network conditions: Current and forecasted traffic information, road and weather conditions, and other road network status. Either raw data, processed data, or some combination of both may be provided by this architecture flow. Information on diversions and alternate routes, closures, and special traffic restrictions (lane/shoulder use, weight restrictions, width restrictions, HOV requirements) in effect is included along with a definition of the links, nodes, and routes that make up the road network.

road network traffic probe data: Aggregated route usage, travel times, and other aggregated data collected from probe vehicles that can be used to estimate current traffic conditions.

road weather information: Road conditions and weather information that are made available by road maintenance operations to other transportation system operators.

roadway equipment coordination: The direct flow of information between field equipment. This includes transfer of information between sensors and driver information systems (e.g., DMS, HAR, variable speed limit signs, dynamic lane signs) or control devices (e.g., traffic signals, ramp meters), direct coordination between adjacent control devices, interfaces between detection and warning or alarm systems, and any other direct communications between field equipment.

roadway information system data: Information used to initialize, configure, and control roadside systems that provide driver information (e.g., dynamic message signs, highway advisory radio, beacon systems). This flow can provide message content and delivery attributes, local message store maintenance requests, control mode commands, status queries, and all other commands and associated parameters that support remote management of these systems.

roadway information system status: Current operating status of dynamic message signs, highway advisory radios, beacon systems, or other configurable field equipment that provides dynamic information to the driver.

roadway maintenance status: Summary of maintenance fleet operations affecting the road network. This includes the status of winter maintenance (snow plow schedule and current status).

secure area surveillance data: Data collected from surveillance systems used to monitor secure areas. Includes video, audio, processed surveillance data, equipment operational status, and alarm indicators when a threat has been detected.

selected routes: Routes selected based on route request criteria.

signal control commands: Control of traffic signal controllers or field masters including clock synchronization.

signal control data: Information used to configure local traffic signal controllers.

signal control device configuration: Data used to configure traffic signal control equipment including local controllers and system masters.

signal control plans: Traffic signal timing parameters including minimum green time and interval durations for basic operation and cycle length, splits, offset, phase sequence, etc. for coordinated systems.

signal control status: Operational and status data of traffic signal control equipment including operating condition and current indications.

signal fault data: Faults from traffic signal control equipment.

signal system configuration: Data used to configure traffic signal systems including configuring control sections and mode of operation (time based or traffic responsive).

threat information: Threats regarding transportation infrastructure, facilities, or systems detected by a variety of methods (sensors, surveillance, threat analysis of advisories from outside agencies, etc.

track status: Current status of the wayside equipment and notification of an arriving train.

traffic archive data: Information describing the use and vehicle composition on transportation facilities and the traffic control strategies employed. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.

traffic flow: Raw and/or processed traffic detector data which allows derivation of traffic flow variables (e.g., speed, volume, and density measures) and associated information (e.g., congestion, potential incidents). This flow includes the traffic data and the operational status of the traffic detectors.

traffic images: High fidelity, real-time traffic images suitable for surveillance monitoring by the operator or for use in machine vision applications.

traffic operator data: Presentation of traffic operations data to the operator including traffic conditions, current operating status of field equipment, maintenance activity status, incident status, video images, security alerts, emergency response plan updates and other information. This data keeps the operator appraised of current road network status, provides feedback to the operator as traffic control actions are implemented, provides transportation security inputs, and supports review of historical data and preparation for future traffic operations activities.

traffic operator inputs: User input from traffic operations personnel including requests for information, configuration changes, commands to adjust current traffic control strategies (e.g., adjust signal timing plans, change DMS messages), and other traffic operations data entry.

traffic probe data: Vehicle data that is used to determine traffic conditions. In a basic implementation, the data could be limited to time stamped unique identifiers that can be used to measure a vehicle's progress through the network. In more advanced implementations, the vehicle may report current position, speed, and heading and snapshots of recent events including route information, starts and stops, speed changes, and other information that can be used to estimate traffic conditions.

traffic probe reporting management: Data used to manage probe data reporting by vehicles. This flow indicates to the vehicle when to report probe data, the type of probe data to send, and thresholds for nominal conditions when sending data can be skipped.

traffic sensor control: Information used to configure and control traffic sensor systems.

transit and fare schedules: Transit service information including routes, schedules, and fare information.

transit archive data: Data used to describe and monitor transit demand, fares, operations, and system performance. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.

transit emergency data: Initial notification of transit emergency at a transit stop or on transit vehicles and further coordination as additional details become available and the response is coordinated.

transit incident information: Information on transit incidents that impact transit services for public dissemination.

transit information request: Request for transit operations information including schedule and fare information. The request can be a subscription that initiates as-needed information updates as well as a one-time request for information.

transit schedule adherence information: Dynamic transit schedule adherence and transit vehicle location information.

transit service information: Transit service information including routes, schedules, and fare information as well as dynamic transit schedule adherence and transit vehicle location information.

transit system status assessment: Assessment of damage sustained by the public transportation system including location and extent of the damage, current operational status including an estimate of remaining capacity and necessary restrictions, and time frame for repair and recovery.

transportation system status: Current status and condition of transportation infrastructure (e.g., tunnels, bridges, interchanges, TMC offices, maintenance facilities). In case of disaster or major incident, this flow provides an assessment of damage sustained by the surface transportation system including location and extent of the damage, estimate of remaining capacity and necessary restrictions, and time frame for repair and recovery.

video surveillance control: Information used to configure and control video surveillance systems.

weather archive data: Accumulated forecasted and current weather data (e.g., temperature, pressure, wind speed, wind direction, humidity, precipitation, visibility, light conditions, etc.) as well as qualified environmental sensor data. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.

weather information: Accumulated forecasted and current weather data (e.g., temperature, pressure, wind speed, wind direction, humidity, precipitation, visibility, light conditions, etc.).

work zone information: Summary of maintenance and construction work zone activities affecting the road network including the nature of the maintenance or construction activity, location, impact to the roadway, expected time(s) and duration of impact, anticipated delays, alternate routes, and suggested speed limits. This information may be augmented with images that provide a visual indication of current work zone status and traffic impacts.

10 Appendix C: Functional Requirements

This appendix presents the functional requirements of the ARIA update. Functional requirements are high-level descriptions of what each ITS element is supposed to do in a service area. Essentially, it outlines the required tasks of each element to support the ITS services that area is supposed to provide. They also contain the high-level status (e.g. existing or planned) of each element. They are not detailed design requirements.

Functional requirements presented in this section act more like a list of options or capabilities that a user may select from for their projects, but are not required to. For example, users can use these functional requirements as a starting point for projects that do not have a Concept of Operations developed yet.

The functional requirement tables are organized by element/subsystem name in each service area. Each element is then organized by functional areas that each requirement falls under. A functional area in Turbo Architecture™ is a grouping of related functional requirements. The tables are sorted by the proposed service areas.

Each of the functional requirements are consistent with the National ITS Architecture. The information found in these tables is also found in the ARIA update Turbo Architecture™ database.

10.1 Archive Data Services Functional Requirements

Table 6. Archive Data Services Functional Requirements

Element Name	Functional Area	Requirement	Status
Center/ ADOTPF	Traffic Data Collection	The center shall collect traffic management data such as operational data, event logs, etc.	Planned
Center/ ADOTPF	Traffic Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.	Planned
Center/ APD Headquarters and Dispatch	Emergency Data Collection	The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.	Planned
Center/ APD Headquarters and Dispatch	Emergency Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the emergency management data or for the data itself.	Planned
Center/ GIS Update Provider			
Center/ MOA Archive Data Services	ITS Data Repository	The center shall collect data to be archived from one or more data sources.	Planned
Center/ MOA Archive Data Services	ITS Data Repository	The center shall store the archived data in a focused repository that is suited to a particular set of ITS data users.	Planned
Center/ MOA Archive Data Services	ITS Data Repository	The center shall include capabilities for archive to archive coordination.	Planned
Center/ MOA Archive Data Services	ITS Data Repository	The center shall provide the capability to execute methods on the incoming data such as cleansing, summarizations, aggregations, or transformations applied to the data before it is stored in the archive.	Planned
Center/ MOA Archive Data Services	ITS Data Repository	The center shall respond to requests from the administrator interface function to maintain the archive data.	Planned
Center/ MOA Archive Data Services	ITS Data Repository	When data or a catalog of data is received from the archive, the center shall generate the requested data product for the users systems.	Planned
Center/ MOA Archive Data Services	Virtual Data Warehouse Services	The center shall provide capabilities to access "in-place" data from geographically dispersed archives. These capabilities may include analysis, data fusion, or data mining.	Planned

Element Name	Functional Area	Requirement	Status
Center/ MOA Archive Data Services	Virtual Data Warehouse Services	The center shall coordinate information exchange with a local data warehouse.	Planned
Center/ MOA Public Works	MCM Data Collection	The center shall collect maintenance and construction data (such as field equipment status, infrastructure status, maintenance and construction activity data) gathered from roadway, traffic, and other maintenance and construction sources.	Planned
Center/ MOA Public Works	MCM Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the maintenance and construction data or for the data itself.	Planned
Center/ MOA Public Works	MCM Winter Maintenance Management	The center shall collect real-time information on the state of the regional transportation system from other centers including current traffic and road conditions, weather conditions, special event and incident information and use the collected information to support winter maintenance operations.	Planned
Center/ MOA Signal Control	Traffic Data Collection	The center shall collect traffic management data such as operational data, event logs, etc.	Planned
Center/ MOA Signal Control	Traffic Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.	Planned
Center/ MSCVE Headquarters	CV Data Collection	The center shall receive operational data from the roadside check systems as well as administration and credentials data.	Planned
Center/ MSCVE Headquarters	CV Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the commercial vehicle operations data or for the data itself.	Planned
Center/ National Weather Service Offices	ISP Data Collection	The center shall collect traveler information data, such as parking lot data, rideshare data, road network use data, vehicle probe data, and other data from traveler information system operations.	Planned
Center/ National Weather Service Offices	ISP Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the traveler information data or for the data itself.	Planned
Center/ Transit Agency Dispatch (Placeholder)	Transit Data Collection	The center shall collect transit management data such as transit fares and passenger use, transit services, paratransit operations, transit vehicle maintenance data, etc.	Planned
Center/ Transit Agency Dispatch (Placeholder)	Transit Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the transit data or for the data itself.	Planned

10.2 Arterial Management Functional Requirements

Table 7. Arterial Management Functional Requirements

Element Name	Functional Area	Requirement	Status
Center/ Cameras	Collect Traffic Surveillance	The center shall maintain a database of surveillance equipment and sensors and associated data (including the roadway on which they are located, the type of data collected, and the ownership of each)	Existing
Center/ Cameras	Collect Traffic Surveillance	The center shall monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center.	Planned
Center/ Cameras	Collect Traffic Surveillance	The center shall distribute road network conditions data (raw or processed) based on collected and analyzed traffic sensor and surveillance data to other centers.	Planned
Center/ MOA Archive Data Services	ITS Data Repository	The center shall collect data to be archived from one or more data sources.	Planned
Center/ MOA Signal Control	HRI Traffic Management	The center shall collect incident information related to a highway-rail intersection (HRI), such as intersection blockages or crashes or equipment malfunctions.	Planned
Center/ MOA Signal Control	HRI Traffic Management	The center shall implement control plans to coordinate signalized intersections around highway-rail intersections (HRI), under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, equipment faults, pedestrian crossings, etc.	Planned
Center/ MOA Signal Control	TMC Probe Information Collection	The center shall collect traffic probe data from vehicles via roadside field equipment.	Planned
Center/ MOA Signal Control	TMC Probe Information Collection	The center shall collect traffic data from traveler information centers based on data from their subscriber vehicles; the data may be aggregated and initial link time calculations performed at the sending center.	Planned
Center/ MOA Signal Control	TMC Probe Information Collection	The center shall assimilate current and forecast traffic conditions based on collected probe data and distribute to other centers for dissemination to travelers.	Planned
Center/ MOA Signal Control	TMC Signal Control	The center shall remotely control traffic signal controllers.	Existing
Center/ MOA Signal Control	TMC Signal Control	The center shall collect traffic signal controller operational status and compare against the control information sent by the center.	Existing
Center/ MOA Signal Control	TMC Signal Control	The center shall collect traffic signal controller fault data from the field.	Existing
Center/ MOA Signal Control	TMC Signal Control	The center shall manage (define, store and modify) control plans to coordinate signalized intersections, to be engaged at the direction of center personnel or according to a daily schedule.	Planned
Center/ MOA Signal Control	TMC Transportation Operations Data Collection	The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	Planned

Element Name	Functional Area	Requirement	Status
Center/ MOA Signal Control	TMC Transportation Operations Data Collection	The center shall support the capability for the system operator to monitor and control the information collection service.	Planned
Center/ MOA Signal Control	Traffic Data Collection	The center shall collect traffic management data such as operational data, event logs, etc.	Existing
Center/ MOA Signal Control	Traffic Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.	Planned
Center/ Traffic Information Dissemination (ADOTPF)	TMC Traffic Information Dissemination	The center shall remotely control dynamic messages signs for dissemination of traffic and other information to drivers.	Planned
Center/ Traffic Information Dissemination (ADOTPF)	TMC Traffic Information Dissemination	The center shall collect operational status for the driver information systems equipment (DMS, HAR, etc.).	Planned
Center/ Traffic Information Dissemination (MOA)	TMC Traffic Information Dissemination	The center shall remotely control dynamic messages signs for dissemination of traffic and other information to drivers.	Planned
Center/ Traffic Information Dissemination (MOA)	TMC Traffic Information Dissemination	The center shall collect operational status for the driver information systems equipment (DMS, HAR, etc.).	Planned
Center/ Traffic Information Dissemination (MOA)	TMC Traffic Information Dissemination	The center shall retrieve locally stored traffic information, including current and forecasted traffic information, road and weather conditions, traffic incident information, information on diversions and alternate routes, closures, and special traffic restrictions (lane/shoulder use, weight restrictions, width restrictions, HOV requirements), and the definition of the road network itself.	Planned
Center/ Traffic Operations Personnel			
Center/ Traveler Information	ISP Data Collection	The center shall collect traveler information data, such as parking lot data, rideshare data, road network use data, vehicle probe data, and other data from traveler information system operations.	Planned
Center/ Traveler Information	ISP Probe Information Collection	The center shall collect traffic probe data (speeds, travel times, etc.) from appropriately equipped vehicles and short range communications equipment.	Planned
Center/ Traveler Information	ISP Probe Information Collection	The center shall aggregate collected traffic probe data, calculate route segment travel times, route segment speeds, and route usage, and disseminate to other centers.	Planned
Field/ Cameras	Roadway Basic Surveillance	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.	Existing

Element Name	Functional Area	Requirement	Status
Field/ Cameras	Roadway Basic Surveillance	The field element shall return sensor and CCTV system operational status to the controlling center.	Existing
Field/ Cameras	Roadway Basic Surveillance	The field element shall return sensor and CCTV system fault data to the controlling center for repair.	Existing
Field/ Permanent Dynamic Message Signs (ADOTPF)	Roadway Traffic Information Dissemination	The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center control; the DMS may be either those that display variable text messages, or those that have fixed format display(s) (e.g. vehicle restrictions, or lane open/close).	Existing
Field/ Permanent Dynamic Message Signs (ADOTPF)	Roadway Traffic Information Dissemination	The field element shall provide operational status for the driver information systems equipment (DMS, HAR, etc.) to the center.	Existing
Field/ Permanent Dynamic Message Signs (MOA)	Roadway Traffic Information Dissemination	The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center control; the DMS may be either those that display variable text messages, or those that have fixed format display(s) (e.g. vehicle restrictions, or lane open/close).	Planned
Field/ Permanent Dynamic Message Signs (MOA)	Roadway Traffic Information Dissemination	The field element shall provide operational status for the driver information systems equipment (DMS, HAR, etc.) to the center.	Planned
Field/ Pre-emption and Priority Systems	Roadway Equipment Coordination	The field element shall include devices that provide data and status information to other field element devices without center control.	Planned
Field/ Pre-emption and Priority Systems	Roadway Equipment Coordination	The field element shall include devices that receive configuration data from other field element devices, without center control.	Planned
Field/ Pre-emption and Priority Systems	Roadway Signal Preemption	The field element shall respond to signal preemption requests from emergency vehicles.	Planned
Field/ Pre-emption and Priority Systems	Roadway Signal Priority	The field element shall notify controlling traffic management center and maintenance center that the signal timing has changed based on a signal preemption/priority request to help those centers determine whether a fault detected at the signal is a true malfunction or due to a signal override.	Existing
Field/ Pre-emption and Priority Systems	Roadway Signal Priority	The field element shall respond to signal priority requests from transit vehicles.	Planned
Field/ Rail Wayside Equipment			
Field/ Traffic Detectors	Advanced Rail Crossing	The field element shall collect and process, traffic sensor data in the vicinity of a highway-rail intersection (HRI).	Planned
Field/ Traffic Detectors	Advanced Rail Crossing	The field element shall determine whether the highway-rail intersection (HRI) is blocked by traffic in the roadway or some other obstruction.	Planned
Field/ Traffic Detectors	Advanced Rail Crossing	The field element shall notify the traffic management center and the rail wayside equipment of any intersection blockages, including trapped vehicles or other obstructions.	Planned

Element Name	Functional Area	Requirement	Status
Field/ Traffic Detectors	Advanced Rail Crossing	The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the traffic management center.	Planned
Field/ Traffic Detectors	Advanced Rail Crossing	The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the rail wayside equipment.	Planned
Field/ Traffic Detectors	Advanced Rail Crossing	The field element shall receive track status and arriving train information from the rail wayside equipment that can be passed on to the traffic management center. This may include the current status of the tracks and when a train is expected and/or how long the crossing will be closed.	Planned
Field/ Traffic Detectors	Roadway Equipment Coordination	The field element shall include sensors that provide data and status information to other field element devices, without center control.	Existing
Field/ Traffic Detectors	Roadway Probe Data Communications	The field element shall communicate with passing vehicles for traffic data link time calculations and send collected data to the controlling center; identification will be removed to ensure anonymity.	Planned
Field/ Traffic Detectors	Roadway Probe Data Communications	The field element shall communicate with on-board equipment on passing vehicles to collect current vehicle position, speed, and heading and a record of previous events (e.g., starts and stops, link travel times) that can be used to determine current traffic conditions.	Planned
Field/ Traffic Detectors	Roadway Probe Data Communications	The field element shall aggregate and forward collected probe information to the center.	Planned
Field/ Traffic Signal Controllers	Advanced Rail Crossing	The field element shall collect and process, traffic sensor data in the vicinity of a highway-rail intersection (HRI).	Planned
Field/ Traffic Signal Controllers	Advanced Rail Crossing	The field element shall support the integrated control of adjacent traffic signals to clear an area in advance of an approaching train and to manage traffic around the intersection.	Planned
Field/ Traffic Signal Controllers	Roadway Equipment Coordination	The field element shall include devices that receive configuration data from other field element devices, without center control.	Planned
Field/ Traffic Signal Controllers	Roadway Signal Controls	The field element shall control traffic signals under center control.	Existing
Field/ Traffic Signal Controllers	Roadway Signal Controls	The field element shall respond to pedestrian crossing requests by accommodating the pedestrian crossing.	Existing
Field/ Traffic Signal Controllers	Roadway Signal Controls	The field element shall report the current signal control information to the center.	Existing
Field/ Traffic Signal Controllers	Roadway Signal Controls	The field element shall return traffic signal controller operational status to the center.	Existing
Field/ Traffic Signal Controllers	Roadway Signal Controls	The field element shall return traffic signal controller fault data to the center.	Existing
Travelers/ Driver			
Travelers/ Pedestrian			

Element Name	Functional Area	Requirement	Status
Vehicle/ General Public Vehicles			
Vehicle/ Maintenance Vehicle On-board Systems (MOA)	MCV Roadway Maintenance and Construction	The maintenance vehicle shall send priority requests to traffic signal controllers at intersections, pedestrian crossings, and multimodal crossings on the roads (surface streets) and freeway (ramp controls) network that enable a maintenance vehicle schedule deviation to be corrected.	Planned
Vehicle/ Transit Vehicle On-board Systems (Placeholder)	On-board Transit Signal Priority	The transit vehicle shall send priority requests to traffic signal controllers at intersections, pedestrian crossings, and multimodal crossings on the roads (surface streets) and freeway (ramp controls) network that enable a transit vehicle schedule deviation to be corrected.	Planned

10.3 Roadway Maintenance & Construction Functional Requirements

Table 8. Roadway Maintenance & Construction Functional Requirements

Element Name	Functional Area	Requirement	Status
Center/ MOA Archive Data Services	ISP Operational Data Repository	The center shall select real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, transit information, parking information, special event and incident information.	Planned
Center/ MOA Archive Data Services	ITS Data Repository	The center shall collect data to be archived from one or more data sources.	Planned
Center/ MOA Archive Data Services	ITS Data Repository	The center shall store the archived data in a focused repository that is suited to a particular set of ITS data users.	Planned
Center/ MOA Maintenance Dispatch Office	MCM Data Collection	The center shall collect maintenance and construction data (such as field equipment status, infrastructure status, maintenance and construction activity data) gathered from roadway, traffic, and other maintenance and construction sources.	Existing
Center/ MOA Maintenance Dispatch Office	MCM Data Collection	The center shall receive and respond to requests from ITS Archives for either a catalog of the maintenance and construction data or for the data itself.	Existing
Center/ MOA Maintenance Dispatch Office	MCM Data Collection	The center shall be able to produce sample products of the data available.	Existing
Center/ MOA Maintenance Dispatch Office	MCM Environmental Information Collection	The center shall provide weather and road condition information to weather service providers and center personnel.	Planned
Center/ MOA Maintenance Dispatch Office	MCM Environmental Information Processing	The center shall disseminate current and forecasted road weather and road condition information to weather service providers (such as the National Weather Service and value-added sector specific meteorological services) as well as other agencies including traffic, emergency, and transit management, traveler information providers, rail operations centers, media, and other maintenance management centers.	Planned
Center/ MOA Maintenance Dispatch Office	MCM Vehicle Tracking	The center shall monitor the locations of all maintenance and construction vehicles and other equipment under its jurisdiction.	Existing
Center/ MOA Maintenance Dispatch Office	MCM Winter Maintenance Management	The center shall respond to requests from emergency management and traffic management centers for hazard removal, field equipment repair, and other winter roadway maintenance.	Existing

Element Name	Functional Area	Requirement	Status
Center/ MOA Maintenance Dispatch Office	MCM Winter Maintenance Management	The center shall exchange information with administrative systems to support the planning and scheduling of winter maintenance activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Existing
Center/ MOA Maintenance Dispatch Office	MCM Winter Maintenance Management	The center shall provide status information about scheduled winter maintenance activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations. The information is provided to other management centers such as traffic, emergency, transit, traveler information providers, other maintenance centers, and the media.	Existing
Center/ MOA Maintenance Dispatch Office	MCM Winter Maintenance Management	The center shall dispatch and route winter maintenance vehicle drivers and support them with route-specific environmental, incident, advisory, threat, alert, and traffic congestion information.	Existing
Center/ MOA Maintenance Dispatch Office	MCM Winter Maintenance Management	The center shall determine the need for roadway treatment based on current and forecasted weather information, current usage of treatments and materials, available resources, requests for action from other agencies, and recommendations from the Maintenance Decision Support system, specifically under winter conditions. This supports winter maintenance such as plowing, treating, anti-icing, etc.	Existing
Center/ MOA Maintenance Dispatch Office	MCM Winter Maintenance Management	The center shall provide dispatch instructions for vehicle operators based on input parameters from center personnel, specifically for winter conditions. This could include a treatment route, treatment application rates, start and end times, and other treatment instructions.	Existing
Center/ MOA Maintenance Dispatch Office	MCM Work Zone Management	The center shall generate new work zone activity schedules for use by maintenance and construction vehicles, maintenance and construction operators, and for information coordination purposes.	Existing
Center/ MOA Maintenance Dispatch Office	MCM Work Zone Management	The center shall control the collection of work zone status information including video images from cameras located in or near the work zone.	Existing
Center/ MOA Maintenance Dispatch Office	MCM Work Zone Management	The center shall disseminate work zone information to other agencies and centers including traffic, transit, emergency management centers, other maintenance centers, traveler information providers, and the media.	Existing
Center/ National Weather Service Offices	Basic Information Broadcast	The center shall disseminate weather information to travelers.	Existing
Center/ National Weather Service Offices	ISP Operational Data Repository	The center shall select real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, transit information, parking information, special event and incident information.	Existing
Center/ National Weather Service Offices	ISP Operational Data Repository	The center shall distribute real-time transportation operations data to centers in the region. The data may be broadcast or customized based on the receiving center's specified requests or subscriptions.	Existing

Element Name	Functional Area	Requirement	Status
Center/ Traveler Information	Center Secure Area Surveillance	The center shall exchange traveler images with other emergency management centers to support traveler image matching.	Planned
Center/ Traveler Information	ISP Traveler Data Collection	The center shall collect, process, and store current and forecast road conditions and surface weather conditions.	Planned
Field/ Pre-emption and Priority Systems	Roadway Signal Priority	The field element shall respond to signal priority requests from transit vehicles.	Planned
Field/ Road Weather Information Systems (RWIS)	Roadway Basic Surveillance	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.	Existing
Field/ Road Weather Information Systems (RWIS)	Roadway Environmental Monitoring	The field element shall provide weather and road surface condition data to centers.	Existing
Vehicle/ Maintenance Vehicle On-board Systems (MOA)	MCV Roadway Maintenance and Construction	The maintenance and construction vehicle shall respond to dispatch information from the center, presented to the vehicle operator for acknowledgement and returning status.	Existing
Vehicle/ Maintenance Vehicle On-board Systems (MOA)	MCV Roadway Maintenance and Construction	The maintenance and construction vehicle shall send operational data to the center including the operational state of the maintenance equipment (e.g., blade up/down, spreader pattern), types and quantities of materials used for construction and maintenance activities, and a record of the actual work performed.	Existing
Vehicle/ Maintenance Vehicle On-board Systems (MOA)	MCV Vehicle Location Tracking	The maintenance and construction vehicle shall track its current location.	Existing
Vehicle/ Maintenance Vehicle On-board Systems (MOA)	MCV Vehicle Location Tracking	The maintenance and construction vehicle shall send the time stamped vehicle location to the controlling center.	Existing

10.4 Transit Operations Functional Requirements

Transit Operations functional requirements summarized in Table 9 reflect the external operations highlighted in the service area. Some of these requirements are "existing" in regards to internal operations. However, this service area focuses on the external flows with outside agencies and departments and these requirements reflect those proposed connections.

Table 9. Transit Operations Functional Requirements

Element Name	Functional Area	Requirement	Status
Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Transit Center Fare Management	The center shall be capable of establishing emergency fare structures to override all other fares during disasters, states of emergency, or evacuations.	Planned
Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Transit Center Fare Management	The center shall exchange fare and load information with other transit management centers, including potential Centralized Payments facilities.	Planned
Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Transit Center Fare Management	The center shall provide transit fare information to other centers, including traveler information providers upon request.	Planned
Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Transit Center Fixed-Route Operations	The center shall generate transit routes and schedules based on such factors as parameters input by the system operator, road network conditions, incident information, operational data on current routes and schedules, and digitized map data.	Planned
Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Transit Center Fixed-Route Operations	The center shall be able to generate special routes and schedules to support an incident, disaster, evacuation, or other emergency.	Planned
Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Transit Center Fixed-Route Operations	The center shall disseminate up-to-date schedules and route information to other centers for fixed and flexible route services.	Planned

Element Name	Functional Area	Requirement	Status
Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Transit Center Information Services	The center shall provide travelers using public transportation with traffic and advisory information upon request. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.	Planned
Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Transit Center Information Services	The center shall provide transit information to the media including details of deviations from schedule of regular transit services.	Planned
Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Transit Center Information Services	The center shall provide transit service information to traveler information service providers including routes, schedules, schedule adherence, and fare information as well as transit service information during evacuation.	Planned
Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Transit Center Paratransit Operations	The center shall disseminate up-to-date schedules and route information to other centers for demand responsive transit services (paratransit).	Planned
Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Transit Center Paratransit Operations	The center shall process trip requests for demand responsive transit services, i.e. paratransit. Sources of the requests may include traveler information service providers.	Planned
Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Transit Center Paratransit Operations	The center shall generate demand response transit (including paratransit) routes and schedules based on such factors as parameters input by the system operator, what other demand responsive transit schedules have been planned, the availability and location of vehicles, the relevance of any fixed transit routes and schedules, road network information, and incident information.	Planned
Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Transit Data Collection	The center shall collect transit management data such as transit fares and passenger use, transit services, paratransit operations, transit vehicle maintenance data, etc.	Planned

Element Name	Functional Area	Requirement	Status
Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Transit Evacuation Support	The center shall manage the use of transit resources to support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency.	Planned
Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Transit Evacuation Support	The center shall coordinate regional evacuation plans with Emergency Management - identifying the transit role in an evacuation and the transit resources that would be used.	Planned
Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Transit Evacuation Support	The center shall adjust and update transit service and fare schedules and provide that information to other agencies as they coordinate evacuations.	Planned
Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The data may be raw or pre-processed in the field.	Planned
Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Center Secure Area Surveillance	The center shall remotely monitor video images and audio surveillance data collected on-board transit vehicles. The data may be raw or pre-processed in the field.	Planned
Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Center Secure Area Surveillance	The center shall identify potential security threats based on collected security surveillance data.	Planned
Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Center Secure Area Surveillance	The center shall verify potential security threats by correlating security surveillance data from multiple sources.	Planned
Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Emergency Early Warning System	The center shall process status information from each of the centers that have been sent the wide-area alert.	Planned
Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Emergency Early Warning System	The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.	Planned
Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Emergency Early Warning System	The center shall broadcast wide-area alerts and advisories to traffic management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Planned

Element Name	Functional Area	Requirement	Status
Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Emergency Evacuation Support	The center shall develop and exchange evacuation plans with allied agencies prior to the occurrence of a disaster.	Planned
Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Emergency Evacuation Support	The center shall provide evacuation information to traffic, transit, maintenance and construction, rail operations, and other emergency management centers as needed.	Planned
Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Emergency Evacuation Support	The center shall request resources from transit agencies as needed to support the evacuation.	Planned
Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Emergency Evacuation Support	The center shall monitor the progress or status of the evacuation once it begins and exchange tactical plans, prepared during the incident, with allied agencies.	Planned
Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Emergency Response Management	The center shall manage coordinated inter-agency responses to and recovery from large-scale emergencies. Such agencies include traffic management, transit, maintenance and construction management, rail operations, and other emergency management agencies.	Planned
Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Emergency Response Management	The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.	Planned
Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Emergency Response Management	The center shall develop, coordinate with other agencies, and store emergency response plans.	Planned
Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Emergency Response Management	The center shall receive event scheduling information from Event Promoters.	Planned
Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Emergency Response Management	The center shall provide the capability to request transit resource availability from transit centers for use during disaster and evacuation operations.	Planned
Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Emergency Response Management	The center shall provide the overall status of infrastructure recovery efforts to traveler information providers and media.	Planned
Center/ National Weather Service Offices	Basic Information Broadcast	The center shall disseminate weather information to travelers.	Existing
Center/ National Weather Service Offices	ISP Operational Data Repository	The center shall select real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, transit information, parking information, special event and incident information.	Existing

Element Name	Functional Area	Requirement	Status
Center/ Transit Agency Websites	Basic Information Broadcast	The center shall disseminate traffic and highway condition information to travelers, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.	Planned
Center/ Transit Agency Websites	Basic Information Broadcast	The center shall disseminate transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information to travelers.	Planned
Center/ Transit Agency Websites	Basic Information Broadcast	The center shall disseminate parking information to travelers, including location, availability, and fees.	Planned
Center/ Transit Agency Websites	Infrastructure Provided Trip Planning	The center shall provide the capability to provide specific pre-trip and enroute directions to travelers (and drivers), including costs, arrival times, and transfer points.	Planned
Center/ Transit Agency Websites	Infrastructure Provided Trip Planning	The center shall generate route plans based on transit services, including fares, schedules, and requirements for travelers with special needs.	Planned
Center/ Transit Agency Websites	Infrastructure Provided Trip Planning	The center shall provide the capability for the traveler to confirm the proposed trip plan.	Planned
Center/ Transit Agency Websites	ISP Emergency Traveler Information	The center shall disseminate emergency evacuation information to the traveler interface systems, including evacuation zones, shelter information, available transportation modes, road closures and detours, changes to transit services, and traffic and road conditions at the origin, destination, and along the evacuation routes.	Planned
Center/ Transit Agency Websites	ISP Emergency Traveler Information	The center shall disseminate wide-area alert information to the traveler interface systems, including major emergencies such as a natural or man-made disaster, civil emergency, child abductions, severe weather watches and warnings, military activities, and law enforcement warnings.	Planned
Center/ Transit Agency Websites	ISP Traveler Data Collection	The center shall collect, process, and store transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information.	Planned
Center/ Transit Agency Websites	ISP Traveler Data Collection	The center shall collect, process, and store parking information, including location, availability, and fees.	Planned
Center/ Transit Agency Websites	ISP Traveler Information Alerts	The center shall accept traveler profiles that establish recurring trip characteristics including route, mode, and timeframe information.	Planned
Center/ Traveler Information	Basic Information Broadcast	The center shall disseminate transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information to travelers.	Planned

Element Name	Functional Area	Requirement	Status
Center/ Traveler Information	Basic Information Broadcast	The center shall disseminate parking information to travelers, including location, availability, and fees.	Planned
Center/ Traveler Information	ISP Emergency Traveler Information	The center shall disseminate wide-area alert information to the traveler interface systems, including major emergencies such as a natural or man-made disaster, civil emergency, child abductions, severe weather watches and warnings, military activities, and law enforcement warnings.	Planned
Center/ Traveler Information	ISP Traveler Data Collection	The center shall collect, process, and store transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information.	Planned
Center/ Traveler Information	ISP Traveler Data Collection	The center shall collect, process, and store parking information, including location, availability, and fees.	Planned
Field/ Parking Management and Information	Parking Coordination	The parking element shall distribute parking lot information upon request to transit management centers for park and ride facilities, parking shuttle services, and other applications that integrate transit and parking services.	Planned
Field/ Traffic Signal Controllers	Roadway Signal Priority	The field element shall respond to signal priority requests from transit vehicles.	Planned
Field/ Transit Agency Security Monitoring Systems	Field Secure Area Surveillance	The field element shall include video and/or audio surveillance of secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).	Planned
Field/ Transit Agency Security Monitoring Systems	Field Secure Area Surveillance	The field element shall be remotely controlled by a center.	Planned
Field/ Transit Agency Security Monitoring Systems	Field Secure Area Surveillance	The field element shall provide raw video or audio data.	Planned
Vehicle/ Transit Vehicle On-Board Systems (Security, Trip Monitoring, Schedule Management, Passenger Counting, Fare Management, Transit Information, Transit Signal Priority	On-board Transit Security	The transit vehicle shall perform video and audio surveillance inside of transit vehicles and output raw video or audio data for either local monitoring (for processing or direct output to the transit vehicle operator), remote monitoring or for local storage (e.g., in an event recorder).	Planned
Vehicle/ Transit Vehicle On-Board Systems (Security, Trip Monitoring, Schedule Management, Passenger Counting, Fare Management, Transit Information, Transit Signal Priority	On-board Transit Security	The transit vehicle shall perform local monitoring of video or audio surveillance data collected inside of transit vehicles, and identify potential incidents or threats based on received processing parameters.	Planned

Element Name	Functional Area	Requirement	Status
Vehicle/ Transit Vehicle On-Board Systems (Security, Trip Monitoring, Schedule Management, Passenger Counting, Fare Management, Transit Information, Transit Signal Priority	On-board Transit Signal Priority	The transit vehicle shall send priority requests to traffic signal controllers at intersections, pedestrian crossings, and multimodal crossings on the roads (surface streets) and freeway (ramp controls) network that enable a transit vehicle schedule deviation to be corrected.	Planned

10.5 Traveler Information Functional Requirements

Table 10. Traveler Information Functional Requirements

Element Name	Functional Area	Requirement	Status
Center/ Cameras	Collect Traffic Surveillance	The center shall monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center.	Planned
Center/ Cameras	Collect Traffic Surveillance	The center shall distribute road network conditions data (raw or processed) based on collected and analyzed traffic sensor and surveillance data to other centers.	Planned
Center/ Controlled Agency Information Access	Emergency Data Collection	The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.	Planned
Center/ Controlled Agency Information Access	ISP Data Collection	The center shall collect traveler information data, such as parking lot data, rideshare data, road network use data, vehicle probe data, and other data from traveler information system operations.	Planned
Center/ Controlled Agency Information Access	ISP Emergency Traveler Information	The center shall disseminate emergency evacuation information to the traveler interface systems, including evacuation zones, shelter information, available transportation modes, road closures and detours, changes to transit services, and traffic and road conditions at the origin, destination, and along the evacuation routes.	Planned
Center/ Controlled Agency Information Access	ISP Emergency Traveler Information	The center shall disseminate wide-area alert information to the traveler interface systems, including major emergencies such as a natural or man-made disaster, civil emergency, child abductions, severe weather watches and warnings, military activities, and law enforcement warnings.	Planned
Center/ Controlled Agency Information Access	ISP Traveler Data Collection	The center shall collect, process, and store traffic and highway condition information, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.	Planned
Center/ Controlled Agency Information Access	ISP Traveler Data Collection	The center shall collect, process, and store maintenance and construction information, including scheduled maintenance and construction work activities and work zone activities.	Planned
Center/ Controlled Agency Information Access	ISP Traveler Data Collection	The center shall collect, process, and store current and forecast road conditions and surface weather conditions.	Planned
Center/ Controlled Agency Information Access	ISP Traveler Information Alerts	The center shall disseminate personalized traffic alerts reporting congestion, incidents, delays, detours and road closures that may impact a current or planned trip.	Planned
Center/ Information	Personal Basic Information Reception	The personal traveler interface shall receive wide-area alerts and present it to the traveler.	Planned
Center/ Information	Personal Basic Information Reception	The personal traveler interface shall present information to the traveler in audible or visual forms, consistent with a personal device.	Planned

Element Name	Functional Area	Requirement	Status
Center/ Information	Personal Basic Information Reception	The personal traveler interface shall receive traffic information from a center and present it to the traveler.	Planned
Center/ Information	Personal Basic Information Reception	The personal traveler interface shall receive event information from a center and present it to the traveler.	Planned
Center/ MOA Maintenance Dispatch Office	MCM Environmental Information Collection	The center shall provide weather and road condition information to weather service providers and center personnel.	Planned
Center/ MOA Maintenance Dispatch Office	MCM Roadway Maintenance and Construction	The center shall provide emergency management and traffic management centers with information about scheduled maintenance and construction work activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations.	Existing
Center/ MOA Maintenance Dispatch Office	MCM Roadway Maintenance and Construction	The center shall track the status of roadway maintenance and construction activities by monitoring collected data from the dispatched vehicles and equipment.	Existing
Center/ MOA Maintenance Dispatch Office	MCM Transportation Operations Data Collection	The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	Planned
Center/ Public Broadcast Emergency System (Phone)	Traveler Telephone Information	The center shall receive and forward region-specific wide-area alert and advisory information to the traveler telephone information system, including major emergencies such as a natural or man-made disaster, civil emergency, child abductions, severe weather watches and warnings, military activities, and law enforcement warnings.	Planned
Center/ Public Broadcast Emergency System (Phone)	Traveler Telephone Information	The center shall provide the capability to process traveler information requests from a traveler telephone information system.	Planned
Center/ Public Broadcast Emergency System (Phone)	Traveler Telephone Information	The center shall provide information on traffic conditions in the requested voice format and for the requested location.	Planned
Center/ Public Information Access	Personal Basic Information Reception	The personal traveler interface shall present information to the traveler in audible or visual forms, consistent with a personal device.	Planned
Center/ Public Information Access	Personal Basic Information Reception	The personal traveler interface shall receive traffic information from a center and present it to the traveler.	Planned
Center/ Traveler Information	Emergency Data Collection	The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.	Planned
Center/ Traveler Information	ISP Emergency Traveler Information	The center shall disseminate emergency evacuation information to the traveler interface systems, including evacuation zones, shelter information, available transportation modes, road closures and detours, changes to transit services, and traffic and road conditions at the origin, destination, and along the evacuation routes.	Planned

Element Name	Functional Area	Requirement	Status
Center/ Traveler Information	ISP Emergency Traveler Information	The center shall disseminate wide-area alert information to the traveler interface systems, including major emergencies such as a natural or man-made disaster, civil emergency, child abductions, severe weather watches and warnings, military activities, and law enforcement warnings.	Planned
Center/ Traveler Information	ISP Traveler Data Collection	The center shall collect, process, and store maintenance and construction information, including scheduled maintenance and construction work activities and work zone activities.	Existing
Center/ Traveler Information	ISP Traveler Data Collection	The center shall collect, process, and store traffic and highway condition information, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.	Planned
Center/ Traveler Information	ISP Traveler Data Collection	The center shall collect, process, and store parking information, including location, availability, and fees.	Planned
Center/ Traveler Information	ISP Traveler Data Collection	The center shall collect, process, and store current and forecast road conditions and surface weather conditions.	Planned
Center/ Traveler Information	ISP Traveler Information Alerts	The center shall disseminate personalized parking alerts reporting parking availability and closures.	Planned
Center/ Traveler Information	ISP Traveler Information Alerts	The center shall disseminate personalized road weather alerts reporting adverse road and weather conditions.	Planned
Center/ Traveler Information	ISP Traveler Information Alerts	The center shall disseminate personalized traffic alerts reporting congestion, incidents, delays, detours and road closures that may impact a current or planned trip.	Planned
Center/ Traveler Information	MCM Winter Maintenance Management	The center shall provide status information about scheduled winter maintenance activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations. The information is provided to other management centers such as traffic, emergency, transit, traveler information providers, other maintenance centers, and the media.	Existing
Center/ Traveler Information	MCM Winter Maintenance Management	The center shall collect real-time information on the state of the regional transportation system from other centers including current traffic and road conditions, weather conditions, special event and incident information and use the collected information to support winter maintenance operations.	Planned

11 Appendix D: Architecture (Data) Flows & Flow Diagrams

This appendix displays the architecture flows used in the ARIA update. The flows are defined by a source element and a destination element in which information is transferred. The high-level status (e.g. existing or planned) is also documented. The information presented in these tables can also be found in the ARIA update Turbo Architecture™ database.

This appendix also shows the flow diagrams of each service area. The diagrams are shown here in landscape to improve readability. They can also be used to support the interpretation of the architecture flow tables that follow.

11.1 Archive Data Services Flows & Flow Diagrams

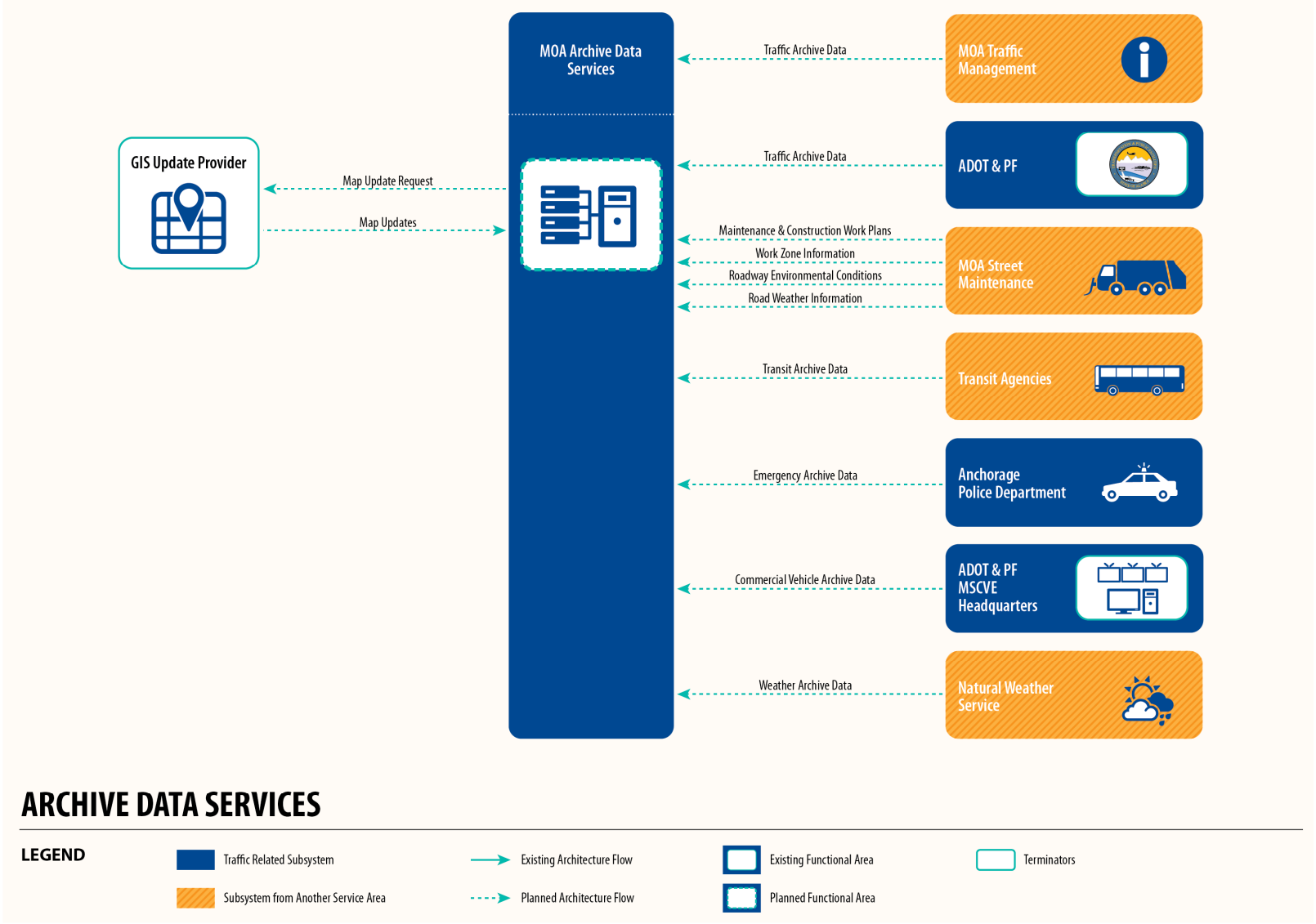


Figure 9. Large Archive Data Services Flow Diagram

Table 11. Archive Data Services Architecture Flows

Source Element	Flow Name	Destination Element	Project Flow Status
Center/ ADOTPF	traffic archive data	Center/ MOA Archive Data Services	Planned
Center/ APD Headquarters and Dispatch	emergency archive data	Center/ MOA Archive Data Services	Planned
Center/ GIS Update Provider	map updates	Center/ MOA Archive Data Services	Planned
Center/ MOA Archive Data Services	map update request	Center/ GIS Update Provider	Planned
Center/ MOA Public Works	.regional/local roadway environmental conditions.	Center/ MOA Archive Data Services	Planned
Center/ MOA Public Works	maint and constr work plans	Center/ MOA Archive Data Services	Planned
Center/ MOA Public Works	road weather information	Center/ MOA Archive Data Services	Planned
Center/ MOA Public Works	work zone information	Center/ MOA Archive Data Services	Planned
Center/ MOA Signal Control	traffic archive data	Center/ MOA Archive Data Services	Planned
Center/ MSCVE Headquarters	commercial vehicle archive data	Center/ MOA Archive Data Services	Planned
Center/ National Weather Service Offices	weather archive data	Center/ MOA Archive Data Services	Planned
Center/ Transit Agency Dispatch (Placeholder)	transit archive data	Center/ MOA Archive Data Services	Planned

11.2 Arterial Management Flows & Flow Diagrams

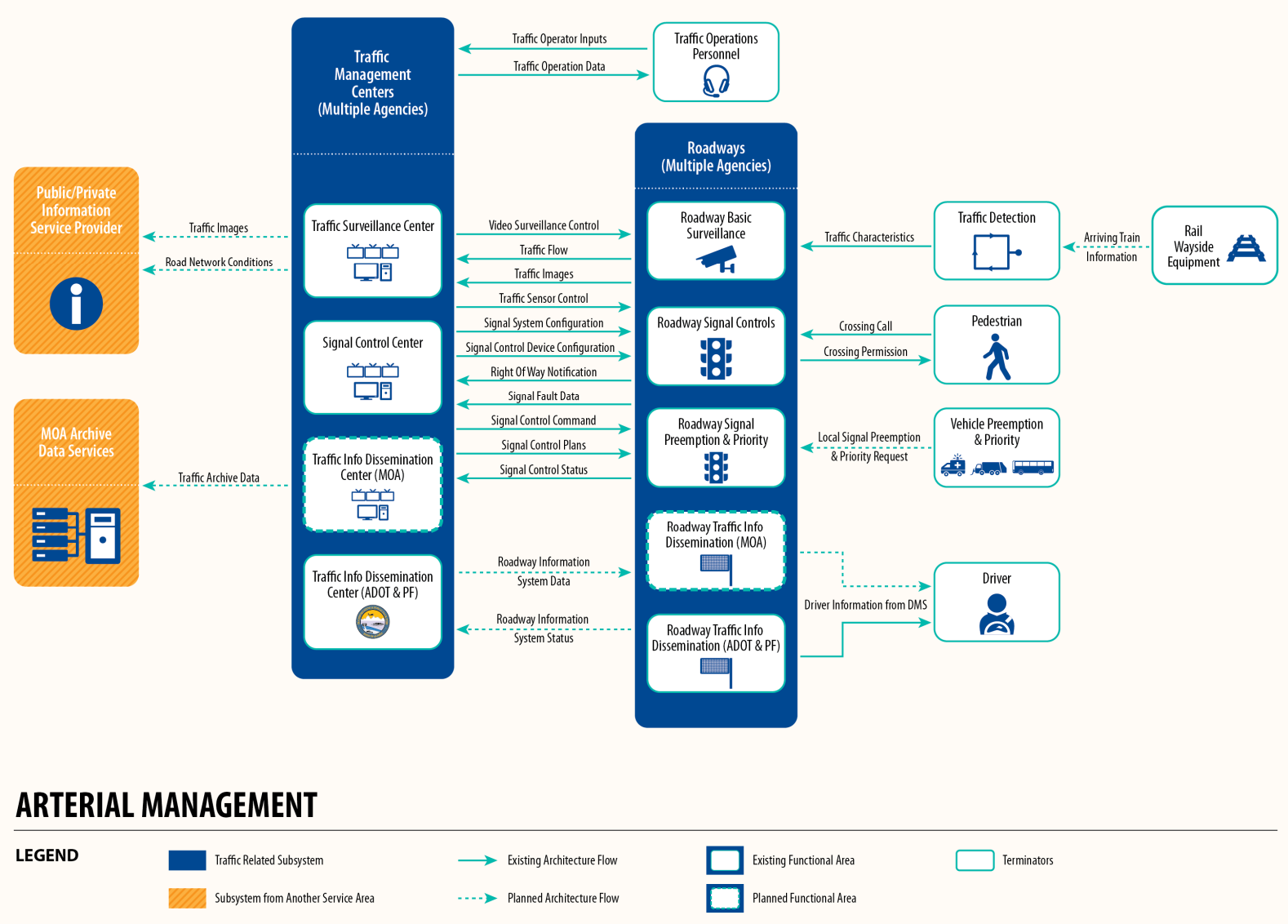


Figure 10. Large Arterial Management Flow Diagram

Table 12. Arterial Management Architecture Flows

Source Element	Flow Name	Destination Element	Project Flow Status
Center/ Cameras	incident information	Center/ Traveler Information	Planned
Center/ Cameras	road network conditions	Center/ Traveler Information	Planned
Center/ Cameras	traffic images	Center/ Traveler Information	Planned
Center/ Cameras	traffic sensor control	Field/ Cameras	Existing
Center/ Cameras	video surveillance control	Field/ Cameras	Existing
Center/ MOA Signal Control	hri control data	Field/ Traffic Signal Controllers	Planned
Center/ MOA Signal Control	hri request	Field/ Traffic Signal Controllers	Planned
Center/ MOA Signal Control	incident information	Center/ Traffic Information Dissemination (MOA)	Planned
Center/ MOA Signal Control	incident information	Center/ Traveler Information	Planned
Center/ MOA Signal Control	road network conditions	Center/ Traffic Information Dissemination (MOA)	Planned
Center/ MOA Signal Control	road network conditions	Center/ Traveler Information	Planned
Center/ MOA Signal Control	signal control commands	Field/ Traffic Signal Controllers	Existing
Center/ MOA Signal Control	signal control device configuration	Field/ Traffic Signal Controllers	Existing
Center/ MOA Signal Control	signal control plans	Field/ Traffic Signal Controllers	Existing
Center/ MOA Signal Control	signal system configuration	Field/ Traffic Signal Controllers	Existing
Center/ MOA Signal Control	traffic archive data	Center/ MOA Archive Data Services	Planned
Center/ MOA Signal Control	traffic operator data	Center/ Traffic Operations Personnel	Existing
Center/ Traffic Information Dissemination (ADOTPF)	roadway information system data	Field/ Permanent Dynamic Message Signs (ADOTPF)	Existing
Center/ Traffic Information Dissemination (MOA)	roadway information system data	Field/ Permanent Dynamic Message Signs (MOA)	Planned
Center/ Traffic Operations Personnel	traffic operator inputs	Center/ MOA Signal Control	Existing
Center/ Traveler Information	road network traffic probe data	Center/ MOA Signal Control	Planned
Center/ Traveler Information	traffic probe reporting management	Vehicle/ General Public Vehicles	Planned
Field/ Cameras	traffic flow	Center/ Cameras	Existing

Source Element	Flow Name	Destination Element	Project Flow Status
Field/ Cameras	traffic images	Center/ Cameras	Existing
Field/ Permanent Dynamic Message Signs (ADOTPF)	driver information	Travelers/ Driver	Existing
Field/ Permanent Dynamic Message Signs (ADOTPF)	roadway information system status	Center/ Traffic Information Dissemination (ADOTPF)	Existing
Field/ Permanent Dynamic Message Signs (MOA)	driver information	Travelers/ Driver	Planned
Field/ Permanent Dynamic Message Signs (MOA)	roadway information system status	Center/ Traffic Information Dissemination (MOA)	Planned
Field/ Pre-emption and Priority Systems	right-of-way request notification	Center/ MOA Signal Control	Existing
Field/ Pre-emption and Priority Systems	roadway equipment coordination	Field/ Traffic Signal Controllers	Planned
Field/ Pre-emption and Priority Systems	signal control data	Field/ Traffic Signal Controllers	Planned
Field/ Rail Wayside Equipment	arriving train information	Field/ Traffic Detectors	Planned
Field/ Rail Wayside Equipment	track status	Field/ Traffic Detectors	Planned
Field/ Traffic Detectors	intersection blockage notification	Center/ MOA Signal Control	Planned
Field/ Traffic Detectors	intersection blockage notification	Field/ Rail Wayside Equipment	Planned
Field/ Traffic Detectors	roadway equipment coordination	Field/ Traffic Signal Controllers	Existing
Field/ Traffic Detectors	signal control data	Field/ Traffic Signal Controllers	Existing
Field/ Traffic Detectors	traffic probe data	Center/ Traveler Information	Planned
Field/ Traffic Detectors	traffic probe reporting management	Vehicle/ General Public Vehicles	Planned
Field/ Traffic Signal Controllers	crossing permission	Travelers/ Pedestrian	Existing
Field/ Traffic Signal Controllers	hri operational status	Field/ Rail Wayside Equipment	Planned
Field/ Traffic Signal Controllers	hri status	Center/ MOA Signal Control	Planned
Field/ Traffic Signal Controllers	roadway equipment coordination	Field/ Pre-emption and Priority Systems	Planned
Field/ Traffic Signal Controllers	signal control data	Field/ Pre-emption and Priority Systems	Planned
Field/ Traffic Signal Controllers	signal control status	Center/ MOA Signal Control	Existing

Source Element	Flow Name	Destination Element	Project Flow Status
Field/ Traffic Signal Controllers	signal fault data	Center/ MOA Signal Control	Existing
Field/ Traffic Signal Controllers	traffic flow	Center/ MOA Signal Control	Planned
Travelers/ Pedestrian	crossing call	Field/ Traffic Signal Controllers	Existing
Vehicle/ General Public Vehicles	traffic probe data	Center/ Traveler Information	Planned
Vehicle/ General Public Vehicles	traffic probe data	Field/ Traffic Detectors	Planned
Vehicle/ Maintenance Vehicle On-board Systems (MOA)	.signal priority request.	Field/ Pre-emption and Priority Systems	Planned
Vehicle/ Transit Vehicle On-board Systems (Placeholder)	local signal priority request	Field/ Pre-emption and Priority Systems	Planned

11.3 Roadway Maintenance & Construction Flows & Flow Diagrams

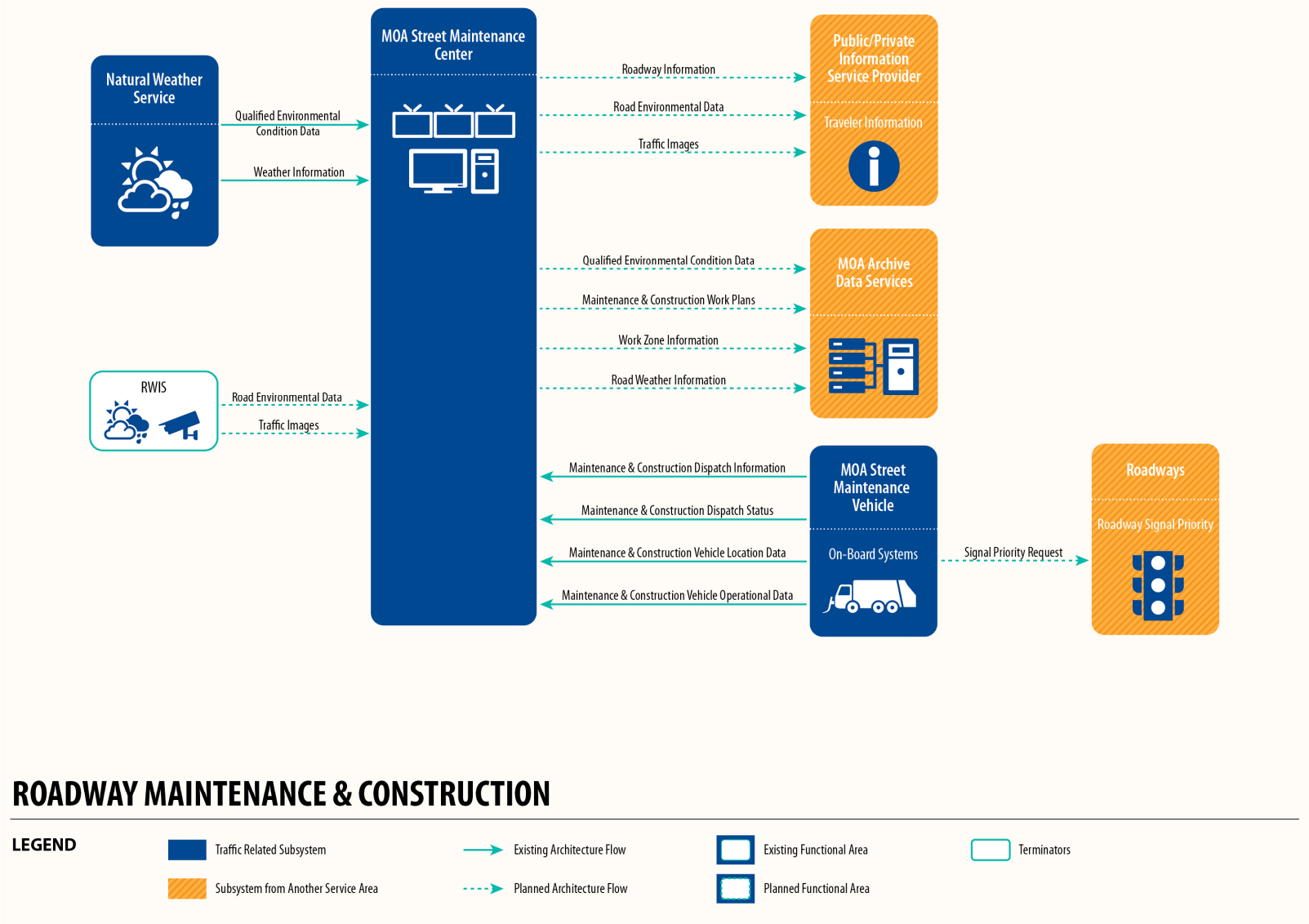


Figure 11. Roadway Maintenance & Construction Flow Diagram

Table 13. Roadway Maintenance & Construction Architecture Flows

Source Element	Flow Name	Destination Element	Project Flow Status
Center/ MOA Maintenance Dispatch Office	.regional/local roadway environmental conditions.	Center/ MOA Archive Data Services	Planned
Center/ MOA Maintenance Dispatch Office	environmental conditions data	Center/ Traveler Information	Planned
Center/ MOA Maintenance Dispatch Office	maint and constr dispatch information	Vehicle/ Maintenance Vehicle On-board Systems (MOA)	Existing
Center/ MOA Maintenance Dispatch Office	maint and constr work plans	Center/ MOA Archive Data Services	Planned
Center/ MOA Maintenance Dispatch Office	road weather information	Center/ MOA Archive Data Services	Planned
Center/ MOA Maintenance Dispatch Office	road weather information	Center/ Traveler Information	Planned
Center/ MOA Maintenance Dispatch Office	traffic images	Center/ Traveler Information	Planned
Center/ MOA Maintenance Dispatch Office	work zone information	Center/ MOA Archive Data Services	Planned
Center/ National Weather Service Offices	qualified environmental conditions data	Center/ MOA Maintenance Dispatch Office	Existing
Center/ National Weather Service Offices	weather information	Center/ MOA Maintenance Dispatch Office	Existing
Field/ Road Weather Information Systems (RWIS)	environmental sensor data	Center/ MOA Maintenance Dispatch Office	Planned
Field/ Road Weather Information Systems (RWIS)	traffic images	Center/ MOA Maintenance Dispatch Office	Planned
Vehicle/ Maintenance Vehicle On-board Systems (MOA)	.signal priority request.	Field/ Pre-emption and Priority Systems	Planned
Vehicle/ Maintenance Vehicle On-board Systems (MOA)	maint and constr dispatch status	Center/ MOA Maintenance Dispatch Office	Existing
Vehicle/ Maintenance Vehicle On-board Systems (MOA)	maint and constr vehicle location data	Center/ MOA Maintenance Dispatch Office	Existing
Vehicle/ Maintenance Vehicle On-board Systems (MOA)	maint and constr vehicle operational data	Center/ MOA Maintenance Dispatch Office	Existing

11.4 Transit Operations Flows & Flow Diagrams

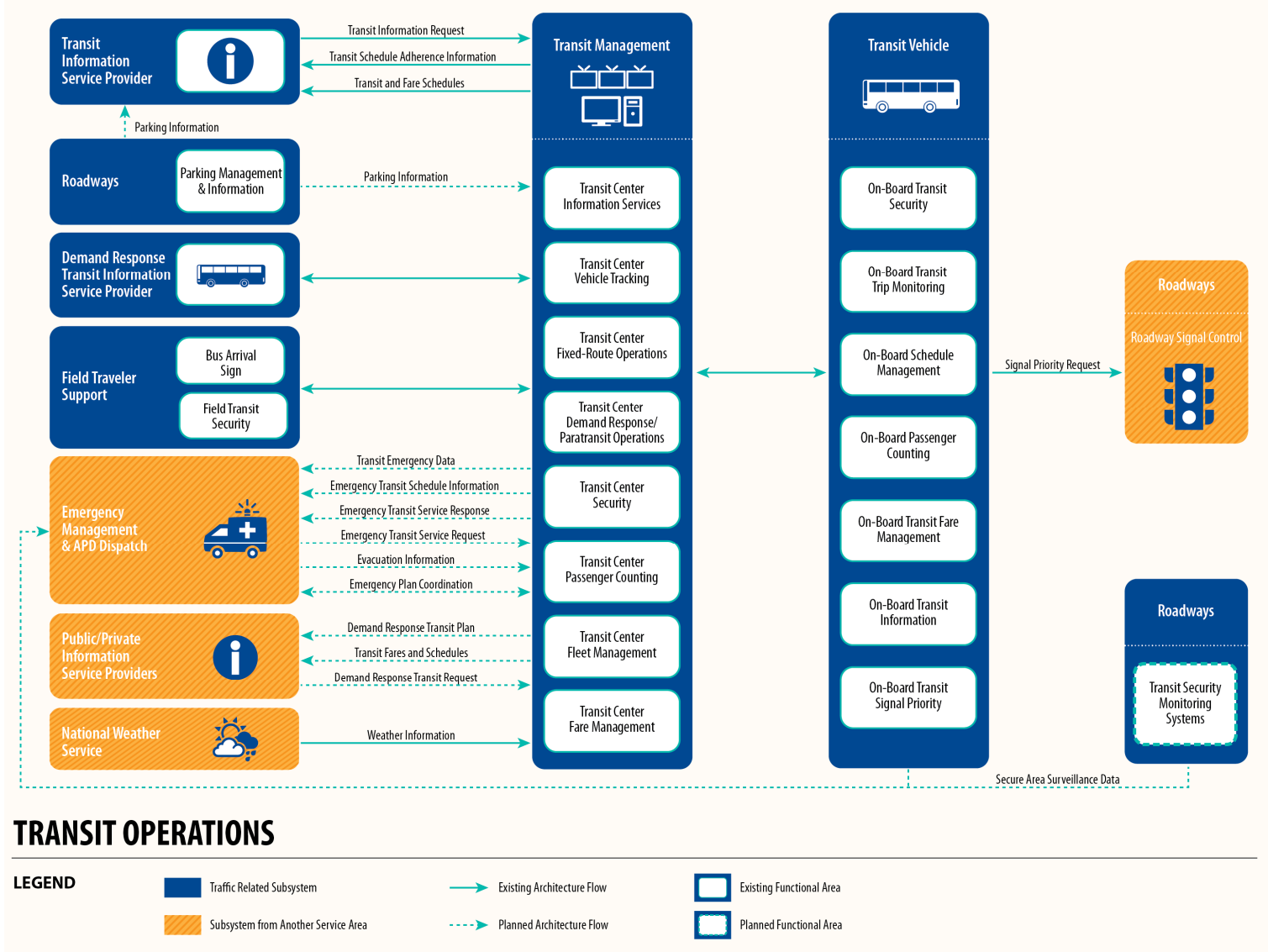


Figure 12. Large Transit Operations Flow Diagram

Table 14. Transit Operations Architecture Flows

Source Element	Flow Name	Destination Element	Project Flow Status
Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	alert status	Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Planned
Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	demand responsive transit plan	Center/ Transit Agency Websites	Existing
Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	demand responsive transit plan	Center/ Traveler Information	Planned
Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	emergency plan coordination	Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Planned
Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	emergency transit schedule information	Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Planned
Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	emergency transit schedule information	Center/ Transit Agency Websites	Existing
Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	emergency transit service response	Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Planned

Source Element	Flow Name	Destination Element	Project Flow Status
Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	emergency traveler information	Center/ Traveler Information	Planned
Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	transit and fare schedules	Center/ Transit Agency Websites	Existing
Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	transit and fare schedules	Center/ Traveler Information	Planned
Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	transit emergency data	Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Planned
Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	transit incident information	Center/ Transit Agency Websites	Existing
Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	transit schedule adherence information	Center/ Transit Agency Websites	Existing
Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	transit schedule adherence information	Center/ Traveler Information	Planned

Source Element	Flow Name	Destination Element	Project Flow Status
Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	transit system status assessment	Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Planned
Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	alert notification	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Planned
Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	emergency plan coordination	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Planned
Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	emergency transit service request	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Planned
Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	evacuation information	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Planned
Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	incident information	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Planned
Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	incident response status	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Planned
Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	threat information	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Planned
Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	transportation system status	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Planned

Source Element	Flow Name	Destination Element	Project Flow Status
Center/ National Weather Service Offices	weather information	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Existing
Center/ Transit Agency Websites	demand responsive transit request	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Existing
Center/ Transit Agency Websites	emergency traveler information	Center/ Traveler Information	Planned
Center/ Transit Agency Websites	incident information	Center/ Traveler Information	Planned
Center/ Transit Agency Websites	parking information	Center/ Traveler Information	Planned
Center/ Transit Agency Websites	selected routes	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Existing
Center/ Transit Agency Websites	transit information request	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Existing
Center/ Transit Agency Websites	transit service information	Center/ Traveler Information	Planned
Center/ Traveler Information	demand responsive transit request	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Planned
Center/ Traveler Information	emergency traveler information	Center/ Transit Agency Websites	Planned

Source Element	Flow Name	Destination Element	Project Flow Status
Center/ Traveler Information	selected routes	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Planned
Center/ Traveler Information	transit service information	Center/ Transit Agency Websites	Planned
Field/ Parking Management and Information	parking information	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Planned
Field/ Parking Management and Information	parking information	Center/ Transit Agency Websites	Planned
Field/ Transit Agency Security Monitoring Systems	secure area surveillance data	Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Planned
Vehicle/ Transit Vehicle On-Board Systems (Security, Trip Monitoring, Schedule Management, Passenger Counting, Fare Management, Transit Information, Transit Signal Priority	local signal priority request	Field/ Traffic Signal Controllers	Existing
Vehicle/ Transit Vehicle On-Board Systems (Security, Trip Monitoring, Schedule Management, Passenger Counting, Fare Management, Transit Information, Transit Signal Priority	secure area surveillance data	Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Planned

11.5 Traveler Information Flows & Flow Diagrams

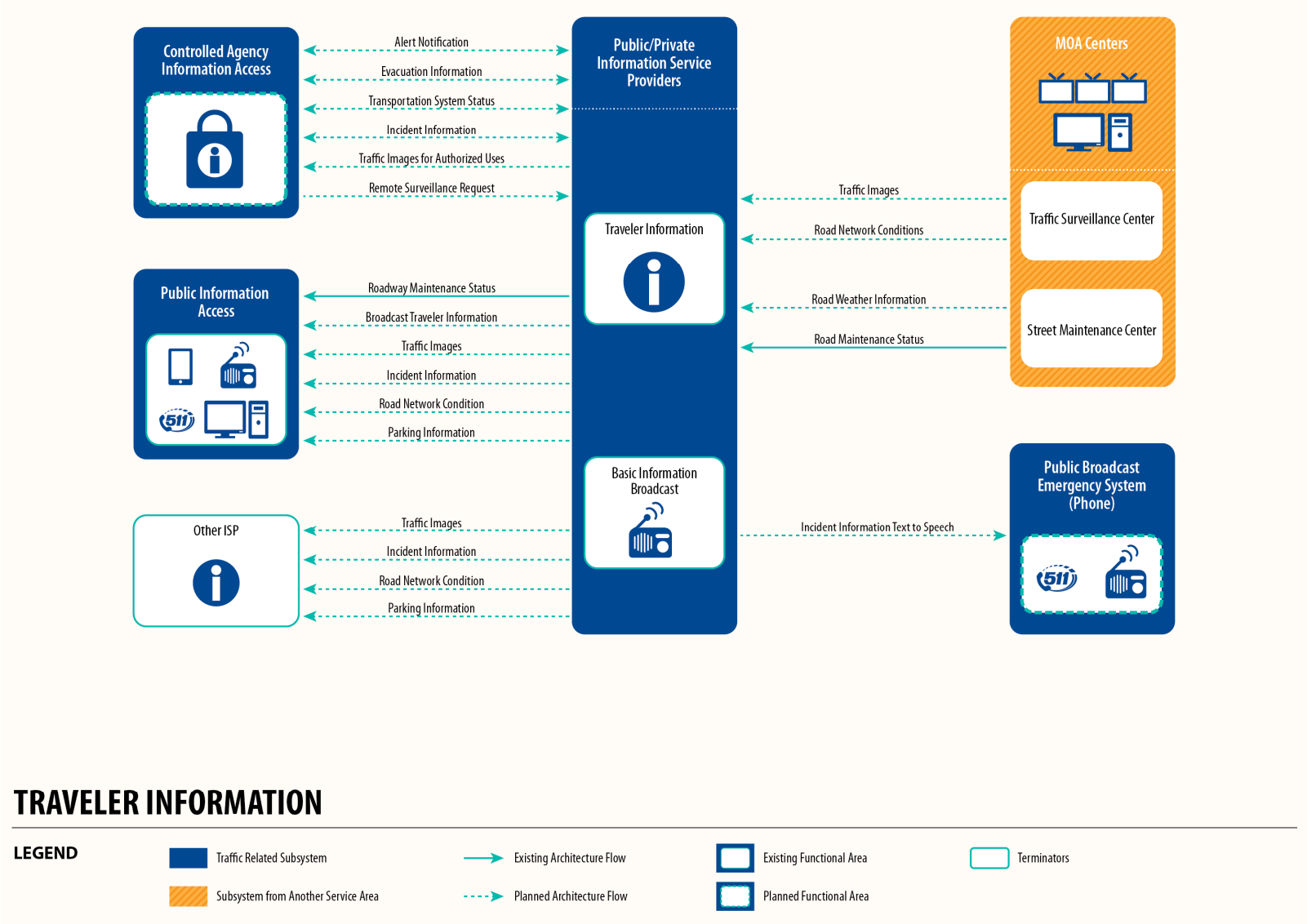


Figure 13. Large Traveler Information Flow Diagram

Table 15. Traveler Information Architecture Flows

Source Element	Flow Name	Destination Element	Project Flow Status
Center/ Cameras	road network conditions	Center/ Traveler Information	Planned
Center/ Cameras	traffic images	Center/ Traveler Information	Planned
Center/ Controlled Agency Information Access	.remote surveillance request.	Center/ Traveler Information	Planned
Center/ Controlled Agency Information Access	alert notification	Center/ Traveler Information	Planned
Center/ Controlled Agency Information Access	evacuation information	Center/ Traveler Information	Planned
Center/ Controlled Agency Information Access	incident information	Center/ Traveler Information	Planned
Center/ Controlled Agency Information Access	transportation system status	Center/ Traveler Information	Planned
Center/ MOA Maintenance Dispatch Office	road network conditions	Center/ Traveler Information	Planned
Center/ MOA Maintenance Dispatch Office	road weather information	Center/ Traveler Information	Planned
Center/ MOA Maintenance Dispatch Office	roadway maintenance status	Center/ Traveler Information	Existing
Center/ Traveler Information	.roadway information (plow status).	Center/ Controlled Agency Information Access	Planned
Center/ Traveler Information	.roadway information (plow status).	Center/ Public Information Access	Existing
Center/ Traveler Information	alert notification	Center/ Controlled Agency Information Access	Planned
Center/ Traveler Information	broadcast traveler information	Center/ Information	Planned
Center/ Traveler Information	broadcast traveler information	Center/ Public Information Access	Planned
Center/ Traveler Information	emergency traveler information	Center/ Controlled Agency Information Access	Planned
Center/ Traveler Information	emergency traveler information	Center/ Information	Planned
Center/ Traveler Information	emergency traveler information	Center/ Public Broadcast Emergency System (Phone)	Planned
Center/ Traveler Information	evacuation information	Center/ Controlled Agency Information Access	Planned
Center/ Traveler Information	incident information	Center/ Controlled Agency Information Access	Planned
Center/ Traveler Information	incident information	Center/ Information	Planned

Source Element	Flow Name	Destination Element	Project Flow Status
Center/ Traveler Information	incident information	Center/ Public Broadcast Emergency System (Phone)	Planned
Center/ Traveler Information	incident information	Center/ Public Information Access	Planned
Center/ Traveler Information	parking information	Center/ Information	Planned
Center/ Traveler Information	parking information	Center/ Public Information Access	Planned
Center/ Traveler Information	road network conditions	Center/ Controlled Agency Information Access	Planned
Center/ Traveler Information	road network conditions	Center/ Information	Planned
Center/ Traveler Information	road network conditions	Center/ Public Broadcast Emergency System (Phone)	Planned
Center/ Traveler Information	road network conditions	Center/ Public Information Access	Planned
Center/ Traveler Information	road weather information	Center/ Controlled Agency Information Access	Planned
Center/ Traveler Information	roadway maintenance status	Center/ Controlled Agency Information Access	Planned
Center/ Traveler Information	traffic images	Center/ Controlled Agency Information Access	Planned
Center/ Traveler Information	traffic images	Center/ Information	Planned
Center/ Traveler Information	traffic images	Center/ Public Information Access	Planned
Center/ Traveler Information	transportation system status	Center/ Controlled Agency Information Access	Planned

12 Appendix E: Standards

This appendix exhibits the standards that are applicable to the ARIA update. Standards are technical specifications established by the consensus of manufacturers, regulators, and users that provide rules, guidelines, or characteristics for data interfaces. The standards found in these tables are from the ARIA update Turbo Architecture™ database.

12.1 Archive Data Services Standards

Table 16. Archive Data Services Standards

SDO	Document ID	Standard Title	Standard Type	User Defined	Source Element	Destination Element	Flow Name
AASHTO/ITE	ITE TMDD	Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC)	Message/Data	No	Center/ ADOTPF	Center/ MOA Archive Data Services	traffic archive data
AASHTO/ITE	ITE TMDD	Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC)	Message/Data	No	Center/ MOA Public Works	Center/ MOA Archive Data Services	road weather information
AASHTO/ITE	ITE TMDD	Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC)	Message/Data	No	Center/ MOA Signal Control	Center/ MOA Archive Data Services	traffic archive data
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ ADOTPF	Center/ MOA Archive Data Services	traffic archive data
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ APD Headquarters and Dispatch	Center/ MOA Archive Data Services	emergency archive data
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ GIS Update Provider	Center/ MOA Archive Data Services	map updates
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ MOA Archive Data Services	Center/ GIS Update Provider	map update request
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ MOA Public Works	Center/ MOA Archive Data Services	maint and constr work plans
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ MOA Public Works	Center/ MOA Archive Data Services	road weather information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ MOA Public Works	Center/ MOA Archive Data Services	work zone information

SDO	Document ID	Standard Title	Standard Type	User Defined	Source Element	Destination Element	Flow Name
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ MOA Signal Control	Center/ MOA Archive Data Services	traffic archive data
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ National Weather Service Offices	Center/ MOA Archive Data Services	weather archive data
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Transit Agency Dispatch (Placeholder)	Center/ MOA Archive Data Services	transit archive data
ASTM	ASTM E2468-05	Standard Practice for Metadata to Support Archived Data Management Systems	Other	No	Center/ ADOTPF	Center/ MOA Archive Data Services	traffic archive data
ASTM	ASTM E2468-05	Standard Practice for Metadata to Support Archived Data Management Systems	Other	No	Center/ APD Headquarters and Dispatch	Center/ MOA Archive Data Services	emergency archive data
ASTM	ASTM E2468-05	Standard Practice for Metadata to Support Archived Data Management Systems	Other	No	Center/ GIS Update Provider	Center/ MOA Archive Data Services	map updates
ASTM	ASTM E2468-05	Standard Practice for Metadata to Support Archived Data Management Systems	Other	No	Center/ MOA Signal Control	Center/ MOA Archive Data Services	traffic archive data
ASTM	ASTM E2468-05	Standard Practice for Metadata to Support Archived Data Management Systems	Other	No	Center/ MSCVE Headquarters	Center/ MOA Archive Data Services	commercial vehicle archive data
ASTM	ASTM E2468-05	Standard Practice for Metadata to Support Archived Data Management Systems	Other	No	Center/ National Weather Service Offices	Center/ MOA Archive Data Services	weather archive data
ASTM	ASTM E2468-05	Standard Practice for Metadata to Support Archived Data Management Systems	Other	No	Center/ Transit Agency Dispatch (Placeholder)	Center/ MOA Archive Data Services	transit archive data
ASTM	ASTM E2665-08	Standard Specifications for Archiving ITS-Generated Traffic Monitoring Data	Message/Data	No	Center/ ADOTPF	Center/ MOA Archive Data Services	traffic archive data
ASTM	ASTM E2665-08	Standard Specifications for Archiving ITS-Generated Traffic Monitoring Data	Message/Data	No	Center/ MOA Signal Control	Center/ MOA Archive Data Services	traffic archive data
IEEE	IEEE IM	Incident Management Standards Group	Group	No	Center/ APD Headquarters and Dispatch	Center/ MOA Archive Data Services	emergency archive data

12.2 Arterial Management Standards

Table 17. Arterial Management Standards

SDO	Document ID	Standard Title	Standard Type	User Defined	Source Element	Destination Element	Flow Name
AASHTO/ITE	ITE TMDD	Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC)	Message/Data	No	Center/ Cameras	Center/ Traveler Information	incident information
AASHTO/ITE	ITE TMDD	Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC)	Message/Data	No	Center/ Cameras	Center/ Traveler Information	road network conditions
AASHTO/ITE	ITE TMDD	Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC)	Message/Data	No	Center/ MOA Signal Control	Center/ MOA Archive Data Services	traffic archive data
AASHTO/ITE	ITE TMDD	Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC)	Message/Data	No	Center/ MOA Signal Control	Center/ Traffic Information Dissemination (MOA)	incident information
AASHTO/ITE	ITE TMDD	Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC)	Message/Data	No	Center/ MOA Signal Control	Center/ Traffic Information Dissemination (MOA)	road network conditions
AASHTO/ITE	ITE TMDD	Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC)	Message/Data	No	Center/ MOA Signal Control	Center/ Traveler Information	incident information
AASHTO/ITE	ITE TMDD	Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC)	Message/Data	No	Center/ MOA Signal Control	Center/ Traveler Information	road network conditions
AASHTO/ITE/NEMA	NTCIP 1201	Global Object Definitions	Message/Data	No	Center/ Cameras	Field/ Cameras	traffic sensor control
AASHTO/ITE/NEMA	NTCIP 1201	Global Object Definitions	Message/Data	No	Center/ Cameras	Field/ Cameras	video surveillance control
AASHTO/ITE/NEMA	NTCIP 1201	Global Object Definitions	Message/Data	No	Center/ MOA Signal Control	Field/ Traffic Signal Controllers	signal control commands
AASHTO/ITE/NEMA	NTCIP 1201	Global Object Definitions	Message/Data	No	Center/ MOA Signal Control	Field/ Traffic Signal Controllers	signal control device configuration
AASHTO/ITE/NEMA	NTCIP 1201	Global Object Definitions	Message/Data	No	Center/ MOA Signal Control	Field/ Traffic Signal Controllers	signal control plans

SDO	Document ID	Standard Title	Standard Type	User Defined	Source Element	Destination Element	Flow Name
AASHTO/ITE/NEMA	NTCIP 1201	Global Object Definitions	Message/Data	No	Center/ MOA Signal Control	Field/ Traffic Signal Controllers	signal system configuration
AASHTO/ITE/NEMA	NTCIP 1201	Global Object Definitions	Message/Data	No	Center/ Traffic Information Dissemination (ADOTPF)	Field/ Permanent Dynamic Message Signs (ADOTPF)	roadway information system data
AASHTO/ITE/NEMA	NTCIP 1201	Global Object Definitions	Message/Data	No	Center/ Traffic Information Dissemination (MOA)	Field/ Permanent Dynamic Message Signs (MOA)	roadway information system data
AASHTO/ITE/NEMA	NTCIP 1201	Global Object Definitions	Message/Data	No	Field/ Cameras	Center/ Cameras	traffic flow
AASHTO/ITE/NEMA	NTCIP 1201	Global Object Definitions	Message/Data	No	Field/ Cameras	Center/ Cameras	traffic images
AASHTO/ITE/NEMA	NTCIP 1201	Global Object Definitions	Message/Data	No	Field/ Permanent Dynamic Message Signs (ADOTPF)	Center/ Traffic Information Dissemination (ADOTPF)	roadway information system status
AASHTO/ITE/NEMA	NTCIP 1201	Global Object Definitions	Message/Data	No	Field/ Permanent Dynamic Message Signs (MOA)	Center/ Traffic Information Dissemination (MOA)	roadway information system status
AASHTO/ITE/NEMA	NTCIP 1201	Global Object Definitions	Message/Data	No	Field/ Pre-emption and Priority Systems	Center/ MOA Signal Control	right-of-way request notification
AASHTO/ITE/NEMA	NTCIP 1201	Global Object Definitions	Message/Data	No	Field/ Pre-emption and Priority Systems	Field/ Traffic Signal Controllers	signal control data
AASHTO/ITE/NEMA	NTCIP 1201	Global Object Definitions	Message/Data	No	Field/ Traffic Detectors	Field/ Traffic Signal Controllers	signal control data
AASHTO/ITE/NEMA	NTCIP 1201	Global Object Definitions	Message/Data	No	Field/ Traffic Signal Controllers	Center/ MOA Signal Control	signal control status
AASHTO/ITE/NEMA	NTCIP 1201	Global Object Definitions	Message/Data	No	Field/ Traffic Signal Controllers	Center/ MOA Signal Control	signal fault data
AASHTO/ITE/NEMA	NTCIP 1201	Global Object Definitions	Message/Data	No	Field/ Traffic Signal Controllers	Center/ MOA Signal Control	traffic flow
AASHTO/ITE/NEMA	NTCIP 1201	Global Object Definitions	Message/Data	No	Field/ Traffic Signal Controllers	Field/ Pre-emption and Priority Systems	signal control data
AASHTO/ITE/NEMA	NTCIP 1201	Global Object Definitions	Message/Data	No	Vehicle/ Transit Vehicle On-board Systems (Placeholder)	Field/ Pre-emption and Priority Systems	local signal priority request
AASHTO/ITE/NEMA	NTCIP 1202	Object Definitions for Actuated Traffic Signal Controller (ASC) Units	Message/Data	No	Center/ MOA Signal Control	Field/ Traffic Signal Controllers	signal control commands
AASHTO/ITE/NEMA	NTCIP 1202	Object Definitions for Actuated Traffic Signal Controller (ASC) Units	Message/Data	No	Center/ MOA Signal Control	Field/ Traffic Signal Controllers	signal control device configuration
AASHTO/ITE/NEMA	NTCIP 1202	Object Definitions for Actuated Traffic Signal Controller (ASC) Units	Message/Data	No	Center/ MOA Signal Control	Field/ Traffic Signal Controllers	signal control plans
AASHTO/ITE/NEMA	NTCIP 1202	Object Definitions for Actuated Traffic Signal Controller (ASC) Units	Message/Data	No	Center/ MOA Signal Control	Field/ Traffic Signal Controllers	signal system configuration

SDO	Document ID	Standard Title	Standard Type	User Defined	Source Element	Destination Element	Flow Name
AASHTO/ITE/NEMA	NTCIP 1202	Object Definitions for Actuated Traffic Signal Controller (ASC) Units	Message/Data	No	Field/ Pre-emption and Priority Systems	Center/ MOA Signal Control	right-of-way request notification
AASHTO/ITE/NEMA	NTCIP 1202	Object Definitions for Actuated Traffic Signal Controller (ASC) Units	Message/Data	No	Field/ Pre-emption and Priority Systems	Field/ Traffic Signal Controllers	roadway equipment coordination
AASHTO/ITE/NEMA	NTCIP 1202	Object Definitions for Actuated Traffic Signal Controller (ASC) Units	Message/Data	No	Field/ Pre-emption and Priority Systems	Field/ Traffic Signal Controllers	signal control data
AASHTO/ITE/NEMA	NTCIP 1202	Object Definitions for Actuated Traffic Signal Controller (ASC) Units	Message/Data	No	Field/ Traffic Detectors	Field/ Traffic Signal Controllers	roadway equipment coordination
AASHTO/ITE/NEMA	NTCIP 1202	Object Definitions for Actuated Traffic Signal Controller (ASC) Units	Message/Data	No	Field/ Traffic Detectors	Field/ Traffic Signal Controllers	signal control data
AASHTO/ITE/NEMA	NTCIP 1202	Object Definitions for Actuated Traffic Signal Controller (ASC) Units	Message/Data	No	Field/ Traffic Signal Controllers	Center/ MOA Signal Control	signal control status
AASHTO/ITE/NEMA	NTCIP 1202	Object Definitions for Actuated Traffic Signal Controller (ASC) Units	Message/Data	No	Field/ Traffic Signal Controllers	Center/ MOA Signal Control	signal fault data
AASHTO/ITE/NEMA	NTCIP 1202	Object Definitions for Actuated Traffic Signal Controller (ASC) Units	Message/Data	No	Field/ Traffic Signal Controllers	Field/ Pre-emption and Priority Systems	roadway equipment coordination
AASHTO/ITE/NEMA	NTCIP 1202	Object Definitions for Actuated Traffic Signal Controller (ASC) Units	Message/Data	No	Field/ Traffic Signal Controllers	Field/ Pre-emption and Priority Systems	signal control data
AASHTO/ITE/NEMA	NTCIP 1203	Object Definitions for Dynamic Message Signs (DMS)	Message/Data	No	Center/ Traffic Information Dissemination (ADOTPF)	Field/ Permanent Dynamic Message Signs (ADOTPF)	roadway information system data
AASHTO/ITE/NEMA	NTCIP 1203	Object Definitions for Dynamic Message Signs (DMS)	Message/Data	No	Center/ Traffic Information Dissemination (MOA)	Field/ Permanent Dynamic Message Signs (MOA)	roadway information system data
AASHTO/ITE/NEMA	NTCIP 1203	Object Definitions for Dynamic Message Signs (DMS)	Message/Data	No	Field/ Permanent Dynamic Message Signs (ADOTPF)	Center/ Traffic Information Dissemination (ADOTPF)	roadway information system status
AASHTO/ITE/NEMA	NTCIP 1203	Object Definitions for Dynamic Message Signs (DMS)	Message/Data	No	Field/ Permanent Dynamic Message Signs (MOA)	Center/ Traffic Information Dissemination (MOA)	roadway information system status
AASHTO/ITE/NEMA	NTCIP 1205	Object Definitions for Closed Circuit Television (CCTV) Camera Control	Message/Data	No	Center/ Cameras	Field/ Cameras	video surveillance control
AASHTO/ITE/NEMA	NTCIP 1205	Object Definitions for Closed Circuit Television (CCTV) Camera Control	Message/Data	No	Field/ Cameras	Center/ Cameras	traffic images
AASHTO/ITE/NEMA	NTCIP 1208	Object Definitions for Closed Circuit Television (CCTV) Switching	Message/Data	No	Center/ Cameras	Field/ Cameras	video surveillance control
AASHTO/ITE/NEMA	NTCIP 1208	Object Definitions for Closed Circuit Television (CCTV) Switching	Message/Data	No	Field/ Cameras	Center/ Cameras	traffic images
AASHTO/ITE/NEMA	NTCIP 1209	Data Element Definitions for Transportation Sensor Systems (TSS)	Message/Data	No	Center/ Cameras	Field/ Cameras	traffic sensor control

SDO	Document ID	Standard Title	Standard Type	User Defined	Source Element	Destination Element	Flow Name
AASHTO/ITE/NEMA	NTCIP 1209	Data Element Definitions for Transportation Sensor Systems (TSS)	Message/Data	No	Field/ Cameras	Center/ Cameras	traffic flow
AASHTO/ITE/NEMA	NTCIP 1209	Data Element Definitions for Transportation Sensor Systems (TSS)	Message/Data	No	Field/ Traffic Signal Controllers	Center/ MOA Signal Control	traffic flow
AASHTO/ITE/NEMA	NTCIP 1210	Field Management Stations (FMS) - Part 1: Object Definitions for Signal System Masters	Message/Data	No	Center/ MOA Signal Control	Field/ Traffic Signal Controllers	signal control commands
AASHTO/ITE/NEMA	NTCIP 1210	Field Management Stations (FMS) - Part 1: Object Definitions for Signal System Masters	Message/Data	No	Center/ MOA Signal Control	Field/ Traffic Signal Controllers	signal control device configuration
AASHTO/ITE/NEMA	NTCIP 1210	Field Management Stations (FMS) - Part 1: Object Definitions for Signal System Masters	Message/Data	No	Center/ MOA Signal Control	Field/ Traffic Signal Controllers	signal control plans
AASHTO/ITE/NEMA	NTCIP 1210	Field Management Stations (FMS) - Part 1: Object Definitions for Signal System Masters	Message/Data	No	Center/ MOA Signal Control	Field/ Traffic Signal Controllers	signal system configuration
AASHTO/ITE/NEMA	NTCIP 1210	Field Management Stations (FMS) - Part 1: Object Definitions for Signal System Masters	Message/Data	No	Field/ Pre-emption and Priority Systems	Field/ Traffic Signal Controllers	roadway equipment coordination
AASHTO/ITE/NEMA	NTCIP 1210	Field Management Stations (FMS) - Part 1: Object Definitions for Signal System Masters	Message/Data	No	Field/ Pre-emption and Priority Systems	Field/ Traffic Signal Controllers	signal control data
AASHTO/ITE/NEMA	NTCIP 1210	Field Management Stations (FMS) - Part 1: Object Definitions for Signal System Masters	Message/Data	No	Field/ Traffic Detectors	Field/ Traffic Signal Controllers	roadway equipment coordination
AASHTO/ITE/NEMA	NTCIP 1210	Field Management Stations (FMS) - Part 1: Object Definitions for Signal System Masters	Message/Data	No	Field/ Traffic Detectors	Field/ Traffic Signal Controllers	signal control data
AASHTO/ITE/NEMA	NTCIP 1210	Field Management Stations (FMS) - Part 1: Object Definitions for Signal System Masters	Message/Data	No	Field/ Traffic Signal Controllers	Center/ MOA Signal Control	signal control status
AASHTO/ITE/NEMA	NTCIP 1210	Field Management Stations (FMS) - Part 1: Object Definitions for Signal System Masters	Message/Data	No	Field/ Traffic Signal Controllers	Center/ MOA Signal Control	signal fault data
AASHTO/ITE/NEMA	NTCIP 1210	Field Management Stations (FMS) - Part 1: Object Definitions for Signal System Masters	Message/Data	No	Field/ Traffic Signal Controllers	Field/ Pre-emption and Priority Systems	roadway equipment coordination
AASHTO/ITE/NEMA	NTCIP 1210	Field Management Stations (FMS) - Part 1: Object Definitions for Signal System Masters	Message/Data	No	Field/ Traffic Signal Controllers	Field/ Pre-emption and Priority Systems	signal control data
AASHTO/ITE/NEMA	NTCIP 1211	Object Definitions for Signal Control and Prioritization (SCP)	Message/Data	No	Center/ MOA Signal Control	Field/ Traffic Signal Controllers	signal control commands
AASHTO/ITE/NEMA	NTCIP 1211	Object Definitions for Signal Control and Prioritization (SCP)	Message/Data	No	Center/ MOA Signal Control	Field/ Traffic Signal Controllers	signal control device configuration
AASHTO/ITE/NEMA	NTCIP 1211	Object Definitions for Signal Control and Prioritization (SCP)	Message/Data	No	Center/ MOA Signal Control	Field/ Traffic Signal Controllers	signal control plans
AASHTO/ITE/NEMA	NTCIP 1211	Object Definitions for Signal Control and Prioritization (SCP)	Message/Data	No	Center/ MOA Signal Control	Field/ Traffic Signal Controllers	signal system configuration
AASHTO/ITE/NEMA	NTCIP 1211	Object Definitions for Signal Control and Prioritization (SCP)	Message/Data	No	Field/ Pre-emption and Priority Systems	Center/ MOA Signal Control	right-of-way request notification
AASHTO/ITE/NEMA	NTCIP 1211	Object Definitions for Signal Control and Prioritization (SCP)	Message/Data	No	Field/ Pre-emption and Priority Systems	Field/ Traffic Signal Controllers	signal control data

SDO	Document ID	Standard Title	Standard Type	User Defined	Source Element	Destination Element	Flow Name
AASHTO/ITE/NEMA	NTCIP 1211	Object Definitions for Signal Control and Prioritization (SCP)	Message/Data	No	Field/ Traffic Detectors	Field/ Traffic Signal Controllers	signal control data
AASHTO/ITE/NEMA	NTCIP 1211	Object Definitions for Signal Control and Prioritization (SCP)	Message/Data	No	Field/ Traffic Signal Controllers	Field/ Pre-emption and Priority Systems	signal control data
AASHTO/ITE/NEMA	NTCIP 1211	Object Definitions for Signal Control and Prioritization (SCP)	Message/Data	No	Vehicle/ Transit Vehicle On-board Systems (Placeholder)	Field/ Pre-emption and Priority Systems	local signal priority request
AASHTO/ITE/NEMA	NTCIP 1214	Object Definitions for Conflict Monitor Units (CMU)	Message/Data	No	Center/ MOA Signal Control	Field/ Traffic Signal Controllers	signal control commands
AASHTO/ITE/NEMA	NTCIP 1214	Object Definitions for Conflict Monitor Units (CMU)	Message/Data	No	Center/ MOA Signal Control	Field/ Traffic Signal Controllers	signal control device configuration
AASHTO/ITE/NEMA	NTCIP 1214	Object Definitions for Conflict Monitor Units (CMU)	Message/Data	No	Center/ MOA Signal Control	Field/ Traffic Signal Controllers	signal control plans
AASHTO/ITE/NEMA	NTCIP 1214	Object Definitions for Conflict Monitor Units (CMU)	Message/Data	No	Center/ MOA Signal Control	Field/ Traffic Signal Controllers	signal system configuration
AASHTO/ITE/NEMA	NTCIP 1214	Object Definitions for Conflict Monitor Units (CMU)	Message/Data	No	Field/ Pre-emption and Priority Systems	Center/ MOA Signal Control	right-of-way request notification
AASHTO/ITE/NEMA	NTCIP 1214	Object Definitions for Conflict Monitor Units (CMU)	Message/Data	No	Field/ Pre-emption and Priority Systems	Field/ Traffic Signal Controllers	roadway equipment coordination
AASHTO/ITE/NEMA	NTCIP 1214	Object Definitions for Conflict Monitor Units (CMU)	Message/Data	No	Field/ Pre-emption and Priority Systems	Field/ Traffic Signal Controllers	signal control data
AASHTO/ITE/NEMA	NTCIP 1214	Object Definitions for Conflict Monitor Units (CMU)	Message/Data	No	Field/ Traffic Detectors	Field/ Traffic Signal Controllers	roadway equipment coordination
AASHTO/ITE/NEMA	NTCIP 1214	Object Definitions for Conflict Monitor Units (CMU)	Message/Data	No	Field/ Traffic Detectors	Field/ Traffic Signal Controllers	signal control data
AASHTO/ITE/NEMA	NTCIP 1214	Object Definitions for Conflict Monitor Units (CMU)	Message/Data	No	Field/ Traffic Signal Controllers	Center/ MOA Signal Control	signal control status
AASHTO/ITE/NEMA	NTCIP 1214	Object Definitions for Conflict Monitor Units (CMU)	Message/Data	No	Field/ Traffic Signal Controllers	Center/ MOA Signal Control	signal fault data
AASHTO/ITE/NEMA	NTCIP 1214	Object Definitions for Conflict Monitor Units (CMU)	Message/Data	No	Field/ Traffic Signal Controllers	Field/ Pre-emption and Priority Systems	roadway equipment coordination
AASHTO/ITE/NEMA	NTCIP 1214	Object Definitions for Conflict Monitor Units (CMU)	Message/Data	No	Field/ Traffic Signal Controllers	Field/ Pre-emption and Priority Systems	signal control data
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Cameras	Center/ Traveler Information	incident information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Cameras	Center/ Traveler Information	road network conditions
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ MOA Signal Control	Center/ MOA Archive Data Services	traffic archive data

SDO	Document ID	Standard Title	Standard Type	User Defined	Source Element	Destination Element	Flow Name
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ MOA Signal Control	Center/ Traffic Information Dissemination (MOA)	incident information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ MOA Signal Control	Center/ Traffic Information Dissemination (MOA)	road network conditions
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ MOA Signal Control	Center/ Traveler Information	incident information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ MOA Signal Control	Center/ Traveler Information	road network conditions
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Traveler Information	Center/ MOA Signal Control	road network traffic probe data
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Field/ Pre-emption and Priority Systems	Field/ Traffic Signal Controllers	roadway equipment coordination
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Field/ Traffic Detectors	Field/ Traffic Signal Controllers	roadway equipment coordination
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Field/ Traffic Signal Controllers	Field/ Pre-emption and Priority Systems	roadway equipment coordination
AASHTO/ITE/NEMA	NTCIP C2F	NTCIP Center-to-Field Standards Group	Group	No	Center/ Cameras	Field/ Cameras	traffic sensor control
AASHTO/ITE/NEMA	NTCIP C2F	NTCIP Center-to-Field Standards Group	Group	No	Center/ Cameras	Field/ Cameras	video surveillance control
AASHTO/ITE/NEMA	NTCIP C2F	NTCIP Center-to-Field Standards Group	Group	No	Center/ MOA Signal Control	Field/ Traffic Signal Controllers	hri control data
AASHTO/ITE/NEMA	NTCIP C2F	NTCIP Center-to-Field Standards Group	Group	No	Center/ MOA Signal Control	Field/ Traffic Signal Controllers	hri request
AASHTO/ITE/NEMA	NTCIP C2F	NTCIP Center-to-Field Standards Group	Group	No	Center/ MOA Signal Control	Field/ Traffic Signal Controllers	signal control commands
AASHTO/ITE/NEMA	NTCIP C2F	NTCIP Center-to-Field Standards Group	Group	No	Center/ MOA Signal Control	Field/ Traffic Signal Controllers	signal control device configuration
AASHTO/ITE/NEMA	NTCIP C2F	NTCIP Center-to-Field Standards Group	Group	No	Center/ MOA Signal Control	Field/ Traffic Signal Controllers	signal control plans
AASHTO/ITE/NEMA	NTCIP C2F	NTCIP Center-to-Field Standards Group	Group	No	Center/ MOA Signal Control	Field/ Traffic Signal Controllers	signal system configuration
AASHTO/ITE/NEMA	NTCIP C2F	NTCIP Center-to-Field Standards Group	Group	No	Center/ Traffic Information Dissemination (ADOTPF)	Field/ Permanent Dynamic Message Signs (ADOTPF)	roadway information system data
AASHTO/ITE/NEMA	NTCIP C2F	NTCIP Center-to-Field Standards Group	Group	No	Center/ Traffic Information Dissemination (MOA)	Field/ Permanent Dynamic Message Signs (MOA)	roadway information system data
AASHTO/ITE/NEMA	NTCIP C2F	NTCIP Center-to-Field Standards Group	Group	No	Field/ Cameras	Center/ Cameras	traffic flow

SDO	Document ID	Standard Title	Standard Type	User Defined	Source Element	Destination Element	Flow Name
AASHTO/ITE/NEMA	NTCIP C2F	NTCIP Center-to-Field Standards Group	Group	No	Field/ Cameras	Center/ Cameras	traffic images
AASHTO/ITE/NEMA	NTCIP C2F	NTCIP Center-to-Field Standards Group	Group	No	Field/ Permanent Dynamic Message Signs (ADOTPF)	Center/ Traffic Information Dissemination (ADOTPF)	roadway information system status
AASHTO/ITE/NEMA	NTCIP C2F	NTCIP Center-to-Field Standards Group	Group	No	Field/ Permanent Dynamic Message Signs (MOA)	Center/ Traffic Information Dissemination (MOA)	roadway information system status
AASHTO/ITE/NEMA	NTCIP C2F	NTCIP Center-to-Field Standards Group	Group	No	Field/ Pre-emption and Priority Systems	Center/ MOA Signal Control	right-of-way request notification
AASHTO/ITE/NEMA	NTCIP C2F	NTCIP Center-to-Field Standards Group	Group	No	Field/ Pre-emption and Priority Systems	Field/ Traffic Signal Controllers	signal control data
AASHTO/ITE/NEMA	NTCIP C2F	NTCIP Center-to-Field Standards Group	Group	No	Field/ Traffic Detectors	Center/ MOA Signal Control	intersection blockage notification
AASHTO/ITE/NEMA	NTCIP C2F	NTCIP Center-to-Field Standards Group	Group	No	Field/ Traffic Detectors	Field/ Traffic Signal Controllers	signal control data
AASHTO/ITE/NEMA	NTCIP C2F	NTCIP Center-to-Field Standards Group	Group	No	Field/ Traffic Signal Controllers	Center/ MOA Signal Control	hri status
AASHTO/ITE/NEMA	NTCIP C2F	NTCIP Center-to-Field Standards Group	Group	No	Field/ Traffic Signal Controllers	Center/ MOA Signal Control	signal control status
AASHTO/ITE/NEMA	NTCIP C2F	NTCIP Center-to-Field Standards Group	Group	No	Field/ Traffic Signal Controllers	Center/ MOA Signal Control	signal fault data
AASHTO/ITE/NEMA	NTCIP C2F	NTCIP Center-to-Field Standards Group	Group	No	Field/ Traffic Signal Controllers	Center/ MOA Signal Control	traffic flow
AASHTO/ITE/NEMA	NTCIP C2F	NTCIP Center-to-Field Standards Group	Group	No	Field/ Traffic Signal Controllers	Field/ Pre-emption and Priority Systems	signal control data
APTA	APTA TCIP-S-001 3.0.4	Standard for Transit Communications Interface Profiles	Message/Data	No	Vehicle/ Transit Vehicle On-board Systems (Placeholder)	Field/ Pre-emption and Priority Systems	local signal priority request
ASTM	ASTM E2468-05	Standard Practice for Metadata to Support Archived Data Management Systems	Other	No	Center/ MOA Signal Control	Center/ MOA Archive Data Services	traffic archive data
ASTM	ASTM E2665-08	Standard Specifications for Archiving ITS-Generated Traffic Monitoring Data	Message/Data	No	Center/ MOA Signal Control	Center/ MOA Archive Data Services	traffic archive data
ASTM	DSRC 915MHz	Dedicated Short Range Communication at 915 MHz Standards Group	Group	No	Vehicle/ General Public Vehicles	Field/ Traffic Detectors	traffic probe data
ASTM	DSRC 915MHz	Dedicated Short Range Communication at 915 MHz Standards Group	Group	No	Vehicle/ Transit Vehicle On-board Systems (Placeholder)	Field/ Pre-emption and Priority Systems	local signal priority request
ASTM/IEEE/SAE	DSRC 5GHz	Dedicated Short Range Communication at 5.9 GHz Standards Group	Group	No	Vehicle/ General Public Vehicles	Field/ Traffic Detectors	traffic probe data
ASTM/IEEE/SAE	DSRC 5GHz	Dedicated Short Range Communication at 5.9 GHz Standards Group	Group	No	Vehicle/ Transit Vehicle On-board Systems (Placeholder)	Field/ Pre-emption and Priority Systems	local signal priority request

SDO	Document ID	Standard Title	Standard Type	User Defined	Source Element	Destination Element	Flow Name
IEEE	IEEE 1455-1999	Standard for Message Sets for Vehicle/Roadside Communications	Message/Data	No	Vehicle/ General Public Vehicles	Field/ Traffic Detectors	traffic probe data
IEEE	IEEE 1570-2002	Standard for the Interface Between the Rail Subsystem and the Highway Subsystem at a Highway Rail Intersection	Message/Data	No	Field/ Rail Wayside Equipment	Field/ Traffic Detectors	arriving train information
IEEE	IEEE 1570-2002	Standard for the Interface Between the Rail Subsystem and the Highway Subsystem at a Highway Rail Intersection	Message/Data	No	Field/ Rail Wayside Equipment	Field/ Traffic Detectors	track status
IEEE	IEEE 1570-2002	Standard for the Interface Between the Rail Subsystem and the Highway Subsystem at a Highway Rail Intersection	Message/Data	No	Field/ Traffic Detectors	Field/ Rail Wayside Equipment	intersection blockage notification
IEEE	IEEE 1570-2002	Standard for the Interface Between the Rail Subsystem and the Highway Subsystem at a Highway Rail Intersection	Message/Data	No	Field/ Traffic Signal Controllers	Field/ Rail Wayside Equipment	hri operational status
IEEE	IEEE IM	Incident Management Standards Group	Group	No	Center/ Cameras	Center/ Traveler Information	incident information
IEEE	IEEE IM	Incident Management Standards Group	Group	No	Center/ MOA Signal Control	Center/ Traveler Information	incident information
SAE	SAE J2735	Dedicated Short Range Communications (DSRC) Message Set Dictionary	Message/Data	No	Field/ Traffic Detectors	Vehicle/ General Public Vehicles	traffic probe reporting management
SAE	SAE J2735	Dedicated Short Range Communications (DSRC) Message Set Dictionary	Message/Data	No	Vehicle/ General Public Vehicles	Field/ Traffic Detectors	traffic probe data

12.3 Roadway Maintenance & Construction Standards

Table 18. Roadway Maintenance & Construction Standards

SDO	Document ID	Standard Title	Standard Type	User Defined	Source Element	Destination Element	Flow Name
AASHTO/ITE	ITE TMDD	Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC)	Message/Data	No	Center/ MOA Maintenance Dispatch Office	Center/ MOA Archive Data Services	road weather information
AASHTO/ITE	ITE TMDD	Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC)	Message/Data	No	Center/ MOA Maintenance Dispatch Office	Center/ Traveler Information	environmental conditions data
AASHTO/ITE	ITE TMDD	Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC)	Message/Data	No	Center/ MOA Maintenance Dispatch Office	Center/ Traveler Information	road weather information
AASHTO/ITE/NEMA	NTCIP 1201	Global Object Definitions	Message/Data	No	Field/ Road Weather Information Systems (RWIS)	Center/ MOA Maintenance Dispatch Office	environmental sensor data
AASHTO/ITE/NEMA	NTCIP 1201	Global Object Definitions	Message/Data	No	Field/ Road Weather Information Systems (RWIS)	Center/ MOA Maintenance Dispatch Office	traffic images
AASHTO/ITE/NEMA	NTCIP 1204	Object Definitions for Environmental Sensor Stations (ESS)	Message/Data	No	Field/ Road Weather Information Systems (RWIS)	Center/ MOA Maintenance Dispatch Office	environmental sensor data
AASHTO/ITE/NEMA	NTCIP 1205	Object Definitions for Closed Circuit Television (CCTV) Camera Control	Message/Data	No	Field/ Road Weather Information Systems (RWIS)	Center/ MOA Maintenance Dispatch Office	traffic images
AASHTO/ITE/NEMA	NTCIP 1208	Object Definitions for Closed Circuit Television (CCTV) Switching	Message/Data	No	Field/ Road Weather Information Systems (RWIS)	Center/ MOA Maintenance Dispatch Office	traffic images
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ MOA Maintenance Dispatch Office	Center/ MOA Archive Data Services	maint and constr work plans
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ MOA Maintenance Dispatch Office	Center/ MOA Archive Data Services	road weather information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ MOA Maintenance Dispatch Office	Center/ MOA Archive Data Services	work zone information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ MOA Maintenance Dispatch Office	Center/ Traveler Information	environmental conditions data

SDO	Document ID	Standard Title	Standard Type	User Defined	Source Element	Destination Element	Flow Name
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ MOA Maintenance Dispatch Office	Center/ Traveler Information	road weather information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ National Weather Service Offices	Center/ MOA Maintenance Dispatch Office	qualified environmental conditions data
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ National Weather Service Offices	Center/ MOA Maintenance Dispatch Office	weather information
AASHTO/ITE/NEMA	NTCIP C2F	NTCIP Center-to-Field Standards Group	Group	No	Field/ Road Weather Information Systems (RWIS)	Center/ MOA Maintenance Dispatch Office	environmental sensor data
AASHTO/ITE/NEMA	NTCIP C2F	NTCIP Center-to-Field Standards Group	Group	No	Field/ Road Weather Information Systems (RWIS)	Center/ MOA Maintenance Dispatch Office	traffic images

12.4 Transit Operations Standards

Table 19. Transit Operations Standards

SDO	Document ID	Standard Title	Standard Type	User Defined	Source Element	Destination Element	Flow Name
AASHTO/ITE/NEMA	NTCIP 1201	Global Object Definitions	Message/Data	No	Field/ Transit Agency Security Monitoring Systems	Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	secure area surveillance data
AASHTO/ITE/NEMA	NTCIP 1201	Global Object Definitions	Message/Data	No	Vehicle/ Transit Vehicle On-Board Systems (Security, Trip Monitoring, Schedule Management, Passenger Counting, Fare Management, Transit Information, Transit Signal Priority	Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	secure area surveillance data
AASHTO/ITE/NEMA	NTCIP 1201	Global Object Definitions	Message/Data	No	Vehicle/ Transit Vehicle On-Board Systems (Security, Trip Monitoring, Schedule Management, Passenger Counting, Fare Management, Transit Information, Transit Signal Priority	Field/ Traffic Signal Controllers	local signal priority request
AASHTO/ITE/NEMA	NTCIP 1205	Object Definitions for Closed Circuit Television (CCTV) Camera Control	Message/Data	No	Field/ Transit Agency Security Monitoring Systems	Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	secure area surveillance data
AASHTO/ITE/NEMA	NTCIP 1205	Object Definitions for Closed Circuit Television (CCTV) Camera Control	Message/Data	No	Vehicle/ Transit Vehicle On-Board Systems (Security, Trip Monitoring, Schedule Management, Passenger Counting, Fare Management, Transit Information, Transit Signal Priority	Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	secure area surveillance data
AASHTO/ITE/NEMA	NTCIP 1208	Object Definitions for Closed Circuit Television (CCTV) Switching	Message/Data	No	Field/ Transit Agency Security Monitoring Systems	Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	secure area surveillance data
AASHTO/ITE/NEMA	NTCIP 1211	Object Definitions for Signal Control and Prioritization (SCP)	Message/Data	No	Vehicle/ Transit Vehicle On-Board Systems (Security, Trip Monitoring, Schedule Management, Passenger Counting, Fare Management, Transit Information, Transit Signal Priority	Field/ Traffic Signal Controllers	local signal priority request
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	alert status

SDO	Document ID	Standard Title	Standard Type	User Defined	Source Element	Destination Element	Flow Name
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	emergency plan coordination
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	emergency transit schedule information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	emergency transit service response
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	transit emergency data
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	transit system status assessment
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Center/ Transit Agency Websites	demand responsive transit plan
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Center/ Transit Agency Websites	emergency transit schedule information

SDO	Document ID	Standard Title	Standard Type	User Defined	Source Element	Destination Element	Flow Name
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Center/ Transit Agency Websites	transit and fare schedules
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Center/ Transit Agency Websites	transit incident information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Center/ Transit Agency Websites	transit schedule adherence information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Center/ Traveler Information	demand responsive transit plan
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Center/ Traveler Information	emergency traveler information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Center/ Traveler Information	transit and fare schedules
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Center/ Traveler Information	transit schedule adherence information

SDO	Document ID	Standard Title	Standard Type	User Defined	Source Element	Destination Element	Flow Name
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	alert notification
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	emergency plan coordination
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	emergency transit service request
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	evacuation information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	incident information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	incident response status
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	threat information

SDO	Document ID	Standard Title	Standard Type	User Defined	Source Element	Destination Element	Flow Name
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	transportation system status
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ National Weather Service Offices	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	weather information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Transit Agency Websites	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	demand responsive transit request
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Transit Agency Websites	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	selected routes
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Transit Agency Websites	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	transit information request
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Transit Agency Websites	Center/ Traveler Information	emergency traveler information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Transit Agency Websites	Center/ Traveler Information	incident information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Transit Agency Websites	Center/ Traveler Information	parking information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Transit Agency Websites	Center/ Traveler Information	transit service information

SDO	Document ID	Standard Title	Standard Type	User Defined	Source Element	Destination Element	Flow Name
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Traveler Information	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	demand responsive transit request
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Traveler Information	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	selected routes
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Traveler Information	Center/ Transit Agency Websites	emergency traveler information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Traveler Information	Center/ Transit Agency Websites	transit service information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Field/ Parking Management and Information	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	parking information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Field/ Parking Management and Information	Center/ Transit Agency Websites	parking information
AASHTO/ITE/NEMA	NTCIP C2F	NTCIP Center-to-Field Standards Group	Group	No	Field/ Transit Agency Security Monitoring Systems	Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	secure area surveillance data
APTA	APTA TCIP-S-001 3.0.4	Standard for Transit Communications Interface Profiles	Message/Data	No	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Center/ Transit Agency Websites	transit and fare schedules
APTA	APTA TCIP-S-001 3.0.4	Standard for Transit Communications Interface Profiles	Message/Data	No	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Center/ Transit Agency Websites	transit schedule adherence information

SDO	Document ID	Standard Title	Standard Type	User Defined	Source Element	Destination Element	Flow Name
APTA	APTA TCIP-S-001 3.0.4	Standard for Transit Communications Interface Profiles	Message/Data	No	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Center/ Traveler Information	transit and fare schedules
APTA	APTA TCIP-S-001 3.0.4	Standard for Transit Communications Interface Profiles	Message/Data	No	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Center/ Traveler Information	transit schedule adherence information
APTA	APTA TCIP-S-001 3.0.4	Standard for Transit Communications Interface Profiles	Message/Data	No	Field/ Parking Management and Information	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	parking information
APTA	APTA TCIP-S-001 3.0.4	Standard for Transit Communications Interface Profiles	Message/Data	No	Vehicle/ Transit Vehicle On-Board Systems (Security, Trip Monitoring, Schedule Management, Passenger Counting, Fare Management, Transit Information, Transit Signal Priority	Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	secure area surveillance data
APTA	APTA TCIP-S-001 3.0.4	Standard for Transit Communications Interface Profiles	Message/Data	No	Vehicle/ Transit Vehicle On-Board Systems (Security, Trip Monitoring, Schedule Management, Passenger Counting, Fare Management, Transit Information, Transit Signal Priority	Field/ Traffic Signal Controllers	local signal priority request
ASTM	DSRC 915MHz	Dedicated Short Range Communication at 915 MHz Standards Group	Group	No	Vehicle/ Transit Vehicle On-Board Systems (Security, Trip Monitoring, Schedule Management, Passenger Counting, Fare Management, Transit Information, Transit Signal Priority	Field/ Traffic Signal Controllers	local signal priority request
ASTM/IEEE/SAE	DSRC 5GHz	Dedicated Short Range Communication at 5.9 GHz Standards Group	Group	No	Vehicle/ Transit Vehicle On-Board Systems (Security, Trip Monitoring, Schedule Management, Passenger Counting, Fare Management, Transit Information, Transit Signal Priority	Field/ Traffic Signal Controllers	local signal priority request
IEEE	IEEE IM	Incident Management Standards Group	Group	No	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	transit emergency data

SDO	Document ID	Standard Title	Standard Type	User Defined	Source Element	Destination Element	Flow Name
IEEE	IEEE IM	Incident Management Standards Group	Group	No	Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	incident information
IEEE	IEEE IM	Incident Management Standards Group	Group	No	Center/ MOA Emergency Operations Center, Anchorage Police Department Dispatch	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	incident response status
SAE	ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	Group	No	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	Center/ Traveler Information	emergency traveler information
SAE	ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	Group	No	Center/ Transit Agency Websites	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	selected routes
SAE	ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	Group	No	Center/ Transit Agency Websites	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	transit information request
SAE	ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	Group	No	Center/ Transit Agency Websites	Center/ Traveler Information	emergency traveler information
SAE	ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	Group	No	Center/ Transit Agency Websites	Center/ Traveler Information	incident information
SAE	ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	Group	No	Center/ Transit Agency Websites	Center/ Traveler Information	parking information
SAE	ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	Group	No	Center/ Transit Agency Websites	Center/ Traveler Information	transit service information

SDO	Document ID	Standard Title	Standard Type	User Defined	Source Element	Destination Element	Flow Name
SAE	ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	Group	No	Center/ Traveler Information	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	selected routes
SAE	ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	Group	No	Center/ Traveler Information	Center/ Transit Agency Websites	emergency traveler information
SAE	ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	Group	No	Center/ Traveler Information	Center/ Transit Agency Websites	transit service information
SAE	ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	Group	No	Field/ Parking Management and Information	Center/ Information Services, Vehicle Tracking, Fixed-Route Operations, Demand Response/Paratransit Operations, Security, Passenger Counting, Fleet Management, and Fare Management	parking information
SAE	ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	Group	No	Field/ Parking Management and Information	Center/ Transit Agency Websites	parking information

12.5 Traveler Information Standards

Table 20. Traveler Information Standards

SDO	Document ID	Standard Title	Standard Type	User Defined	Source Element	Destination Element	Flow Name
AASHTO/ITE	ITE TMDD	Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC)	Message/Data	No	Center/ Cameras	Center/ Traveler Information	road network conditions
AASHTO/ITE	ITE TMDD	Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC)	Message/Data	No	Center/ MOA Maintenance Dispatch Office	Center/ Traveler Information	road network conditions
AASHTO/ITE	ITE TMDD	Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC)	Message/Data	No	Center/ MOA Maintenance Dispatch Office	Center/ Traveler Information	road weather information
AASHTO/ITE	ITE TMDD	Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC)	Message/Data	No	Center/ Traveler Information	Center/ Controlled Agency Information Access	road weather information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Cameras	Center/ Traveler Information	road network conditions
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Controlled Agency Information Access	Center/ Traveler Information	alert notification
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Controlled Agency Information Access	Center/ Traveler Information	evacuation information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Controlled Agency Information Access	Center/ Traveler Information	incident information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Controlled Agency Information Access	Center/ Traveler Information	transportation system status
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ MOA Maintenance Dispatch Office	Center/ Traveler Information	road network conditions
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ MOA Maintenance Dispatch Office	Center/ Traveler Information	road weather information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ MOA Maintenance Dispatch Office	Center/ Traveler Information	roadway maintenance status

SDO	Document ID	Standard Title	Standard Type	User Defined	Source Element	Destination Element	Flow Name
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Traveler Information	Center/ Controlled Agency Information Access	alert notification
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Traveler Information	Center/ Controlled Agency Information Access	emergency traveler information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Traveler Information	Center/ Controlled Agency Information Access	evacuation information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Traveler Information	Center/ Controlled Agency Information Access	incident information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Traveler Information	Center/ Controlled Agency Information Access	road network conditions
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Traveler Information	Center/ Controlled Agency Information Access	road weather information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Traveler Information	Center/ Controlled Agency Information Access	roadway maintenance status
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Traveler Information	Center/ Controlled Agency Information Access	traffic images
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Traveler Information	Center/ Controlled Agency Information Access	transportation system status
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Traveler Information	Center/ Information	emergency traveler information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Traveler Information	Center/ Information	incident information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Traveler Information	Center/ Information	parking information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Traveler Information	Center/ Information	road network conditions
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Traveler Information	Center/ Information	traffic images
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Traveler Information	Center/ Public Broadcast Emergency System (Phone)	emergency traveler information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Traveler Information	Center/ Public Broadcast Emergency System (Phone)	incident information

SDO	Document ID	Standard Title	Standard Type	User Defined	Source Element	Destination Element	Flow Name
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Traveler Information	Center/ Public Broadcast Emergency System (Phone)	road network conditions
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Traveler Information	Center/ Public Information Access	incident information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Traveler Information	Center/ Public Information Access	parking information
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Traveler Information	Center/ Public Information Access	road network conditions
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No	Center/ Traveler Information	Center/ Public Information Access	traffic images
IEEE	IEEE IM	Incident Management Standards Group	Group	No	Center/ Controlled Agency Information Access	Center/ Traveler Information	incident information
IEEE	IEEE IM	Incident Management Standards Group	Group	No	Center/ Traveler Information	Center/ Controlled Agency Information Access	incident information
IEEE	IEEE IM	Incident Management Standards Group	Group	No	Center/ Traveler Information	Center/ Public Broadcast Emergency System (Phone)	incident information
SAE	ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	Group	No	Center/ Controlled Agency Information Access	Center/ Traveler Information	incident information
SAE	ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	Group	No	Center/ Traveler Information	Center/ Controlled Agency Information Access	emergency traveler information
SAE	ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	Group	No	Center/ Traveler Information	Center/ Controlled Agency Information Access	incident information
SAE	ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	Group	No	Center/ Traveler Information	Center/ Controlled Agency Information Access	road network conditions
SAE	ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	Group	No	Center/ Traveler Information	Center/ Information	broadcast traveler information
SAE	ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	Group	No	Center/ Traveler Information	Center/ Information	emergency traveler information
SAE	ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	Group	No	Center/ Traveler Information	Center/ Information	incident information
SAE	ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	Group	No	Center/ Traveler Information	Center/ Information	parking information
SAE	ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	Group	No	Center/ Traveler Information	Center/ Information	road network conditions
SAE	ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	Group	No	Center/ Traveler Information	Center/ Public Broadcast Emergency System (Phone)	emergency traveler information

SDO	Document ID	Standard Title	Standard Type	User Defined	Source Element	Destination Element	Flow Name
SAE	ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	Group	No	Center/ Traveler Information	Center/ Public Broadcast Emergency System (Phone)	incident information
SAE	ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	Group	No	Center/ Traveler Information	Center/ Public Broadcast Emergency System (Phone)	road network conditions
SAE	ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	Group	No	Center/ Traveler Information	Center/ Public Information Access	broadcast traveler information
SAE	ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	Group	No	Center/ Traveler Information	Center/ Public Information Access	incident information
SAE	ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	Group	No	Center/ Traveler Information	Center/ Public Information Access	parking information
SAE	ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	Group	No	Center/ Traveler Information	Center/ Public Information Access	road network conditions
SAE	ATIS Low Bandwidth	Advanced Traveler Information Systems (ATIS) Bandwidth Limited Standards Group	Group	No	Center/ Traveler Information	Center/ Information	broadcast traveler information
SAE	ATIS Low Bandwidth	Advanced Traveler Information Systems (ATIS) Bandwidth Limited Standards Group	Group	No	Center/ Traveler Information	Center/ Public Information Access	broadcast traveler information