

# *Standards Requirements Package 13: Archived Data Management Interfaces*

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# 1. Introduction to Standards Requirements Documentation

The Standards Requirements Packages are intended to be used in conjunction with the other architecture documents. In particular, the introductory chapters of the Standards Requirements Document provide contextual material and explanations/justifications of some of the methods used to evaluate and rate architecture flows. However, it is recognized that many people may initially only receive a given Standards Requirements Package, without the associated supporting material. To aid these individuals, we offer some generic introductory material to promote understanding of the context and approach used to create a Standards Requirements Package. Ultimately, any standards development organization pursuing an ITS-related standard should ensure that they have access to a complete set of the architecture documents as a reference source.

## *What's New in this Version?*

- This version of the Standards Requirements Package has been updated based on new physical architecture flows and underlying logical data flows recently added to the National ITS Architecture. These new flows provide new material for the standards community to consider.
- This version of the Standards Requirements Package is based on logical data flows whereas previous versions had been based on a separate set of flows called Leveled Data Items. Rather than maintain two sets of information in the architecture, it was felt that these packages could provide the raw material from the logical architecture for the SDOs. If further information is needed to clarify the content or organization of the logical data flows, the architecture team can be contacted for assistance.
- This version of the Standards Requirements Package also includes the new Maintenance and Construction interface with the Archive Data Management Subsystem. The new interfaces added are the ADMS ↔ MCMS which replaced Construction and Maintenance terminator – X09; ADMS ↔ Surface Transportation Weather Service (X77); and ADMS ↔ Asset Management (X79). Also modified the architecture flow name for ADMS to RS. There are a list of architecture flows and logical data flows associated with the interface, as well as the communication layer requirements and the constraints.

For this version of the Standards Requirements Packages, some of the changes from Version 3.0 to Version 4.0 of the National ITS Architecture are reflected in the addenda found on the Version 4.0 CD-ROM and website. Addenda were compiled to reflect the smaller changes to affected Standards Requirements Packages that did not necessitate a wholesale rewrite. Addenda have been created for Standards Requirements Packages 1, 2, 3, 5, 6, 7, 9, 10 and 11.

## 1.1 Standards Requirements Document Executive Summary

The executive summary of the Standards Requirements Document is reproduced here, to provide a sense of the overall goals and content of the document.

The Standards Requirements Document (“SRD”) collects information from the other National ITS Architecture program documents and reorganizes it in a manner intended to support the development of critical ITS standards. The key results in the SRD are a reference model for the National ITS Architecture, a rating scheme for evaluating the standardization issues associated with individual data flows that make up the architecture interfaces, and then a set of priority groupings of interfaces into standards requirements “packages”. These results and the major conclusions are summarized below.

The introductory section explains the structure of the SRD and its intended usage. The strategy is that the reference model provides the overall context for a standards development organization ("SDO"). A given SDO can pull a particular package of standards requirements out of the document and then use the reference model as a quick reference to the overall architecture. More detailed needs will require going to the original source documents, such as the Logical or Physical Architectures.

The next section provides the rationale for several different ratings schemes applied to the architecture interconnects and flows. These include interoperability requirements, technology maturity assessments, and stakeholder interest. All architecture interconnects were examined with respect to these measures. The stakeholder interest and interoperability requirements in particular were then used as the basis for selecting the standards requirements packages. In general, interfaces associated with mobile systems had both the greatest stakeholder interest and the most stringent interoperability requirements. Following close behind were interfaces associated with Traffic Management and Information Service Provider subsystems.

The Architecture Reference Model is provided next as a high level definition of the components that form the National ITS Architecture. It depicts the interconnectivity of the subsystems and terminators, their definitions, and suitable types of communications strategies. This reference model is an important tool for communicating the full breadth of the architecture at an abstracted level. In the SRD it is intended as a contextual reference, but, as a separate document, the reference model has received international circulation through the International Organization of Standards (ISO) as a basis for documenting and comparing ITS architectures.

The "meat" of the SRD is the set of standards requirements packages. Each package is a special grouping of standards requirements and contextual information intended to be used in a nearly standalone fashion by an SDO. Thus, packages have been selected that cover the key ITS priorities, maintain the integrity and vision of the National ITS Architecture, and also are perceived as having an interested stakeholder constituency that will help drive standardization. This is a difficult balancing act, but the following 14 packages were identified as covering the high priority standardization needs for the architecture program:

1. Dedicated Short Range Communications (DSRC)
2. Digital Map Data Exchange and Location Referencing Formats
3. Information Service Provider Wireless Interfaces
4. Inter-Center Data Exchange for Commercial Vehicle Operations
5. Personal, Transit, and HAZMAT Maydays
6. Traffic Management Subsystem to Other Centers (except EMS)
7. Traffic Management Subsystem to Roadside Devices and Emissions Monitoring
8. Signal Priority for Transit and Emergency Vehicles
9. Emergency Management Subsystem to Other Centers
10. Information Service Provider Subsystem to Other Centers (except EMS and TMS)
11. Transit Management Subsystem Interfaces
12. Highway Rail Intersections (HRI)
13. Archived Data Management Subsystem Interfaces
14. Maintenance and Construction Management Interfaces

These 14 areas cover much of the National ITS Architecture and represent the distillation of stakeholder interests and architecture interoperability requirements. If standardization can be achieved in the near term for all or most of these packages, then ITS will be a long way towards achieving the original vision captured in the user service requirements.

## 1.2 Constructing a Standards Requirements Package

The intent of creating a Standards Requirements Package is to facilitate efforts to standardize some subset of the National ITS Architecture. The “packaging” process involves abstracting and reorganizing information from other documents, primarily the Logical and Physical Architectures.

This Standards Requirements Package has the following main components:

- General introduction to the scope and intent of this package
- Message transaction sets
- Communications considerations
- Constraints
- Decomposition of the interfaces
- Data Dictionary Entry definitions

The general introduction is self-explanatory, but the other items require some explanation. We will address them one at a time:

*Message Transaction Sets:* In order to accomplish a given activity, a series of messages usually have to be exchanged between two or more subsystems. These messages, as a group, constitute a message transaction set. The sequencing of the messages is shown via the physical architecture flow, each representing individual messages.

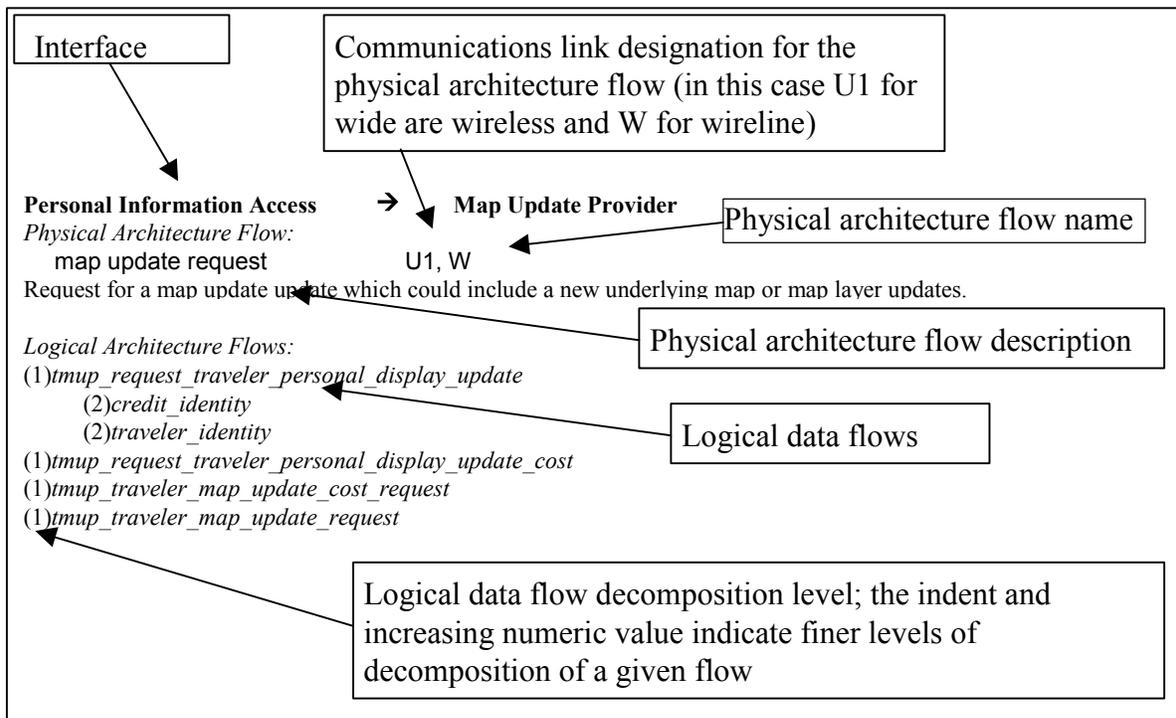
For version 4.0, we will be referencing portions of the revised Theory of Operations which defines the transactions for each Market Package.

*Communications Considerations* provides a discussion of the basic nature of the communications modalities that are suitable for supporting the interfaces in the particular standards requirements package. This section identifies some high level requirements, but the primary focus is to provide information that is viewed as useful to the initiation of the standardization process.

*Constraints* lists the architecture flows and any constraints placed upon them.

*Decomposition of the Interfaces:* This is the hierarchy of items that constitute an interface. It starts with the interface between two subsystems itself, or between a subsystem and a terminator, which is then decomposed into physical architecture flows. Each of the physical architecture flows is then decomposed into a set of Logical Architecture data flows that in turn are decomposed until we reach primitive data elements. The physical architecture flows are labeled with the type of communications technology appropriate for that flow. Figure 1 shows an example of an interface decomposition.

*Data Dictionary Elements:* These definitions are copied from the Logical Architecture Data Dictionary. Each DDE provides a description of the data flow, and a definition of its composite data elements. For a more in depth examination of each data flow and the functions (or PSpecs) that use it, it is necessary to refer to the logical architecture documentation.



**Figure 1. Example of the parts of an interface decomposition**

As a final clarification, it is useful to remind readers of the distinction between the layers in the OSI communications reference model and the layers in the National ITS Architecture. For purposes of analysis and discussion, the National ITS Architecture has been portrayed as having three layers: *the transportation, the communications, and the institutional layer*. The first two are of concern here. The transportation layer contains all the functionality of the National ITS Architecture. As a consequence, any discussion of interfaces, messages, data dictionary entries, etc., is drawn from the information in the transportation layer. The communications layer describes the technology required to support the information exchange needs of the transportation layer. These National ITS Architecture layers can be roughly mapped to the OSI reference model; the transportation layer is typically at or above the application layer and the communications layer is most often concerned with the lowest four layers of the OSI reference model. The interested reader is directed to the Communications Analysis Document for a more substantial explanation of this relationship.

This explanation of the layers is offered here because the terminology can be confusing. Every effort has been made to clarify when the “layered model” is the National ITS Architecture and when it is the OSI reference model. In general, when the term “communications layer” is used in the Standards Requirements Document, it refers to the National ITS Architecture “layer”.

## **2 Introduction to this Standards Package**

This standards requirements package captures the requirements for providing interfaces to an Archived Data Management Subsystem (ADMS). The interfaces to the ADMS include the sources for the data, other archives, consumers of the data contained in the archive, and the manager of the archive. The sources of data for the ADMS include all of the center subsystems in the National ITS Architecture plus many of the terminators that represent center type systems, which also include data collected from the roadside.

The subsystems and the physical architecture flows that are applicable to this standards package are shown in Figure 2.



### 3 Transaction Sets for Archived Data Management Subsystem

Based on the top-level physical architecture data flows presented in the previous section, we can define the transaction sets needed to accomplish different ITS tasks. A message sequence chart format along the lines of those defined under ISO standardization is used for clarity of presentation.

#### 3.1. Archived Data Sources

Each of the following subsystems and terminators interacts with the ADMS to provide catalogs and data to the archive:

- Asset Management (NEW)
- Commercial Vehicle Administration
- Emergency Management
- Emissions Management
- Information Service Provider
- Intermodal Freight Depot
- Maintenance and Construction Management (NEW)
- Multimodal Transportation Service Provider
- Other Data Sources
- Parking Management
- Surface Transportation Weather Service (NEW)
- Toll Administration
- Traffic Management
- Transit Management
- Weather Service

The sequence of messages is shown in Figure 3.

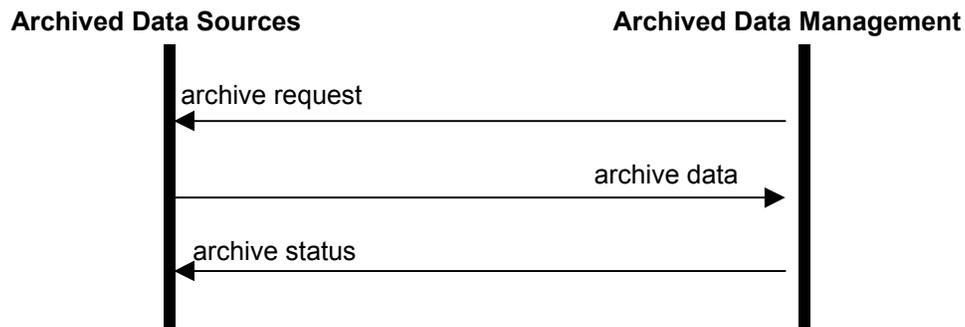


Figure 3. Archived Data Sources Transaction Set

### 3.2. Archived Roadway Data Sources

The interaction between roadway subsystem and the ADMS is a special interface to accommodate deployments that directly connect roadside devices such as data collection and monitoring equipment to an archive type system. The sequence of messages is shown in Figure 4.

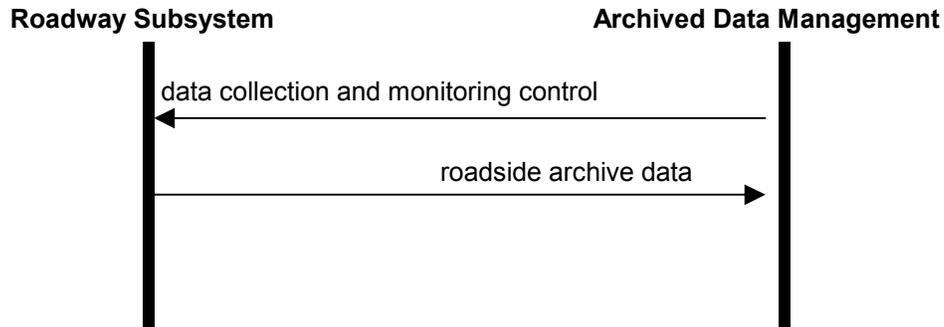


Figure 4. Roadside Archived Data Transaction Set

### 3.3. Map Update Provider Interface

The Map Update Provider terminator interacts with the ADMS to provide geographical information to support users requests for archive data. The sequence of messages is shown in Figure 5.

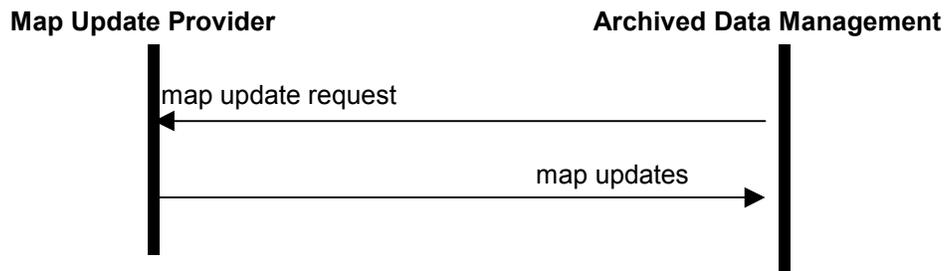


Figure 5. Map Update Provider Transaction Set

### 3.4. Archive Coordination Interfaces

The Other Archives terminator interacts with the ADMS to allow information to be shared or coordinated between ITS data archives. The sequence of messages is shown in Figure 6.

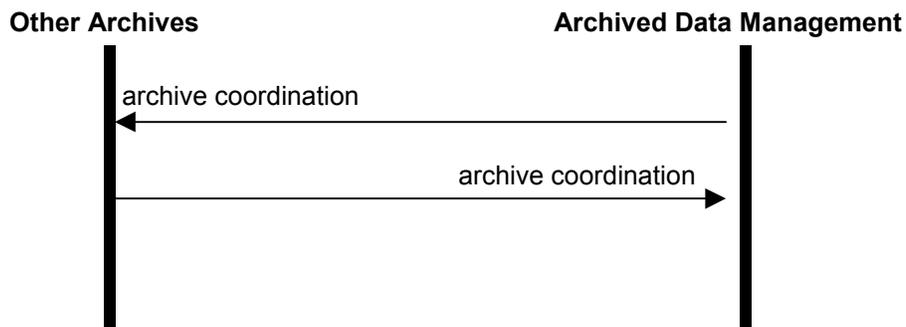


Figure 6. Archive Coordination Transaction Set

### 3.5. Archived Data User Systems Interfaces

The Archived Data User Systems terminator represents systems that end users operate to interact with the ADMS to allow users to request data or analysis products from the archive. The sequence of messages is shown in Figure 7.

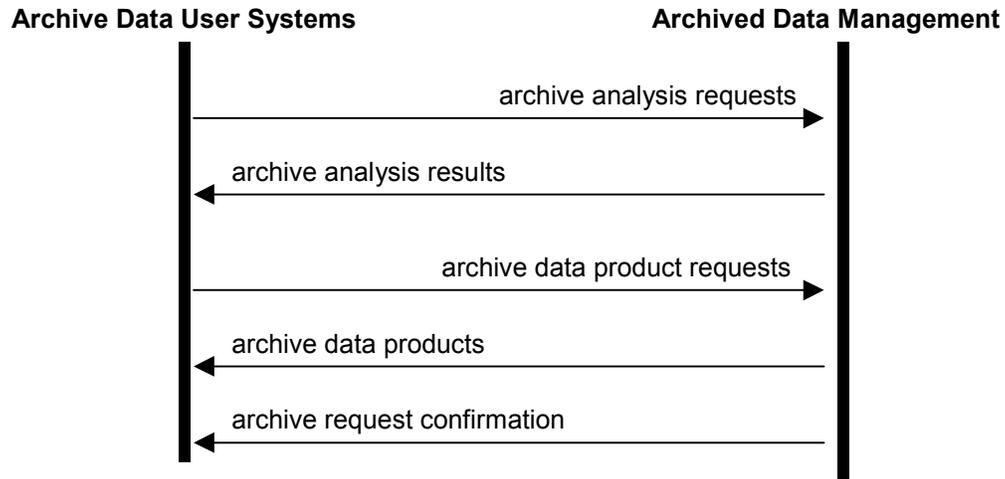


Figure 7. Archived Data User Systems Transaction Set

### 3.6. Government Reporting Systems Interfaces

The Government Reporting Systems terminator represents systems that interact with the ADMS to collect data that can be formatted for state, local, or federal government reporting requirements. The sequence of messages is shown in Figure 8.

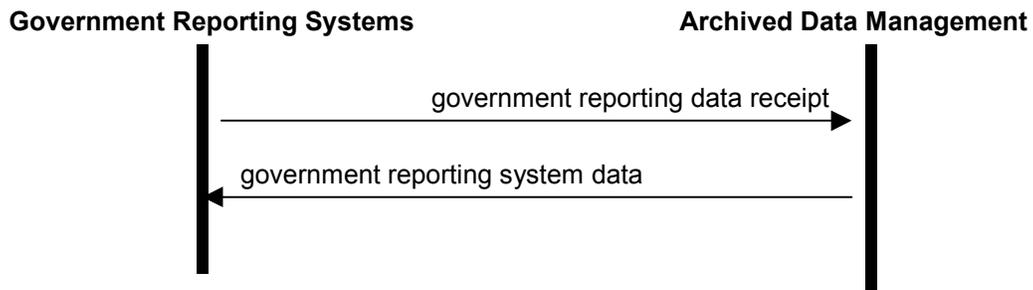


Figure 8. Government Reporting Systems Transaction Set

## 4 Communications Layer Requirements

This chapter describes relevant requirements regarding the Communications Layer for the portion of the ITS National Architecture covered by this package. In general the Communications Layer supports the four lower layers of the OSI model (transport, network, data link, and physical layer). A complete description of the Communications Layer is contained in the ITS National Architecture Communications Analysis Document.

### 4.1 Communications Services: Wireline and Wireless

The communication services define the exchange of information between two points and are independent of media and application (i.e., ITS user service). In essence, they are a specified set of user-information transfer capabilities provided by the communication layer to a user in the transportation layer.

Communication services consist of two broad categories, *interactive* and *distribution*. Interactive services allow the user to exchange data with other users or providers in real or near real time, asking for service or information and receiving it in the time it takes to communicate or look up the information. Distribution services allow the user to send the same message to multiple other users.

Interactive services may be either *conversational* or *messaging*. Conversational implies the use of a two-way connection established before information exchange begins and terminated when the exchange is completed. Messaging, on the other hand, works more like electronic mail being exchanged between users. The messages are exchanged without establishing a dedicated path between the two sites. Each message is addressed and placed on the network for transmission, intermixed with messages from other users. The communications community labels this mode of communication a “datagram” service.

Distribution services may be either *broadcast* or *multicast* and may be used over wireline and/or wireless communication links. Broadcast messages are those sent to all users while multicast messages are sent only to a subset of users. Multicast differs from broadcast in its use of a designated address for all users and user groups. Examples of broadcast information might include current weather or road conditions, whereas multicast information might be information sent to all drivers working for a specific company. A changing group membership could be the set of users traveling between two locations or with a certain destination, for which unique information must be transmitted. The services that can be supported using circuit or packet connection mode include voice, video, image, and data. (See Appendix A-1 of the communication document for a complete description.)

An additional class of communications services is location services. These fall into two categories: (1) the services that do not use the communication network (i.e., GPS, and stand alone terrestrial systems); (2) location services that use the network for providing the service (e.g., cellular based systems). In the latter case, the location services fall under the interactive services. The service will be rendered by a service provider in response to a request for information or help.

The class of communications service for each Architecture Flow in this standards package is defined in a table in the following section.

### 4.2 Wireline Communication Elements (w)

The wireline links represent wide area network communications elements, which can take a number of forms. Typically, it will be a data network of some kind. Physically the network can be fiber, coaxial, twisted pair, or even microwave. It can be an ITS dedicated network, such as a communications system installed by a public agency to pass messages between a Traffic Management subsystem and associated

Roadway subsystems distributed across a region. Alternatively it can be a privately deployed network owned and operated by a communication service provider, where operators of ITS subsystems pay a service fee for connection to and use of the network or lease the lines. More than one network used for ITS may coexist in a region, and these networks will be connected (or internetworked) to support ITS message communication between subsystems that are attached to different networks.

It is expected that the current trend toward ubiquitous internetworking of public and private data networks, as currently embodied by the Internet will continue. This will enable inter-subsystem messaging across local, regional, and national distances. What the Internet is rapidly evolving to (as security and reliability issues of today's Internet are addressed) has been referred to as the "National Information Infrastructure" or "NII".

As commercial data networks are deployed, interconnected, and mature, and the cost of access and use of these private data networks drops, we expect more and more wireline networks for ITS to be supplied from Communication Service Providers (CSPs). The time when the transition from private data networks to commercial data networks becomes practical and economical will vary by region. We expect this transition to be analogous to the transition that was made early in this century from private phone networks to the Public Switched Telephone Network (PSTN). Our expectation is that in the 20-year time frame, most ITS communications will be provided by CSPs.

Table 1 shows the wireline architecture flows in this standards package.

**Table 1. Wireline Data Flows (w) for Archived Data Management**

Source	Destination	architecture flow	Communication Service
Archived Data Management Subsystem	Archived Data User Systems	archive analysis results	Messaging data
Archived Data Management Subsystem	Archived Data User Systems	archive request confirmation	Messaging data
Archived Data Management Subsystem	Archived Data User Systems	archived data products	Messaging data
Archived Data Management Subsystem	Asset Management	archive requests	Messaging data
Archived Data Management Subsystem	Asset Management	archive status	Messaging data
Archived Data Management Subsystem	Commercial Vehicle Administration	archive requests	Messaging data
Archived Data Management Subsystem	Commercial Vehicle Administration	archive status	Messaging data
Archived Data Management Subsystem	Emergency Management	archive requests	Messaging data
Archived Data Management Subsystem	Emergency Management	archive status	Messaging data
Archived Data Management Subsystem	Emissions Management	archive requests	Messaging data
Archived Data Management Subsystem	Emissions Management	archive status	Messaging data
Archived Data Management Subsystem	Government Reporting Systems	government reporting system data	Messaging data
Archived Data Management Subsystem	Information Service Provider	archive requests	Messaging data
Archived Data Management Subsystem	Information Service Provider	archive status	Messaging data
Archived Data Management Subsystem	Intermodal Freight Depot	archive requests	Messaging data
Archived Data Management Subsystem	Intermodal Freight Depot	archive status	Messaging data
Archived Data Management Subsystem	Maintenance and Construction Management	archive requests	Messaging data
Archived Data Management Subsystem	Maintenance and Construction Management	archive status	Messaging data
Archived Data Management Subsystem	Map Update Provider	map update request	Messaging data
Archived Data Management Subsystem	Multimodal Transportation Service Provider	archive requests	Messaging data
Archived Data Management Subsystem	Multimodal Transportation Service Provider	archive status	Messaging data
Archived Data Management Subsystem	Other Archives	archive coordination	Messaging data
Archived Data Management Subsystem	Other Data Sources	archive requests	Messaging data
Archived Data Management Subsystem	Other Data Sources	archive status	Messaging data
Archived Data Management Subsystem	Parking Management	archive requests	Messaging data
Archived Data Management Subsystem	Parking Management	archive status	Messaging data
Archived Data Management Subsystem	Roadway Subsystem	data collection and monitoring control	Messaging data
Archived Data Management Subsystem	Surface Transportation Weather Service	archive requests	Messaging data
Archived Data Management Subsystem	Surface Transportation Weather Service	archive status	Messaging data

Source	Destination	architecture flow	Communication Service
Archived Data Management Subsystem	Toll Administration	archive requests	Messaging data
Archived Data Management Subsystem	Toll Administration	archive status	Messaging data
Archived Data Management Subsystem	Traffic Management	archive requests	Messaging data
Archived Data Management Subsystem	Traffic Management	archive status	Messaging data
Archived Data Management Subsystem	Transit Management	archive requests	Messaging data
Archived Data Management Subsystem	Transit Management	archive status	Messaging data
Archived Data Management Subsystem	Weather Service	archive requests	Messaging data
Archived Data Management Subsystem	Weather Service	archive status	Messaging data
Archived Data User Systems	Archived Data Management Subsystem	archive analysis requests	Messaging data
Archived Data User Systems	Archived Data Management Subsystem	archived data product requests	Messaging data
Asset Management	Archived Data Management Subsystem	asset archive data	Messaging data
Commercial Vehicle Administration	Archived Data Management Subsystem	commercial vehicle archive data	Messaging data
Emergency Management	Archived Data Management Subsystem	emergency archive data	Messaging data
Emissions Management	Archived Data Management Subsystem	emissions archive data	Messaging data
Government Reporting Systems	Archived Data Management Subsystem	government reporting data receipt	Messaging data
Information Service Provider	Archived Data Management Subsystem	traveler archive data	Messaging data
Intermodal Freight Depot	Archived Data Management Subsystem	intermodal freight archive data	Messaging data
Maintenance and Construction Management	Archived Data Management Subsystem	maint and constr archive data	Messaging data
Map Update Provider	Archived Data Management Subsystem	map updates	Messaging data, Broadcast data, Multicast
Multimodal Transportation Service Provider	Archived Data Management Subsystem	multimodal archive data	Messaging data
Other Archives	Archived Data Management Subsystem	archive coordination	Messaging data
Other Data Sources	Archived Data Management Subsystem	other data source archive data	Messaging data
Parking Management	Archived Data Management Subsystem	parking archive data	Messaging data
Roadway Subsystem	Archived Data Management Subsystem	roadside archive data	Messaging data
Surface Transportation Weather Service	Archived Data Management Subsystem	transportation weather information	Messaging data, Broadcast data, Multicast
Toll Administration	Archived Data Management Subsystem	toll archive data	Messaging data
Traffic Management	Archived Data Management Subsystem	traffic archive data	Messaging data
Transit Management	Archived Data Management Subsystem	transit archive data	Messaging data
Weather Service	Archived Data Management Subsystem	weather information	Messaging data

The primary requirements for the wireline communications layers include the utilization of open standards for the communications protocols. For the links to the ADMS, the evolving ITS communications standard is the National Transportation Communications for ITS Protocol (NTCIP) family. This set of standards is being developed for the transmission of data and messages between ITS elements. The initial version of the NTCIP is being developed to support the interface from the TMS to traffic controllers and dynamic message signs. Work is underway to extend this to other roadside equipment. Plans are also in place to extend the protocol for center to center communications, which would be of primary interest to the ADMS, interfaces. In the area of center to center communications there are several existing and developing communications standards to choose from. These include ATM, Frame Relay, MAN (IEEE 802.6), and FDDI. At the network layers, TCP/IP is a widespread standardized protocol. The key is that by using standard communication protocol suites the regional integration of the wireline data shown above will most readily be accomplished.

### 4.3 Wireless Communication Elements (u1 and u2)

There are no wireless interfaces in this standards requirements package.

## 5 Constraints

This chapter identifies constraints placed upon Physical Architecture flows, as described in Physical Architecture inter-subsystem message performance requirements below the application layer.

### 5.1. Assessment Categories

The following categories have been used in rating the constraints that exist on the physical data flows.

#### 1. Performance

##### a. Emergency Priority (E)

Essentially "real-time" requirements. Emergency data that is time critical must be received by a certain absolute time, or it is useless. For these flows, the communication channel may require priority in emergencies. The data channels required must be operational even when there is an emergency that might place other loads on the interface. A private communication channel or frequency may be required to satisfy the requirement.

##### b. Reliability(R)

This category encompasses both the concepts of reliability and availability. Data must be delivered reliably. Loss can not be tolerated. The communication link must also have high availability. Failure of the communication medium may result in severe accident. This communication channel may require redundant paths or extra attention paid to potential failure modes. For wireline cases, this may indicate alternate phone or other connections are required. For wireless cases (e.g., for AHS applications), special attention will be paid to the transmitters, receivers, and potential interference for these connections.

##### c. Timing (T)

The timing constraints are critical. If communication does not occur within set limits system failures can occur. Timing for most ITS communication services is based on the response to a request for data. Because of this, common communication media designed to handle voice data will likely support these requirements. The beacon interface has special requirements of identifying the vehicle as well as exchanging information before the vehicle gets out of range. This is more of a problem with vehicles traveling at speed. The architecture constrains such time critical access to data such that the data is available at the beacon site. This obviates the need for explicit specification of other timing information to support data transfer over a short-range beacon.

This timing constraint is related to (but not the same as) another attribute often discussed in specifying systems: latency. Latency is used to quantify end-to-end processing and transmission time (round trip delays). Data with a latency requirement must be handled within a certain time interval. This differs from "time criticality" in that it is a relative rather than absolute time requirement (i.e., latency: interface screen must update every 2 seconds; time criticality: route instructions must be received 30 seconds prior to first turning action). Because latency requirements are greatly affected by the implementation of the subsystem elements, it cannot be specified directly when discussing only the interface between two subsystems.

## 2. Data Sensitivity

### a. Security (S)

Access to the data must be restricted. Data itself must be secure during transmission. This is typically used for financial information.

### b. Privacy(P)

Anonymity of the data source or recipient must be protected. This is typically used for personal information.

## 5.2. Architecture Flow Constraints

The table below lists the architecture flows for the Archived Data Management Interfaces that have been assigned special constraints.

**Table 2. Architecture Flow Constraints**

<b>Source</b>	<b>Destination</b>	<b>Architecture Flow</b>	<b>Interconnects</b>	<b>Communication Service</b>	<b>Special Constraints</b>
Roadway Subsystem	Archived Data Management Subsystem	roadside archive data	W	Messaging data	T
Archived Data Management Subsystem	Roadway Subsystem	data collection and monitoring control	W	Messaging data	T

## 6 Interface Decomposition

This section shows the interface decomposition for the interfaces covered in this package. The format shows the interface followed by the first physical architecture flow in the interface and its description. Each of the physical architecture flows is then decomposed into its constituent logical data flows, which in turn are decomposed hierarchically into more basic data flows. The data flows are numbered and indented to indicate which are top level flows (1) and which are constituent data flows (numbered 2 and lower). The full data flow definition for the top level flows and for all the constituent flows is given in Section 7. That section contains the data dictionary entries, listed in alphabetical order, for all of the data flows contained in this package.

### 6.1 Archived Data User Systems → Archived Data Management Subsystem

**Physical Architecture Flow:** archive analysis requests W

A user request that initiates data mining, analytical processing, aggregation or summarization, report formulation, or other advanced processing and analysis of archived data. The request also includes information that is used to identify and authenticate the user and support electronic payment requirements, if any.

**Logical Architecture Flows:**

(1) *fadu\_archive\_analysis\_request*

(1) *fadu\_on\_demand\_archive\_request*

**Physical Architecture Flow:** archived data product requests W

A user-specified request for archived data products (i.e. data, meta data, or data catalogs). The request also includes information that is used to identify and authenticate the user and support electronic payment requirements, if any.

**Logical Architecture Flows:**

(1) *fadu\_archive\_data\_product\_request*

### 6.2 Asset Management → Archived Data Management Subsystem

**Physical Architecture Flow:** asset archive data W

Information describing transportation assets including pavements, bridges, and all other infrastructure included in the transportation network. In addition, information can cover support assets (support equipment and systems, software, etc.). Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.

**Logical Architecture Flows:**

(1) *fam\_asset\_archive\_data*

(2) *asset\_archive\_catalog*

(2) *asset\_data\_for\_archive*

(3) *asset\_data*

(3) *asset\_data\_attributes*

(4) *authorization\_to\_use*

(4) *collection\_conditions*

(4) *collection\_equipment*

(4) *data\_aggregation*

(4) *data\_concept\_identifier*

(4) *data\_reductions*

(4) *data\_revision*

(4) *data\_version*

- (4) *date\_archived*
- (5) *date*
- (5) *time*
- (4) *date\_created*
- (5) *date*
- (5) *time*
- (4) *date\_published*
- (5) *date*
- (5) *time*
- (4) *equipment\_status*
- (4) *error\_handling*
- (4) *methods\_applied*
- (4) *owner\_entities*
- (4) *perishability\_date*
- (5) *date*
- (5) *time*
- (4) *personal\_identification\_status*
- (4) *quality\_control\_attribute*
- (4) *record\_size*
- (4) *security*
- (4) *standard\_data\_attribute*
- (4) *standard\_message\_attribute*

### 6.3 Commercial Vehicle Administration → Archived Data Management Subsystem

#### Physical Architecture Flow: commercial vehicle archive data

W

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.

#### Logical Architecture Flows:

- (1) *cv\_archive\_data*
- (2) *cv\_archive\_catalog*
- (2) *cv\_data\_for\_archive*
- (3) *cv\_credentials\_enrollment\_attributes*
  - (4) *authorization\_to\_use*
  - (4) *collection\_conditions*
  - (4) *collection\_equipment*
  - (4) *data\_aggregation*
  - (4) *data\_concept\_identifier*
  - (4) *data\_reductions*
  - (4) *data\_revision*
  - (4) *data\_version*
  - (4) *date\_archived*
  - (5) *date*
  - (5) *time*
- (4) *date\_created*
  - (5) *date*
  - (5) *time*
- (4) *date\_published*
  - (5) *date*
  - (5) *time*
- (4) *equipment\_status*
- (4) *error\_handling*
- (4) *methods\_applied*
- (4) *owner\_entities*
- (4) *perishability\_date*
  - (5) *date*
  - (5) *time*
- (4) *personal\_identification\_status*
- (4) *quality\_control\_attribute*
- (4) *record\_size*
- (4) *security*

- (4) *standard\_data\_attribute*
- (4) *standard\_message\_attribute*
- (3) *cv\_credentials\_enrollment\_data*
  - (4) *cv\_update\_new\_credentials\_request*
    - (5) *cv\_credentials\_details*
    - (5) *cv\_route\_details*
    - (5) *cv\_trip\_classification\_data*
    - (5) *cv\_trip\_identity*
    - (5) *hazmat\_load\_data*
- (3) *cv\_daily\_logs*
  - (4) *cv\_roadside\_daily\_log*
    - (5) *cv\_roadside\_facility\_identity*
  - (5) *cv\_roadside\_record*
    - (5) *date*
  - (4) *cvo\_border\_clearance*
    - (5) *cv\_border\_record*
      - (5) *cv\_roadside\_facility\_identity*
      - (5) *date*
- (3) *cv\_daily\_logs\_attributes*
  - (4) *authorization\_to\_use*
  - (4) *collection\_conditions*
  - (4) *collection\_equipment*
  - (4) *data\_aggregation*
  - (4) *data\_concept\_identifier*
  - (4) *data\_reductions*
  - (4) *data\_revision*
  - (4) *data\_version*
  - (4) *date\_archived*
    - (5) *date*
    - (5) *time*
  - (4) *date\_created*
    - (5) *date*
    - (5) *time*
  - (4) *date\_published*
    - (5) *date*
    - (5) *time*
  - (4) *equipment\_status*
  - (4) *error\_handling*
  - (4) *methods\_applied*
  - (4) *owner\_entities*
  - (4) *perishability\_date*
    - (5) *date*
    - (5) *time*
  - (4) *personal\_identification\_status*
  - (4) *quality\_control\_attribute*
  - (4) *record\_size*
  - (4) *security*
  - (4) *standard\_data\_attribute*
  - (4) *standard\_message\_attribute*

## 6.4 Emergency Management → Archived Data Management Subsystem

### Physical Architecture Flow: emergency archive data

W

Logged incident information that characterizes the identified incidents and provides a record of the corresponding incident response. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.

### Logical Architecture Flows:

- (1) *em\_archive\_data*
  - (2) *em\_archive\_catalog*
  - (2) *em\_data\_for\_archive*
- (3) *em\_operational\_data*
  - (4) *archive\_manage\_emergency\_vehicle\_data*
    - (5) *emergency\_vehicle\_status\_data*
  - (4) *archive\_provide\_emergency\_service\_allocation\_data*
  - (4) *emergency\_service\_log\_for\_archive*

- (5) *emergency\_service\_action\_log*
- (3) *em\_operational\_data\_attributes*
  - (4) *authorization\_to\_use*
  - (4) *collection\_conditions*
  - (4) *collection\_equipment*
  - (4) *data\_aggregation*
  - (4) *data\_concept\_identifier*
  - (4) *data\_reductions*
  - (4) *data\_revision*
  - (4) *data\_version*
  - (4) *date\_archived*
    - (5) *date*
    - (5) *time*
  - (4) *date\_created*
    - (5) *date*
    - (5) *time*
  - (4) *date\_published*
    - (5) *date*
    - (5) *time*
  - (4) *equipment\_status*
  - (4) *error\_handling*
  - (4) *methods\_applied*
  - (4) *owner\_entities*
  - (4) *perishability\_date*
    - (5) *date*
    - (5) *time*
  - (4) *personal\_identification\_status*
  - (4) *quality\_control\_attribute*
  - (4) *record\_size*
  - (4) *security*
  - (4) *standard\_data\_attribute*
  - (4) *standard\_message\_attribute*

## 6.5 Emissions Management → Archived Data Management Subsystem

### Physical Architecture Flow: emissions archive data

W

Air quality and vehicle emissions information that is collected by sensors or derived from models. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.

### Logical Architecture Flows:

- (1) *emissions\_archive\_data*
  - (2) *emissions\_archive\_catalog*
  - (2) *emissions\_data\_for\_archive*
  - (3) *archive\_pollution\_reference\_data*
    - (4) *pollution\_area\_acceptance\_data*
    - (4) *pollution\_area\_acceptance\_times*
    - (4) *pollution\_area\_tolerance\_data*
    - (4) *pollution\_area\_tolerance\_times*
    - (4) *pollution\_roadside\_acceptance\_data*
    - (4) *pollution\_roadside\_acceptance\_times*
    - (4) *pollution\_roadside\_tolerance\_data*
    - (4) *pollution\_roadside\_tolerance\_times*
    - (4) *pollution\_vehicle\_acceptance\_conditions*
    - (4) *pollution\_vehicle\_acceptance\_data*
  - (3) *archive\_pollution\_reference\_data\_attributes*
    - (4) *authorization\_to\_use*
    - (4) *collection\_conditions*
    - (4) *collection\_equipment*
    - (4) *data\_aggregation*
    - (4) *data\_concept\_identifier*
    - (4) *data\_reductions*
    - (4) *data\_revision*
    - (4) *data\_version*
    - (4) *date\_archived*
      - (5) *date*

- (5) *time*
- (4) *date\_created*
- (5) *date*
- (5) *time*
- (4) *date\_published*
- (5) *date*
- (5) *time*
- (4) *equipment\_status*
- (4) *error\_handling*
- (4) *methods\_applied*
- (4) *owner\_entities*
- (4) *perishability\_date*
- (5) *date*
- (5) *time*
- (4) *personal\_identification\_status*
- (4) *quality\_control\_attribute*
- (4) *record\_size*
- (4) *security*
- (4) *standard\_data\_attribute*
- (4) *standard\_message\_attribute*
- (3) *archive\_pollution\_state\_data*
- (4) *list\_size*
- (4) *pollution\_state\_area\_collection*
- (5) *area\_air\_quality\_index*
- (5) *current\_carbon\_monoxide\_pollution*
- (5) *current\_hydrocarbon\_pollution*
- (5) *current\_nitrous\_oxide\_pollution*
- (5) *current\_ozone\_pollution*
- (5) *current\_particulate\_pollution*
- (5) *current\_pollution\_location*
- (5) *current\_sulfur\_dioxide\_pollution*
- (4) *pollution\_state\_roadside\_collection*
- (5) *current\_carbon\_monoxide\_pollution*
- (5) *current\_hydrocarbon\_pollution*
- (5) *current\_nitrous\_oxide\_pollution*
- (5) *current\_ozone\_pollution*
- (5) *current\_particulate\_pollution*
- (5) *current\_roadside\_pollution\_location*
- (5) *current\_sulfur\_dioxide\_pollution*
- (4) *pollution\_state\_vehicle\_collection*
- (5) *current\_carbon\_monoxide\_pollution*
- (5) *current\_hydrocarbon\_pollution*
- (5) *current\_nitrous\_oxide\_pollution*
- (5) *current\_ozone\_pollution*
- (5) *current\_particulate\_pollution*
- (5) *current\_sulfur\_dioxide\_pollution*
- (5) *vehicle\_type*
- (3) *archive\_pollution\_state\_data\_attributes*
- (4) *authorization\_to\_use*
- (4) *collection\_conditions*
- (4) *collection\_equipment*
- (4) *data\_aggregation*
- (4) *data\_concept\_identifier*
- (4) *data\_reductions*
- (4) *data\_revision*
- (4) *data\_version*
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- (5) *time*
- (4) *date\_published*
- (5) *date*
- (5) *time*
- (4) *equipment\_status*
- (4) *error\_handling*
- (4) *methods\_applied*
- (4) *owner\_entities*

- (4) *perishability\_date*
- (5) *date*
- (5) *time*
- (4) *personal\_identification\_status*
- (4) *quality\_control\_attribute*
- (4) *record\_size*
- (4) *security*
- (4) *standard\_data\_attribute*
- (4) *standard\_message\_attribute*
- (3) *pollution\_archive\_data\_log*
- (4) *pollution\_state\_static\_log\_data*
- (5) *pollution\_state\_area\_collection*
- (5) *pollution\_state\_roadside\_collection*
- (4) *pollution\_state\_vehicle\_log\_data*
- (5) *pollution\_state\_vehicle\_collection*
- (3) *pollution\_archive\_data\_log\_attributes*
- (4) *authorization\_to\_use*
- (4) *collection\_conditions*
- (4) *collection\_equipment*
- (4) *data\_aggregation*
- (4) *data\_concept\_identifier*
- (4) *data\_reductions*
- (4) *data\_revision*
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- (4) *equipment\_status*
- (4) *error\_handling*
- (4) *methods\_applied*
- (4) *owner\_entities*
- (4) *perishability\_date*
- (5) *date*
- (5) *time*
- (4) *personal\_identification\_status*
- (4) *quality\_control\_attribute*
- (4) *record\_size*
- (4) *security*
- (4) *standard\_data\_attribute*
- (4) *standard\_message\_attribute*

## 6.6 Government Reporting Systems → Archived Data Management Subsystem

### Physical Architecture Flow: government reporting data receipt

W

The acknowledgement of satisfactory receipt of information used as input to government data systems or a report identifying problems or issues with the data submittal.

### Logical Architecture Flows:

- (1) *fgrs\_government\_data\_report\_request*

## 6.7 Information Service Provider → Archived Data Management Subsystem

### Physical Architecture Flow: traveler archive data

W

Data associated with traveler information services including service requests, facility usage, rideshare, routing, and traveler payment transaction data. Content may include a catalog of available information, the actual information to be archived, and associated meta data that

describes the archived information.

### Logical Architecture Flows:

- (1) *traveler\_archive\_data*
  - (2) *traveler\_archive\_catalog*
  - (2) *traveler\_data\_for\_archive*
  - (3) *guidance\_data\_for\_archive*
    - (4) *route\_guidance\_data\_for\_archive*
      - (5) *list\_size*
      - (5) *vehicle\_guidance\_stored\_data*
    - (4) *vehicle\_guidance\_probe\_data\_for\_archive*
      - (5) *route\_segment\_identity*
      - (5) *time*
      - (5) *vehicle\_identity*
  - (3) *guidance\_data\_for\_archive\_attributes*
    - (4) *authorization\_to\_use*
    - (4) *collection\_conditions*
    - (4) *collection\_equipment*
    - (4) *data\_aggregation*
    - (4) *data\_concept\_identifier*
    - (4) *data\_reductions*
    - (4) *data\_revision*
    - (4) *data\_version*
    - (4) *date\_archived*
      - (5) *date*
      - (5) *time*
    - (4) *date\_created*
      - (5) *date*
      - (5) *time*
    - (4) *date\_published*
      - (5) *date*
      - (5) *time*
    - (4) *equipment\_status*
    - (4) *error\_handling*
    - (4) *methods\_applied*
    - (4) *owner\_entities*
    - (4) *perishability\_date*
      - (5) *date*
      - (5) *time*
    - (4) *personal\_identification\_status*
    - (4) *quality\_control\_attribute*
    - (4) *record\_size*
    - (4) *security*
    - (4) *standard\_data\_attribute*
    - (4) *standard\_message\_attribute*
  - (3) *parking\_lot\_data\_for\_archive*
    - (4) *parking\_lot\_bookings\_request*
      - (5) *parking\_lot\_identity*
      - (5) *parking\_space\_details*
      - (5) *vehicle\_identity*
    - (4) *parking\_lot\_identity*
    - (5) *location\_identity*
      - (5) *unit\_number*
    - (4) *parking\_lot\_spaces*
  - (3) *parking\_lot\_data\_for\_archive\_attributes*
    - (4) *authorization\_to\_use*
    - (4) *collection\_conditions*
    - (4) *collection\_equipment*
    - (4) *data\_aggregation*
    - (4) *data\_concept\_identifier*
    - (4) *data\_reductions*
    - (4) *data\_revision*
    - (4) *data\_version*
    - (4) *date\_archived*
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      - (5) *time*
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      - (5) *date*

- (5) *time*
- (4) *date\_published*
- (5) *date*
- (5) *time*
- (4) *equipment\_status*
- (4) *error\_handling*
- (4) *methods\_applied*
- (4) *owner\_entities*
- (4) *perishability\_date*
- (5) *date*
- (5) *time*
- (4) *personal\_identification\_status*
- (4) *quality\_control\_attribute*
- (4) *record\_size*
- (4) *security*
- (4) *standard\_data\_attribute*
- (4) *standard\_message\_attribute*
- (3) *rideshare\_for\_archive*
- (4) *rideshare\_data\_for\_archive*
- (5) *rideshare\_confirmation\_data*
- (5) *rideshare\_details*
- (5) *rideshare\_eligibility\_data*
- (4) *traveler\_rideshare\_request\_for\_archive*
- (5) *traveler\_rideshare\_request*
- (3) *rideshare\_for\_archive\_attributes*
- (4) *authorization\_to\_use*
- (4) *collection\_conditions*
- (4) *collection\_equipment*
- (4) *data\_aggregation*
- (4) *data\_concept\_identifier*
- (4) *data\_reductions*
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- (5) *date*
- (5) *time*
- (4) *equipment\_status*
- (4) *error\_handling*
- (4) *methods\_applied*
- (4) *owner\_entities*
- (4) *perishability\_date*
- (5) *date*
- (5) *time*
- (4) *personal\_identification\_status*
- (4) *quality\_control\_attribute*
- (4) *record\_size*
- (4) *security*
- (4) *standard\_data\_attribute*
- (4) *standard\_message\_attribute*
- (3) *service\_req\_and\_confirm\_for\_archive*
- (4) *service\_req\_and\_confirm\_data*
- (5) *advisory\_data\_request\_for\_archive*
- (5) *event\_information\_requests\_for\_archive*
- (5) *traffic\_data\_kiosk\_request\_for\_archive*
- (5) *traffic\_data\_personal\_request\_for\_archive*
- (5) *transit\_deviation\_kiosk\_request\_for\_archive*
- (5) *transit\_deviations\_personal\_request\_for\_archive*
- (5) *traveler\_confirm\_for\_archive*
- (5) *traveler\_route\_accepted\_for\_archive*
- (5) *traveler\_route\_request\_for\_archive*
- (5) *traveler\_trip\_and\_cond\_requests\_for\_archive*
- (5) *traveler\_yellow\_pages\_requests\_for\_archive*
- (5) *vehicle\_guidance\_route\_accepted\_for\_archive*
- (5) *vehicle\_route\_request\_for\_archive*

- (5) *yellow\_pages\_advisory\_requests\_for\_archive*
- (3) *service\_req\_and\_confirm\_for\_archive\_attributes*
  - (4) *authorization\_to\_use*
  - (4) *collection\_conditions*
  - (4) *collection\_equipment*
  - (4) *data\_aggregation*
  - (4) *data\_concept\_identifier*
  - (4) *data\_reductions*
  - (4) *data\_revision*
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    - (5) *time*
  - (4) *equipment\_status*
  - (4) *error\_handling*
  - (4) *methods\_applied*
  - (4) *owner\_entities*
  - (4) *perishability\_date*
    - (5) *date*
    - (5) *time*
  - (4) *personal\_identification\_status*
  - (4) *quality\_control\_attribute*
  - (4) *record\_size*
  - (4) *security*
  - (4) *standard\_data\_attribute*
  - (4) *standard\_message\_attribute*
- (3) *traveler\_info\_payments\_transactions*
  - (4) *driver\_map\_update\_payments\_transactions*
  - (4) *traveler\_map\_update\_payments\_transactions*
  - (4) *traveler\_rideshare\_payments\_transactions*
  - (4) *traveler\_trip\_payments\_transactions*
  - (4) *yellow\_pages\_provider\_payments\_transactions*
- (3) *traveler\_info\_payments\_transactions\_attributes*
  - (4) *authorization\_to\_use*
  - (4) *collection\_conditions*
  - (4) *collection\_equipment*
  - (4) *data\_aggregation*
  - (4) *data\_concept\_identifier*
  - (4) *data\_reductions*
  - (4) *data\_revision*
  - (4) *data\_version*
  - (4) *date\_archived*
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  - (4) *date\_created*
    - (5) *date*
    - (5) *time*
  - (4) *date\_published*
    - (5) *date*
    - (5) *time*
  - (4) *equipment\_status*
  - (4) *error\_handling*
  - (4) *methods\_applied*
  - (4) *owner\_entities*
  - (4) *perishability\_date*
    - (5) *date*
    - (5) *time*
  - (4) *personal\_identification\_status*
  - (4) *quality\_control\_attribute*
  - (4) *record\_size*
  - (4) *security*
  - (4) *standard\_data\_attribute*
  - (4) *standard\_message\_attribute*
- (3) *trip\_request\_for\_archive*

- (4) *constraints*
  - (5) *constraint\_on\_acceptable\_travel\_time*
  - (5) *constraint\_on\_ahs\_lanes*
  - (5) *constraint\_on\_eta\_change*
  - (5) *constraint\_on\_interstate*
  - (5) *constraint\_on\_load\_classification*
  - (5) *constraint\_on\_number\_of\_mode\_changes*
  - (5) *constraint\_on\_number\_of\_transfers*
  - (5) *constraint\_on\_special\_needs*
  - (5) *constraint\_on\_urban*
  - (5) *constraint\_on\_vehicle\_type*
- (4) *departure\_time*
  - (5) *time*
- (4) *desired\_arrival\_time*
  - (5) *time*
- (4) *destination*
  - (5) *route\_point*
- (4) *origin*
  - (5) *route\_point*
- (4) *preferences*
  - (5) *modes*
  - (5) *preferred\_alternate\_routes*
  - (5) *preferred\_ridesharing\_options*
  - (5) *preferred\_route\_segments*
  - (5) *preferred\_routes*
  - (5) *preferred\_transit\_options*
  - (5) *preferred\_weather\_conditions*
- (3) *trip\_request\_for\_archive\_attributes*
  - (4) *authorization\_to\_use*
  - (4) *collection\_conditions*
  - (4) *collection\_equipment*
  - (4) *data\_aggregation*
  - (4) *data\_concept\_identifier*
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  - (4) *data\_revision*
  - (4) *data\_version*
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  - (4) *date\_created*
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    - (5) *time*
  - (4) *date\_published*
    - (5) *date*
    - (5) *time*
  - (4) *equipment\_status*
  - (4) *error\_handling*
  - (4) *methods\_applied*
  - (4) *owner\_entities*
  - (4) *perishability\_date*
    - (5) *date*
    - (5) *time*
  - (4) *personal\_identification\_status*
  - (4) *quality\_control\_attribute*
  - (4) *record\_size*
  - (4) *security*
  - (4) *standard\_data\_attribute*
  - (4) *standard\_message\_attribute*
- (3) *usage\_for\_archive*
  - (4) *current\_other\_routes\_use\_for\_archive*
  - (5) *route\_segment\_guided\_travelers*
  - (5) *route\_segment\_identity*
  - (5) *route\_segment\_journey\_time*
  - (5) *route\_segment\_total\_number*
  - (4) *current\_road\_network\_use\_for\_archive*
    - (5) *route\_segment\_identity*
    - (5) *route\_segment\_journey\_time*
    - (5) *route\_segment\_total\_number*
    - (5) *route\_segment\_use\_prediction*
- (3) *usage\_for\_archive\_attributes*

- (4) *authorization\_to\_use*
- (4) *collection\_conditions*
- (4) *collection\_equipment*
- (4) *data\_aggregation*
- (4) *data\_concept\_identifier*
- (4) *data\_reductions*
- (4) *data\_revision*
- (4) *data\_version*
- (4) *date\_archived*
  - (5) *date*
  - (5) *time*
- (4) *date\_created*
  - (5) *date*
  - (5) *time*
- (4) *date\_published*
  - (5) *date*
  - (5) *time*
- (4) *equipment\_status*
- (4) *error\_handling*
- (4) *methods\_applied*
- (4) *owner\_entities*
- (4) *perishability\_date*
  - (5) *date*
  - (5) *time*
- (4) *personal\_identification\_status*
- (4) *quality\_control\_attribute*
- (4) *record\_size*
- (4) *security*
- (4) *standard\_data\_attribute*
- (4) *standard\_message\_attribute*

## 6.8 Intermodal Freight Depot → Archived Data Management Subsystem

### Physical Architecture Flow: intermodal freight archive data

W

Information describing demand at intermodal freight terminals including loading/unloading activities of trailers and containers. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.

### Logical Architecture Flows:

- (1) *fffd\_intermodal\_archive\_data*
  - (2) *intermodal\_archive\_catalog*
  - (2) *intermodal\_data\_for\_archive*
  - (3) *intermodal\_data*
  - (3) *intermodal\_data\_attributes*
    - (4) *authorization\_to\_use*
    - (4) *collection\_conditions*
    - (4) *collection\_equipment*
    - (4) *data\_aggregation*
    - (4) *data\_concept\_identifier*
    - (4) *data\_reductions*
    - (4) *data\_revision*
    - (4) *data\_version*
    - (4) *date\_archived*
      - (5) *date*
      - (5) *time*
    - (4) *date\_created*
      - (5) *date*
      - (5) *time*
    - (4) *date\_published*
      - (5) *date*
      - (5) *time*
    - (4) *equipment\_status*
    - (4) *error\_handling*
    - (4) *methods\_applied*

- (4) *owner\_entities*
- (4) *perishability\_date*
- (5) *date*
- (5) *time*
- (4) *personal\_identification\_status*
- (4) *quality\_control\_attribute*
- (4) *record\_size*
- (4) *security*
- (4) *standard\_data\_attribute*
- (4) *standard\_message\_attribute*

## 6.9 Maintenance and Construction Management → Archived Data Management Subsystem

### Physical Architecture Flow: maint and constr archive data

W

Information describing road construction and maintenance activities identifying the type of activity, the work performed, and work zone information including work zone configuration and safety (e.g., a record of intrusions and vehicle speeds) information.. For construction activities, this information also includes a description of the completed infrastructure, including as-built plans as applicable. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.

### Logical Architecture Flows:

- (1) *m\_and\_c\_archive\_data*
  - (2) *m\_and\_c\_archive\_catalog*
  - (2) *m\_and\_c\_data\_for\_archive*
    - (3) *auto\_treatment\_system\_status\_for\_archive*
      - (4) *auto\_treatment\_activation\_data*
      - (4) *device\_identity*
      - (4) *list\_size*
      - (4) *station\_id*
    - (3) *auto\_treatment\_system\_status\_for\_archive\_attributes*
      - (4) *authorization\_to\_use*
      - (4) *collection\_conditions*
      - (4) *collection\_equipment*
      - (4) *data\_aggregation*
      - (4) *data\_concept\_identifier*
      - (4) *data\_reductions*
      - (4) *data\_revision*
      - (4) *data\_version*
      - (4) *date\_archived*
        - (5) *date*
        - (5) *time*
      - (4) *date\_created*
        - (5) *date*
        - (5) *time*
      - (4) *date\_published*
        - (5) *date*
        - (5) *time*
      - (4) *equipment\_status*
      - (4) *error\_handling*
      - (4) *methods\_applied*
      - (4) *owner\_entities*
      - (4) *perishability\_date*
        - (5) *date*
        - (5) *time*
      - (4) *personal\_identification\_status*
      - (4) *quality\_control\_attribute*
      - (4) *record\_size*
      - (4) *security*
      - (4) *standard\_data\_attribute*
      - (4) *standard\_message\_attribute*

- (3) *field\_device\_status\_for\_archive*
  - (4) *auto\_treat equip\_status\_for\_m\_and\_c*
    - (5) *device\_identity*
    - (5) *list\_size*
    - (5) *roadside\_device\_status*
    - (5) *station\_id*
  - (4) *dms equip\_status\_for\_m\_and\_c*
    - (5) *dms\_advisory\_text*
    - (5) *dms\_fault*
    - (5) *indicator\_identity*
    - (5) *list\_size*
  - (4) *env\_sensor equip\_status\_for\_m\_and\_c*
    - (5) *list\_size*
    - (5) *sensor\_identity*
    - (5) *sensor\_status*
    - (5) *station\_id*
  - (4) *har equip\_status\_for\_m\_and\_c*
    - (5) *har\_fault*
  - (4) *hov\_sensor equip\_status\_for\_m\_and\_c*
    - (5) *list\_size*
    - (5) *sensor\_identity*
    - (5) *sensor\_status*
    - (5) *station\_id*
  - (4) *indicator equip\_status\_from\_highways\_for\_m\_and\_c*
    - (5) *indicator\_fault*
    - (5) *indicator\_type*
    - (5) *list\_size*
  - (4) *indicator equip\_status\_from\_roads\_for\_m\_and\_c*
    - (5) *indicator\_fault*
    - (5) *indicator\_type*
    - (5) *list\_size*
  - (4) *infrastructure\_sensor equip\_status\_for\_m\_and\_c*
    - (5) *infrastructure\_sensor\_status\_for\_mcv*
    - (5) *infrastructure\_sensor\_status\_for\_m\_and\_c*
  - (4) *smart\_probe equip\_status\_for\_m\_and\_c*
    - (5) *device\_identity*
    - (5) *list\_size*
    - (5) *roadside\_device\_status*
    - (5) *station\_id*
  - (4) *traffic\_sensor equip\_status\_for\_m\_and\_c*
    - (5) *list\_size*
    - (5) *sensor\_identity*
    - (5) *sensor\_status*
    - (5) *station\_id*
  - (4) *vehicle\_sign equip\_status\_for\_m\_and\_c*
    - (5) *device\_identity*
    - (5) *list\_size*
    - (5) *roadside\_device\_status*
    - (5) *station\_id*
  - (4) *video\_device equip\_status\_for\_m\_and\_c*
    - (5) *device\_identity*
    - (5) *list\_size*
    - (5) *roadside\_device\_status*
    - (5) *station\_id*
- (3) *field\_device\_status\_for\_archive\_attributes*
  - (4) *authorization\_to\_use*
  - (4) *collection\_conditions*
  - (4) *collection\_equipment*
  - (4) *data\_aggregation*
  - (4) *data\_concept\_identifier*
  - (4) *data\_reductions*
  - (4) *data\_revision*
  - (4) *data\_version*
  - (4) *date\_archived*
    - (5) *date*
    - (5) *time*
  - (4) *date\_created*
    - (5) *date*
    - (5) *time*
  - (4) *date\_published*

- (5) *date*
- (5) *time*
- (4) *equipment\_status*
- (4) *error\_handling*
- (4) *methods\_applied*
- (4) *owner\_entities*
- (4) *perishability\_date*
- (5) *date*
- (5) *time*
- (4) *personal\_identification\_status*
- (4) *quality\_control\_attribute*
- (4) *record\_size*
- (4) *security*
- (4) *standard\_data\_attribute*
- (4) *standard\_message\_attribute*
- (3) *infrastructure\_data\_for\_archive*
- (4) *infrastructure\_sensor\_data\_for\_m\_and\_c*
- (5) *infrastructure\_sensor\_data\_from\_roadside\_devices*
- (4) *mcv\_infrastructure\_sensor\_data*
- (5) *infrastructure\_sensor\_data\_for\_mcv*
- (5) *infrastructure\_sensor\_data\_from\_onboard\_devices*
- (4) *processed\_infrastructure\_sensor\_data*
- (5) *infrastructure\_sensor\_data\_for\_m\_and\_c*
- (5) *mcv\_infrastructure\_sensor\_data*
- (3) *infrastructure\_data\_for\_archive\_attributes*
- (4) *authorization\_to\_use*
- (4) *collection\_conditions*
- (4) *collection\_equipment*
- (4) *data\_aggregation*
- (4) *data\_concept\_identifier*
- (4) *data\_reductions*
- (4) *data\_revision*
- (4) *data\_version*
- (4) *date\_archived*
- (5) *date*
- (5) *time*
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- (5) *date*
- (5) *time*
- (4) *date\_published*
- (5) *date*
- (5) *time*
- (4) *equipment\_status*
- (4) *error\_handling*
- (4) *methods\_applied*
- (4) *owner\_entities*
- (4) *perishability\_date*
- (5) *date*
- (5) *time*
- (4) *personal\_identification\_status*
- (4) *quality\_control\_attribute*
- (4) *record\_size*
- (4) *security*
- (4) *standard\_data\_attribute*
- (4) *standard\_message\_attribute*
- (3) *m\_and\_c\_activity\_schedule\_for\_archive*
- (4) *m\_and\_c\_activity\_schedule*
- (5) *fleet\_activity\_schedule*
- (5) *m\_and\_c\_work\_plans*
- (5) *work\_zone\_activity\_plan*
- (3) *m\_and\_c\_activity\_schedule\_for\_archive\_attributes*
- (4) *authorization\_to\_use*
- (4) *collection\_conditions*
- (4) *collection\_equipment*
- (4) *data\_aggregation*
- (4) *data\_concept\_identifier*
- (4) *data\_reductions*
- (4) *data\_revision*
- (4) *data\_version*
- (4) *date\_archived*

- (5) *date*
- (5) *time*
- (4) *date\_created*
- (5) *date*
- (5) *time*
- (4) *date\_published*
- (5) *date*
- (5) *time*
- (4) *equipment\_status*
- (4) *error\_handling*
- (4) *methods\_applied*
- (4) *owner\_entities*
- (4) *perishability\_date*
- (5) *date*
- (5) *time*
- (4) *personal\_identification\_status*
- (4) *quality\_control\_attribute*
- (4) *record\_size*
- (4) *security*
- (4) *standard\_data\_attribute*
- (4) *standard\_message\_attribute*
- (3) *m\_and\_c\_activity\_status\_for\_archive*
- (4) *m\_and\_c\_activity\_status*
- (5) *m\_and\_c\_fleet\_manager\_status*
- (5) *m\_and\_c\_work\_performance*
- (5) *materials\_availability\_for\_status*
- (5) *work\_zone\_data\_for\_status*
- (3) *m\_and\_c\_activity\_status\_for\_archive\_attributes*
- (4) *authorization\_to\_use*
- (4) *collection\_conditions*
- (4) *collection\_equipment*
- (4) *data\_aggregation*
- (4) *data\_concept\_identifier*
- (4) *data\_reductions*
- (4) *data\_revision*
- (4) *data\_version*
- (4) *date\_archived*
- (5) *date*
- (5) *time*
- (4) *date\_created*
- (5) *date*
- (5) *time*
- (4) *date\_published*
- (5) *date*
- (5) *time*
- (4) *equipment\_status*
- (4) *error\_handling*
- (4) *methods\_applied*
- (4) *owner\_entities*
- (4) *perishability\_date*
- (5) *date*
- (5) *time*
- (4) *personal\_identification\_status*
- (4) *quality\_control\_attribute*
- (4) *record\_size*
- (4) *security*
- (4) *standard\_data\_attribute*
- (4) *standard\_message\_attribute*
- (3) *m\_and\_c\_maint\_resource\_needs\_for\_archive*
- (4) *m\_and\_c\_resource\_request\_from\_emerg*
- (4) *m\_and\_c\_resource\_request\_from\_traffic*
- (4) *resource\_needs\_from\_scheduler*
- (5) *date*
- (5) *list\_size*
- (5) *m\_and\_c\_equipment\_quantity*
- (5) *m\_and\_c\_equipment\_type*
- (5) *m\_and\_c\_materials\_quantity*
- (5) *m\_and\_c\_materials\_type*
- (5) *mcv\_vehicle\_type*
- (5) *time*

- (3) *m\_and\_c\_maint\_resource\_needs\_for\_archive\_attributes*
  - (4) *authorization\_to\_use*
  - (4) *collection\_conditions*
  - (4) *collection\_equipment*
  - (4) *data\_aggregation*
  - (4) *data\_concept\_identifier*
  - (4) *data\_reductions*
  - (4) *data\_revision*
  - (4) *data\_version*
  - (4) *date\_archived*
    - (5) *date*
    - (5) *time*
  - (4) *date\_created*
    - (5) *date*
    - (5) *time*
  - (4) *date\_published*
    - (5) *date*
    - (5) *time*
  - (4) *equipment\_status*
  - (4) *error\_handling*
  - (4) *methods\_applied*
  - (4) *owner\_entities*
  - (4) *perishability\_date*
    - (5) *date*
    - (5) *time*
  - (4) *personal\_identification\_status*
  - (4) *quality\_control\_attribute*
  - (4) *record\_size*
  - (4) *security*
  - (4) *standard\_data\_attribute*
  - (4) *standard\_message\_attribute*
- (3) *m\_and\_c\_roadway\_maint\_needs\_for\_archive*
  - (4) *list\_size*
  - (4) *m\_and\_c\_materials\_quantity*
  - (4) *m\_and\_c\_materials\_type*
  - (4) *mcv\_vehicle\_type*
  - (4) *need\_date*
  - (4) *need\_time*
  - (4) *roadway\_maint\_plan*
- (3) *m\_and\_c\_roadway\_maint\_needs\_for\_archive\_attributes*
  - (4) *authorization\_to\_use*
  - (4) *collection\_conditions*
  - (4) *collection\_equipment*
  - (4) *data\_aggregation*
  - (4) *data\_concept\_identifier*
  - (4) *data\_reductions*
  - (4) *data\_revision*
  - (4) *data\_version*
  - (4) *date\_archived*
    - (5) *date*
    - (5) *time*
  - (4) *date\_created*
    - (5) *date*
    - (5) *time*
  - (4) *date\_published*
    - (5) *date*
    - (5) *time*
  - (4) *equipment\_status*
  - (4) *error\_handling*
  - (4) *methods\_applied*
  - (4) *owner\_entities*
  - (4) *perishability\_date*
    - (5) *date*
    - (5) *time*
  - (4) *personal\_identification\_status*
  - (4) *quality\_control\_attribute*
  - (4) *record\_size*
  - (4) *security*
  - (4) *standard\_data\_attribute*
  - (4) *standard\_message\_attribute*

- (3) *m\_and\_c\_winter\_maint\_needs\_for\_archive*
  - (4) *list\_size*
  - (4) *m\_and\_c\_materials\_quantity*
  - (4) *m\_and\_c\_materials\_type*
  - (4) *mcv\_vehicle\_type*
  - (4) *need\_date*
  - (4) *need\_time*
  - (4) *winter\_treatment\_plan*
- (3) *m\_and\_c\_winter\_maint\_needs\_for\_archive\_attributes*
  - (4) *authorization\_to\_use*
  - (4) *collection\_conditions*
  - (4) *collection\_equipment*
  - (4) *data\_aggregation*
  - (4) *data\_concept\_identifier*
  - (4) *data\_reductions*
  - (4) *data\_revision*
  - (4) *data\_version*
  - (4) *date\_archived*
    - (5) *date*
    - (5) *time*
  - (4) *date\_created*
    - (5) *date*
    - (5) *time*
  - (4) *date\_published*
    - (5) *date*
    - (5) *time*
  - (4) *equipment\_status*
  - (4) *error\_handling*
  - (4) *methods\_applied*
  - (4) *owner\_entities*
  - (4) *perishability\_date*
    - (5) *date*
    - (5) *time*
  - (4) *personal\_identification\_status*
  - (4) *quality\_control\_attribute*
  - (4) *record\_size*
  - (4) *security*
  - (4) *standard\_data\_attribute*
  - (4) *standard\_message\_attribute*
- (3) *work\_zone\_data\_for\_archive*
  - (4) *work\_zone\_data\_for\_status*
    - (5) *fomcm\_work\_zone\_info*
    - (5) *work\_zone\_device\_status*
    - (5) *work\_zone\_intrusion\_warning\_data*
    - (5) *work\_zone\_resource\_status*
    - (5) *work\_zone\_status\_from\_mcv*
- (3) *work\_zone\_data\_for\_archive\_attributes*
  - (4) *authorization\_to\_use*
  - (4) *collection\_conditions*
  - (4) *collection\_equipment*
  - (4) *data\_aggregation*
  - (4) *data\_concept\_identifier*
  - (4) *data\_reductions*
  - (4) *data\_revision*
  - (4) *data\_version*
  - (4) *date\_archived*
    - (5) *date*
    - (5) *time*
  - (4) *date\_created*
    - (5) *date*
    - (5) *time*
  - (4) *date\_published*
    - (5) *date*
    - (5) *time*
  - (4) *equipment\_status*
  - (4) *error\_handling*
  - (4) *methods\_applied*
  - (4) *owner\_entities*
  - (4) *perishability\_date*
    - (5) *date*

- (5) *time*
- (4) *personal\_identification\_status*
- (4) *quality\_control\_attribute*
- (4) *record\_size*
- (4) *security*
- (4) *standard\_data\_attribute*
- (4) *standard\_message\_attribute*

## 6.10 Map Update Provider → Archived Data Management Subsystem

**Physical Architecture Flow:** map updates

W

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

**Logical Architecture Flows:**

- (1) *fmup\_map\_archive\_data*
  - (2) *map\_archive\_catalog*
  - (2) *map\_data\_for\_archive*
    - (3) *imported\_map\_data\_attributes*
      - (4) *authorization\_to\_use*
      - (4) *collection\_conditions*
      - (4) *collection\_equipment*
      - (4) *data\_aggregation*
      - (4) *data\_concept\_identifier*
      - (4) *data\_reductions*
      - (4) *data\_revision*
      - (4) *data\_version*
      - (4) *date\_archived*
      - (5) *date*
      - (5) *time*
    - (4) *date\_created*
      - (5) *date*
      - (5) *time*
    - (4) *date\_published*
      - (5) *date*
      - (5) *time*
    - (4) *equipment\_status*
    - (4) *error\_handling*
    - (4) *methods\_applied*
    - (4) *owner\_entities*
    - (4) *perishability\_date*
      - (5) *date*
      - (5) *time*
    - (4) *personal\_identification\_status*
    - (4) *quality\_control\_attribute*
    - (4) *record\_size*
    - (4) *security*
    - (4) *standard\_data\_attribute*
    - (4) *standard\_message\_attribute*
  - (3) *imported\_map\_data\_for\_archive*

## 6.11 Multimodal Transportation Service Provider → Archived Data Management Subsystem

**Physical Architecture Flow:** multimodal archive data

W

Operational information from alternate passenger transportation modes including air, rail transit, taxis, and ferries. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.

### Logical Architecture Flows:

- (1) *fmtsp\_multimodal\_archive\_data*
  - (2) *multimodal\_archive\_catalog*
  - (2) *multimodal\_data\_for\_archive*
  - (3) *multimodal\_data*
  - (3) *multimodal\_data\_attributes*
    - (4) *authorization\_to\_use*
    - (4) *collection\_conditions*
    - (4) *collection\_equipment*
    - (4) *data\_aggregation*
    - (4) *data\_concept\_identifier*
    - (4) *data\_reductions*
    - (4) *data\_revision*
    - (4) *data\_version*
    - (4) *date\_archived*
      - (5) *date*
      - (5) *time*
    - (4) *date\_created*
      - (5) *date*
      - (5) *time*
    - (4) *date\_published*
      - (5) *date*
      - (5) *time*
    - (4) *equipment\_status*
    - (4) *error\_handling*
    - (4) *methods\_applied*
    - (4) *owner\_entities*
    - (4) *perishability\_date*
      - (5) *date*
      - (5) *time*
    - (4) *personal\_identification\_status*
    - (4) *quality\_control\_attribute*
    - (4) *record\_size*
    - (4) *security*
    - (4) *standard\_data\_attribute*
    - (4) *standard\_message\_attribute*

## 6.12 Other Archives → Archived Data Management Subsystem

**Physical Architecture Flow:** archive coordination W

Catalog data, meta data, published data, and other information exchanged between archives to support data synchronization and satisfy user data requests.

### Logical Architecture Flows:

- (1) *foa\_archive\_coordination\_data*

## 6.13 Other Data Sources → Archived Data Management Subsystem

**Physical Architecture Flow:** other data source archive data W

Data extracted from other data sources. A wide range of ITS and non-ITS data and associated meta data may be provided.

### Logical Architecture Flows:

- (1) *fods\_other\_data\_source\_archive\_data*
  - (2) *other\_data\_source\_catalog*
  - (2) *user\_defined\_data\_for\_archive*
  - (3) *user\_defined\_data*
  - (3) *user\_defined\_data\_attributes*
    - (4) *authorization\_to\_use*
    - (4) *collection\_conditions*
    - (4) *collection\_equipment*

- (4) *data\_aggregation*
- (4) *data\_concept\_identifier*
- (4) *data\_reductions*
- (4) *data\_revision*
- (4) *data\_version*
- (4) *date\_archived*
  - (5) *date*
  - (5) *time*
- (4) *date\_created*
  - (5) *date*
  - (5) *time*
- (4) *date\_published*
  - (5) *date*
  - (5) *time*
- (4) *equipment\_status*
- (4) *error\_handling*
- (4) *methods\_applied*
- (4) *owner\_entities*
- (4) *perishability\_date*
  - (5) *date*
  - (5) *time*
- (4) *personal\_identification\_status*
- (4) *quality\_control\_attribute*
- (4) *record\_size*
- (4) *security*
- (4) *standard\_data\_attribute*
- (4) *standard\_message\_attribute*

## 6.14 Parking Management → Archived Data Management Subsystem

### Physical Architecture Flow: parking archive data

W

Data used to analyze and monitor trends in parking demand, pricing, and operational actions. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.

### Logical Architecture Flows:

- (1) *parking\_archive\_data*
  - (2) *parking\_archive\_catalog*
  - (2) *parking\_data\_for\_archive*
  - (3) *parking\_charge\_attributes*
    - (4) *authorization\_to\_use*
    - (4) *collection\_conditions*
    - (4) *collection\_equipment*
    - (4) *data\_aggregation*
    - (4) *data\_concept\_identifier*
    - (4) *data\_reductions*
    - (4) *data\_revision*
    - (4) *data\_version*
    - (4) *date\_archived*
      - (5) *date*
      - (5) *time*
    - (4) *date\_created*
      - (5) *date*
      - (5) *time*
    - (4) *date\_published*
      - (5) *date*
      - (5) *time*
    - (4) *equipment\_status*
    - (4) *error\_handling*
    - (4) *methods\_applied*
    - (4) *owner\_entities*
    - (4) *perishability\_date*
      - (5) *date*
      - (5) *time*

- (4) *personal\_identification\_status*
- (4) *quality\_control\_attribute*
- (4) *record\_size*
- (4) *security*
- (4) *standard\_data\_attribute*
- (4) *standard\_message\_attribute*
- (3) *parking\_charge\_response\_for\_archive*
  - (4) *list\_size*
  - (4) *parking\_lot\_availability*
    - (5) *handicap\_access\_information*
    - (5) *parking\_lot\_hours\_of\_operation*
    - (5) *parking\_lot\_identity*
    - (5) *parking\_lot\_spaces*
    - (5) *traveler\_identity*
  - (4) *parking\_lot\_charge\_application\_time*
  - (4) *parking\_lot\_identity*
    - (5) *location\_identity*
    - (5) *unit\_number*
  - (4) *parking\_lot\_price*
  - (4) *vehicle\_type\_for\_charges*
- (3) *parking\_lot\_state\_attributes*
  - (4) *authorization\_to\_use*
  - (4) *collection\_conditions*
  - (4) *collection\_equipment*
  - (4) *data\_aggregation*
  - (4) *data\_concept\_identifier*
  - (4) *data\_reductions*
  - (4) *data\_revision*
  - (4) *data\_version*
  - (4) *date\_archived*
    - (5) *date*
    - (5) *time*
  - (4) *date\_created*
    - (5) *date*
    - (5) *time*
  - (4) *date\_published*
    - (5) *date*
    - (5) *time*
  - (4) *equipment\_status*
  - (4) *error\_handling*
  - (4) *methods\_applied*
  - (4) *owner\_entities*
  - (4) *perishability\_date*
    - (5) *date*
    - (5) *time*
  - (4) *personal\_identification\_status*
  - (4) *quality\_control\_attribute*
  - (4) *record\_size*
  - (4) *security*
  - (4) *standard\_data\_attribute*
  - (4) *standard\_message\_attribute*
- (3) *parking\_lot\_state\_for\_archive*
  - (4) *parking\_lot\_current\_occupancy*
    - (5) *parking\_lot\_calculated\_occupancy*
    - (5) *parking\_lot\_identity*
  - (4) *parking\_lot\_identity*
    - (5) *location\_identity*
    - (5) *unit\_number*
  - (4) *parking\_lot\_state*

## 6.15 Roadway Subsystem → Archived Data Management Subsystem

### Physical Architecture Flow: roadside archive data

W

A broad set of data derived from roadside sensors that includes current traffic conditions, environmental conditions, and any other data that can be directly collected by roadside sensors. This data also indicates

the status of the sensors and reports of any identified sensor faults.

### Logical Architecture Flows:

- (1) *roadside\_archive\_data*
  - (2) *roadside\_archive\_catalog*
  - (2) *roadside\_data\_for\_archive*
  - (3) *archive\_environmental\_sensor\_data*
    - (4) *environment\_sensor\_data*
    - (5) *environment\_sensor\_output*
    - (5) *list\_size*
    - (5) *sensor\_identity*
    - (5) *station\_id*
    - (4) *environment\_sensor\_fault\_data*
    - (4) *environmental\_sensor\_status*
    - (5) *environment\_sensor\_fault\_data*
    - (5) *list\_size*
    - (5) *sensor\_identity*
    - (5) *station\_id*
  - (3) *environment\_sensor\_attributes*
    - (4) *authorization\_to\_use*
    - (4) *collection\_conditions*
    - (4) *collection\_equipment*
    - (4) *data\_aggregation*
    - (4) *data\_concept\_identifier*
    - (4) *data\_reductions*
    - (4) *data\_revision*
    - (4) *data\_version*
    - (4) *date\_archived*
    - (5) *date*
    - (5) *time*
    - (4) *date\_created*
    - (5) *date*
    - (5) *time*
    - (4) *date\_published*
    - (5) *date*
    - (5) *time*
    - (4) *equipment\_status*
    - (4) *error\_handling*
    - (4) *methods\_applied*
    - (4) *owner\_entities*
    - (4) *perishability\_date*
    - (5) *date*
    - (5) *time*
    - (4) *personal\_identification\_status*
    - (4) *quality\_control\_attribute*
    - (4) *record\_size*
    - (4) *security*
    - (4) *standard\_data\_attribute*
    - (4) *standard\_message\_attribute*
  - (3) *fault\_data*
    - (4) *sensor\_fault\_data*
  - (3) *fault\_data\_attributes*
    - (4) *authorization\_to\_use*
    - (4) *collection\_conditions*
    - (4) *collection\_equipment*
    - (4) *data\_aggregation*
    - (4) *data\_concept\_identifier*
    - (4) *data\_reductions*
    - (4) *data\_revision*
    - (4) *data\_version*
    - (4) *date\_archived*
    - (5) *date*
    - (5) *time*
    - (4) *date\_created*
    - (5) *date*
    - (5) *time*
    - (4) *date\_published*
    - (5) *date*
    - (5) *time*

- (4) *equipment\_status*
- (4) *error\_handling*
- (4) *methods\_applied*
- (4) *owner\_entities*
- (4) *perishability\_date*
  - (5) *date*
  - (5) *time*
- (4) *personal\_identification\_status*
- (4) *quality\_control\_attribute*
- (4) *record\_size*
- (4) *security*
- (4) *standard\_data\_attribute*
- (4) *standard\_message\_attribute*
- (3) *sensor\_attributes*
  - (4) *authorization\_to\_use*
  - (4) *collection\_conditions*
  - (4) *collection\_equipment*
  - (4) *data\_aggregation*
  - (4) *data\_concept\_identifier*
  - (4) *data\_reductions*
  - (4) *data\_revision*
  - (4) *data\_version*
  - (4) *date\_archived*
    - (5) *date*
    - (5) *time*
  - (4) *date\_created*
    - (5) *date*
    - (5) *time*
  - (4) *date\_published*
    - (5) *date*
    - (5) *time*
  - (4) *equipment\_status*
  - (4) *error\_handling*
  - (4) *methods\_applied*
  - (4) *owner\_entities*
  - (4) *perishability\_date*
    - (5) *date*
    - (5) *time*
  - (4) *personal\_identification\_status*
  - (4) *quality\_control\_attribute*
  - (4) *record\_size*
  - (4) *security*
  - (4) *standard\_data\_attribute*
  - (4) *standard\_message\_attribute*
- (3) *sensor\_data\_archive\_input*
  - (4) *hov\_sensor\_data*
    - (5) *hov\_priority*
    - (5) *link\_list*
    - (5) *list\_size*
    - (5) *private\_vehicle\_occupants*
  - (4) *local\_sensor\_data\_for\_highways*
    - (5) *crossing\_close\_duration*
    - (5) *crossing\_close\_time*
    - (5) *hov\_priority*
    - (5) *roadside\_conditions*
    - (5) *traffic\_video\_image*
    - (5) *vehicle\_detection\_data*
  - (4) *local\_sensor\_data\_for\_roads*
    - (5) *crossing\_close\_duration*
    - (5) *crossing\_close\_time*
    - (5) *hov\_priority*
    - (5) *pedestrian\_demand*
    - (5) *roadside\_conditions*
    - (5) *traffic\_video\_image*
    - (5) *vehicle\_detection\_data*
  - (4) *multimodal\_crossing\_sensor\_data*
    - (5) *crossing\_close\_duration*
    - (5) *crossing\_close\_time*
    - (5) *crossing\_list*
  - (4) *pedestrian\_sensor\_data*

- (5) *node\_list*
- (5) *pedestrian\_demand*
- (4) *sensor\_data\_for\_reversible\_lanes*
- (5) *traffic\_video\_image*
- (5) *vehicle\_detection\_data*
- (4) *traffic\_sensor\_data*
- (5) *list\_size*
- (5) *sensor\_identity*
- (5) *station\_id*
- (5) *traffic\_sensor\_output*
- (3) *sensor\_data\_attributes*
- (4) *authorization\_to\_use*
- (4) *collection\_conditions*
- (4) *collection\_equipment*
- (4) *data\_aggregation*
- (4) *data\_concept\_identifier*
- (4) *data\_reductions*
- (4) *data\_revision*
- (4) *data\_version*
- (4) *date\_archived*
- (5) *date*
- (5) *time*
- (4) *date\_created*
- (5) *date*
- (5) *time*
- (4) *date\_published*
- (5) *date*
- (5) *time*
- (4) *equipment\_status*
- (4) *error\_handling*
- (4) *methods\_applied*
- (4) *owner\_entities*
- (4) *perishability\_date*
- (5) *date*
- (5) *time*
- (4) *personal\_identification\_status*
- (4) *quality\_control\_attribute*
- (4) *record\_size*
- (4) *security*
- (4) *standard\_data\_attribute*
- (4) *standard\_message\_attribute*
- (3) *sensor\_status*
- (4) *traffic\_sensor\_status*

## 6.16 Surface Transportation Weather Service → Archived Data Management Subsystem

**Physical Architecture Flow:** transportation weather information

W

Current and forecast road conditions and weather information (e.g., surface condition, flooding, wind advisories, visibility, etc.) associated with the transportation network. This information is of a resolution, timeliness, and accuracy to be useful in transportation decision making.

### Logical Architecture Flows:

- (1) *fstws\_trans\_weather\_archive\_data*
- (2) *surface\_trans\_weather\_archive\_catalog*
- (2) *surface\_trans\_weather\_data\_for\_archive*
- (3) *climatic\_scale\_surface\_trans\_weather\_forecasts*
- (3) *meso\_scale\_surface\_trans\_weather\_forecasts*
- (4) *surface\_trans\_weather\_advisories*
- (4) *surface\_trans\_weather\_forecast\_details*
- (3) *micro\_scale\_surface\_trans\_weather\_forecasts*
- (4) *surface\_trans\_weather\_forecast\_details*
- (3) *miso\_scale\_surface\_trans\_weather\_forecasts*
- (4) *surface\_trans\_weather\_advisories*
- (4) *surface\_trans\_weather\_forecast\_details*

- (3) *surface\_trans\_weather\_observations*
- (3) *surface\_trans\_weather\_scale\_forecast\_data\_attributes*
- (3) *synoptic\_scale\_surface\_trans\_weather\_forecasts*
  - (4) *surface\_trans\_weather\_forecast\_details*
- (3) *weather\_observation\_attributes*

## 6.17 Toll Administration → Archived Data Management Subsystem

### Physical Architecture Flow: toll archive data

W

Data indicating toll facility usage and pricing schedules. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.

### Logical Architecture Flows:

- (1) *toll\_archive\_data*
  - (2) *toll\_archive\_catalog*
  - (2) *toll\_data\_for\_archive*
  - (3) *toll\_operational\_data*
    - (4) *date*
    - (4) *list\_size*
    - (4) *time*
    - (4) *toll\_cost*
    - (4) *toll\_segment\_identity*
      - (5) *unit\_number*
    - (4) *toll\_segment\_users*
  - (3) *toll\_operational\_data\_attributes*
    - (4) *authorization\_to\_use*
    - (4) *collection\_conditions*
    - (4) *collection\_equipment*
    - (4) *data\_aggregation*
    - (4) *data\_concept\_identifier*
    - (4) *data\_reductions*
    - (4) *data\_revision*
    - (4) *data\_version*
    - (4) *date\_archived*
      - (5) *date*
      - (5) *time*
    - (4) *date\_created*
      - (5) *date*
      - (5) *time*
    - (4) *date\_published*
      - (5) *date*
      - (5) *time*
    - (4) *equipment\_status*
    - (4) *error\_handling*
    - (4) *methods\_applied*
    - (4) *owner\_entities*
    - (4) *perishability\_date*
      - (5) *date*
      - (5) *time*
    - (4) *personal\_identification\_status*
    - (4) *quality\_control\_attribute*
    - (4) *record\_size*
    - (4) *security*
    - (4) *standard\_data\_attribute*
    - (4) *standard\_message\_attribute*
  - (3) *toll\_prices\_for\_archive*
    - (4) *list\_size*
    - (4) *toll\_price*
    - (4) *toll\_price\_application\_time*
    - (4) *toll\_segment\_identity*
      - (5) *unit\_number*
    - (4) *vehicle\_type\_for\_tolls*
      - (5) *cv\_tag\_data*

- (5) *cv\_vehicle\_characteristics*
- (5) *vehicle\_identity*
- (5) *vehicle\_type*
- (3) *toll\_prices\_for\_archive\_attributes*
  - (4) *authorization\_to\_use*
  - (4) *collection\_conditions*
  - (4) *collection\_equipment*
  - (4) *data\_aggregation*
  - (4) *data\_concept\_identifier*
  - (4) *data\_reductions*
  - (4) *data\_revision*
  - (4) *data\_version*
  - (4) *date\_archived*
    - (5) *date*
    - (5) *time*
  - (4) *date\_created*
    - (5) *date*
    - (5) *time*
  - (4) *date\_published*
    - (5) *date*
    - (5) *time*
  - (4) *equipment\_status*
  - (4) *error\_handling*
  - (4) *methods\_applied*
  - (4) *owner\_entities*
  - (4) *perishability\_date*
    - (5) *date*
    - (5) *time*
  - (4) *personal\_identification\_status*
  - (4) *quality\_control\_attribute*
  - (4) *record\_size*
  - (4) *security*
  - (4) *standard\_data\_attribute*
  - (4) *standard\_message\_attribute*

## 6.18 Traffic Management → Archived Data Management Subsystem

### Physical Architecture Flow: traffic archive data

W

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.

### Logical Architecture Flows:

- (1) *traffic\_management\_archive\_data*
  - (2) *traffic\_archive\_catalog*
  - (2) *traffic\_data\_for\_archive*
- (3) *ahs\_operational\_data*
  - (4) *ahs\_checking\_records*
    - (5) *ahs\_check\_identity*
    - (5) *ahs\_failed\_checks\_count*
    - (5) *ahs\_successful\_checks\_count*
    - (5) *list\_size*
  - (4) *ahs\_lane\_use\_data*
    - (5) *ahs\_vehicle\_count*
    - (5) *list\_size*
    - (5) *route\_segment\_identity*
  - (4) *date*
  - (4) *list\_size*
  - (4) *time*
- (3) *ahs\_operational\_data\_attributes*
  - (4) *authorization\_to\_use*
  - (4) *collection\_conditions*
  - (4) *collection\_equipment*

- (4) *data\_aggregation*
- (4) *data\_concept\_identifier*
- (4) *data\_reductions*
- (4) *data\_revision*
- (4) *data\_version*
- (4) *date\_archived*
  - (5) *date*
  - (5) *time*
- (4) *date\_created*
  - (5) *date*
  - (5) *time*
- (4) *date\_published*
  - (5) *date*
  - (5) *time*
- (4) *equipment\_status*
- (4) *error\_handling*
- (4) *methods\_applied*
- (4) *owner\_entities*
- (4) *perishability\_date*
  - (5) *date*
  - (5) *time*
- (4) *personal\_identification\_status*
- (4) *quality\_control\_attribute*
- (4) *record\_size*
- (4) *security*
- (4) *standard\_data\_attribute*
- (4) *standard\_message\_attribute*
- (3) *static\_data\_attributes*
  - (4) *authorization\_to\_use*
  - (4) *collection\_conditions*
  - (4) *collection\_equipment*
  - (4) *data\_aggregation*
  - (4) *data\_concept\_identifier*
  - (4) *data\_reductions*
  - (4) *data\_revision*
  - (4) *data\_version*
  - (4) *date\_archived*
    - (5) *date*
    - (5) *time*
  - (4) *date\_created*
    - (5) *date*
    - (5) *time*
  - (4) *date\_published*
    - (5) *date*
    - (5) *time*
  - (4) *equipment\_status*
  - (4) *error\_handling*
  - (4) *methods\_applied*
  - (4) *owner\_entities*
  - (4) *perishability\_date*
    - (5) *date*
    - (5) *time*
  - (4) *personal\_identification\_status*
  - (4) *quality\_control\_attribute*
  - (4) *record\_size*
  - (4) *security*
  - (4) *standard\_data\_attribute*
  - (4) *standard\_message\_attribute*
- (3) *static\_data\_for\_archive*
  - (4) *static\_data\_for\_traffic\_control*
    - (5) *background\_strategy*
    - (5) *coordination\_rules\_for\_highways*
    - (5) *coordination\_rules\_for\_roads*
    - (5) *dms\_allocation*
    - (5) *highway\_control\_devices*
    - (5) *highway\_network*
    - (5) *indicator\_highway\_control\_static\_data*
    - (5) *indicator\_road\_control\_static\_data*
    - (5) *link\_data*
    - (5) *parking\_lot\_static\_data*

- (5) *ramp\_devices*
- (5) *road\_control\_devices*
- (5) *road\_network*
- (5) *roadway\_characteristics*
- (5) *sensor\_allocation*
- (5) *vehicle\_signage\_output\_identity*
- (3) *traffic\_data\_for\_deployment*
  - (4) *current\_data*
    - (5) *current\_other\_routes\_use*
    - (5) *parking\_lot\_storage\_data*
    - (5) *processed\_data*
    - (5) *sensor\_output\_data*
    - (5) *stored\_incident\_data*
    - (5) *traffic\_flow\_state*
    - (5) *traffic\_management\_storage\_data*
    - (5) *traffic\_video\_image\_data*
    - (5) *vehicle\_smart\_probe\_stored\_data*
    - (5) *wide\_area\_pollution\_data*
  - (4) *long\_term\_data*
    - (5) *historical\_other\_routes\_use*
    - (5) *historical\_parking\_lot\_storage\_data*
    - (5) *historical\_processed\_data*
    - (5) *historical\_stored\_incident\_data*
    - (5) *historical\_traffic\_flow\_state*
    - (5) *historical\_traffic\_management\_storage\_data*
    - (5) *historical\_vehicle\_smart\_probe\_stored\_data*
    - (5) *historical\_wide\_area\_pollution\_data*
    - (5) *o\_d\_matrix*
  - (4) *predictive\_model\_data*
    - (5) *predicted\_highway\_network\_data*
    - (5) *predicted\_hov\_lane\_data*
    - (5) *predicted\_o\_d\_matrix*
    - (5) *predicted\_other\_routes\_use*
    - (5) *predicted\_parking\_lot\_data*
    - (5) *predicted\_road\_network\_data*
    - (5) *predicted\_road\_network\_use*
- (3) *traffic\_deployment\_data\_attributes*
  - (4) *authorization\_to\_use*
  - (4) *collection\_conditions*
  - (4) *collection\_equipment*
  - (4) *data\_aggregation*
  - (4) *data\_concept\_identifier*
  - (4) *data\_reductions*
  - (4) *data\_revision*
  - (4) *data\_version*
  - (4) *date\_archived*
    - (5) *date*
    - (5) *time*
  - (4) *date\_created*
    - (5) *date*
    - (5) *time*
  - (4) *date\_published*
    - (5) *date*
    - (5) *time*
  - (4) *equipment\_status*
  - (4) *error\_handling*
  - (4) *methods\_applied*
  - (4) *owner\_entities*
  - (4) *perishability\_date*
    - (5) *date*
    - (5) *time*
  - (4) *personal\_identification\_status*
  - (4) *quality\_control\_attribute*
  - (4) *record\_size*
  - (4) *security*
  - (4) *standard\_data\_attribute*
  - (4) *standard\_message\_attribute*

## 6.19 Transit Management → Archived Data Management Subsystem

### Physical Architecture Flow: transit archive data

W

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.

### Logical Architecture Flows:

- (1) *transit\_archive\_data*
  - (2) *transit\_archive\_catalog*
  - (2) *transit\_data\_for\_archive*
  - (3) *bad\_transit\_collected\_fare\_payment*
    - (4) *enforcement\_agency\_contact*
    - (4) *enforcement\_agency\_details*
    - (5) *enforcement\_agency\_address*
    - (5) *enforcement\_agency\_computer*
    - (5) *enforcement\_agency\_email*
    - (5) *enforcement\_agency\_fax*
    - (5) *enforcement\_agency\_name*
    - (5) *enforcement\_agency\_phone*
    - (5) *enforcement\_agency\_responsibility*
  - (4) *fare\_violation\_information*
    - (5) *credit\_identity*
    - (5) *transit\_fare*
    - (5) *transit\_route\_number*
    - (5) *transit\_route\_segment\_number*
    - (5) *transit\_route\_use\_time*
    - (5) *transit\_user\_category*
    - (5) *transit\_user\_roadside\_image*
    - (5) *transit\_user\_vehicle\_image*
    - (5) *traveler\_identity*
  - (3) *bad\_transit\_roadside\_fare\_payment*
    - (4) *enforcement\_agency\_contact*
    - (4) *enforcement\_agency\_details*
    - (5) *enforcement\_agency\_address*
    - (5) *enforcement\_agency\_computer*
    - (5) *enforcement\_agency\_email*
    - (5) *enforcement\_agency\_fax*
    - (5) *enforcement\_agency\_name*
    - (5) *enforcement\_agency\_phone*
    - (5) *enforcement\_agency\_responsibility*
  - (4) *fare\_collection\_roadside\_violation\_information*
    - (5) *transit\_route\_number*
    - (5) *transit\_route\_segment\_number*
    - (5) *transit\_user\_roadside\_image*
    - (5) *transit\_user\_roadside\_tag\_identity*
  - (3) *bad\_transit\_vehicle\_fare\_payment*
    - (4) *enforcement\_agency\_contact*
    - (4) *enforcement\_agency\_details*
    - (5) *enforcement\_agency\_address*
    - (5) *enforcement\_agency\_computer*
    - (5) *enforcement\_agency\_email*
    - (5) *enforcement\_agency\_fax*
    - (5) *enforcement\_agency\_name*
    - (5) *enforcement\_agency\_phone*
    - (5) *enforcement\_agency\_responsibility*
  - (4) *fare\_collection\_vehicle\_violation\_information*
    - (5) *transit\_route\_number*
    - (5) *transit\_route\_segment\_number*
    - (5) *transit\_user\_vehicle\_image*
    - (5) *transit\_user\_vehicle\_tag\_identity*
  - (3) *paratransit\_service\_data\_for\_archive*
    - (4) *paratransit\_personal\_schedule*
    - (5) *paratransit\_service\_cost*
    - (5) *paratransit\_service\_details*
    - (5) *traveler\_identity*
  - (4) *traveler\_identity*

- (3) *transit\_driver\_info\_for\_archive*
  - (4) *list\_size*
  - (4) *transit\_driver\_details*
    - (5) *transit\_driver\_availability*
    - (5) *transit\_driver\_availability\_considerations*
    - (5) *transit\_driver\_cost\_effectiveness*
    - (5) *transit\_driver\_cost\_effectiveness\_considerations*
    - (5) *transit\_driver\_eligibility*
    - (5) *transit\_driver\_eligibility\_considerations*
    - (5) *transit\_driver\_identity*
    - (5) *transit\_driver\_performance*
    - (5) *transit\_driver\_performance\_considerations*
    - (5) *transit\_driver\_route\_assignment\_considerations*
    - (5) *transit\_driver\_route\_details*
- (3) *transit\_emergency\_data\_for\_archive*
  - (4) *transit\_emergency\_data*
    - (5) *incident\_duration*
    - (5) *incident\_location*
    - (5) *incident\_severity*
    - (5) *incident\_start\_time*
  - (4) *transit\_emergency\_details*
    - (5) *transit\_driver\_emergency\_request*
    - (5) *transit\_user\_emergency\_request*
    - (5) *transit\_vehicle\_location*
  - (4) *transit\_media\_emergency\_interface\_parameters*
- (3) *transit\_fare\_transactions*
  - (4) *advanced\_fare\_transactions*
    - (5) *credit\_identity*
    - (5) *date*
    - (5) *stored\_credit*
    - (5) *time*
    - (5) *transit\_fare*
    - (5) *traveler\_identity*
  - (4) *current\_fare\_transactions*
    - (5) *credit\_identity*
    - (5) *date*
    - (5) *time*
    - (5) *transit\_fare*
    - (5) *traveler\_identity*
  - (4) *list\_size*
- (3) *transit\_incident\_info\_for\_archive*
  - (4) *emergency\_request\_transit\_details*
    - (5) *date*
    - (5) *time*
    - (5) *transit\_emergency\_request*
  - (4) *transit\_area\_surveillance\_information*
  - (4) *transit\_incident\_details*
    - (5) *incident\_duration*
    - (5) *incident\_location*
    - (5) *incident\_severity*
    - (5) *incident\_start\_time*
  - (4) *transit\_media\_incident\_interface\_parameters*
  - (4) *transit\_operator\_security\_action*
    - (5) *transit\_incident\_extra\_data*
    - (5) *transit\_incident\_required\_action*
    - (5) *transit\_video\_camera\_command*
- (3) *transit\_operational\_data\_attributes*
  - (4) *authorization\_to\_use*
  - (4) *collection\_conditions*
  - (4) *collection\_equipment*
  - (4) *data\_aggregation*
  - (4) *data\_concept\_identifier*
  - (4) *data\_reductions*
  - (4) *data\_revision*
  - (4) *data\_version*
  - (4) *date\_archived*
    - (5) *date*
    - (5) *time*
  - (4) *date\_created*
    - (5) *date*

- (5) *time*
- (4) *date\_published*
- (5) *date*
- (5) *time*
- (4) *equipment\_status*
- (4) *error\_handling*
- (4) *methods\_applied*
- (4) *owner\_entities*
- (4) *perishability\_date*
- (5) *date*
- (5) *time*
- (4) *personal\_identification\_status*
- (4) *quality\_control\_attribute*
- (4) *record\_size*
- (4) *security*
- (4) *standard\_data\_attribute*
- (4) *standard\_message\_attribute*
- (3) *transit\_operational\_data\_for\_archive*
- (4) *transit\_operational\_data*
- (5) *date*
- (5) *list\_size*
- (5) *time*
- (5) *transit\_passenger\_operational\_data*
- (5) *transit\_roadside\_operational\_data*
- (5) *transit\_vehicle\_operational\_data*
- (3) *transit\_route\_assign\_for\_archive*
- (4) *list\_size*
- (4) *paratransit\_services\_for\_transit\_drivers*
- (5) *transit\_route*
- (5) *transit\_schedules*
- (5) *transit\_stop\_locations*
- (4) *transit\_services\_for\_transit\_drivers*
- (5) *list\_size*
- (5) *transit\_services*
- (4) *transit\_vehicle\_availability*
- (4) *transit\_vehicle\_identity*
- (3) *transit\_services\_for\_deployment*
- (4) *transit\_services*
- (5) *map\_transit\_data*
- (5) *transit\_routes\_data*
- (5) *transit\_schedule\_data*
- (3) *transit\_technician\_info*
- (4) *list\_size*
- (4) *transit\_technician\_detail*
- (5) *transit\_technician\_identity*
- (5) *transit\_technician\_seniority*
- (5) *transit\_technician\_work\_assignment*
- (5) *transit\_technician\_work\_hours*
- (5) *transit\_technician\_work\_log*
- (5) *transit\_technician\_work\_preferences*
- (5) *transit\_technician\_work\_skills*
- (3) *transit\_user\_payments\_transactions*
- (3) *transit\_vehicle\_data\_for\_archive*
- (4) *transit\_vehicle\_data*
- (5) *list\_size*
- (5) *transit\_vehicle\_identity*
- (5) *transit\_vehicle\_passenger\_loading*
- (4) *transit\_vehicle\_information*
- (5) *transit\_vehicle\_collected\_maintenance\_data*
- (5) *transit\_vehicle\_collected\_trip\_data*
- (5) *transit\_vehicle\_deviation\_update*
- (5) *transit\_vehicle\_eta*
- (5) *transit\_vehicle\_identity*
- (5) *transit\_vehicle\_location*
- (5) *transit\_vehicle\_schedule\_deviations*
- (3) *transit\_vehicle\_maintenance\_info*
- (4) *list\_size*
- (4) *transit\_vehicle\_identity*
- (4) *transit\_vehicle\_operations\_details*
- (5) *transit\_vehicle\_maintenance*

- (5) *transit\_vehicle\_maintenance\_log*
- (5) *transit\_vehicle\_maintenance\_schedule*
- (5) *transit\_vehicle\_maintenance\_specs*

## 6.20 Weather Service → Archived Data Management Subsystem

### Physical Architecture Flow: weather information

W

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

### Logical Architecture Flows:

- (1) *fws\_weather\_archive\_data*
  - (2) *weather\_archive\_catalog*
  - (2) *weather\_data\_for\_archive*
    - (3) *weather\_data*
      - (3) *weather\_data\_attributes*
        - (4) *authorization\_to\_use*
        - (4) *collection\_conditions*
        - (4) *collection\_equipment*
        - (4) *data\_aggregation*
        - (4) *data\_concept\_identifier*
        - (4) *data\_reductions*
        - (4) *data\_revision*
        - (4) *data\_version*
        - (4) *date\_archived*
          - (5) *date*
          - (5) *time*
        - (4) *date\_created*
          - (5) *date*
          - (5) *time*
        - (4) *date\_published*
          - (5) *date*
          - (5) *time*
        - (4) *equipment\_status*
        - (4) *error\_handling*
        - (4) *methods\_applied*
        - (4) *owner\_entities*
        - (4) *perishability\_date*
          - (5) *date*
          - (5) *time*
        - (4) *personal\_identification\_status*
        - (4) *quality\_control\_attribute*
        - (4) *record\_size*
        - (4) *security*
        - (4) *standard\_data\_attribute*
        - (4) *standard\_message\_attribute*

## 6.21 Archived Data Management Subsystem → Archived Data User Systems

### Physical Architecture Flow: archive analysis results

W

Processed information products, supporting meta data, and any associated transaction information resulting from data mining, analytical processing, aggregation or summarization, report formulation, or other on-line processing and analysis of archived data.

### Logical Architecture Flows:

- (1) *tadu\_archive\_analysis\_results*

### Physical Architecture Flow: archive request confirmation

W

Confirmation that an archive request has been received and processed with information on the disposition of the request.

**Logical Architecture Flows:**

- (1) *tadu\_on\_demand\_confirmation*

**Physical Architecture Flow: archived data products**

W

Raw or processed data, meta data, data catalogs and other data products provided to a user system upon request. The response may also include any associated transaction information.

**Logical Architecture Flows:**

- (1) *tadu\_archive\_data\_product*

**6.22 Archived Data Management Subsystem → Asset Management****Physical Architecture Flow: archive requests**

W

A request to a data source for information on available data (i.e. "catalog") or a request that defines the data to be archived. The request can be a general subscription intended to initiate a continuous or regular data stream or a specific request intended to initiate a one-time response from the recipient.

**Logical Architecture Flows:**

- (1) *tam\_archive\_request*
- (2) *asset\_archive\_catalog\_request*
- (2) *asset\_archive\_data\_request*

**Physical Architecture Flow: archive status**

W

Notification that data provided to an archive contains erroneous, missing, or suspicious data or verification that the data provided appears valid. If an error has been detected, the offending data and the nature of the potential problem are identified.

**Logical Architecture Flows:**

- (1) *tam\_asset\_archive\_status*

**6.23 Archived Data Management Subsystem → Commercial Vehicle Administration****Physical Architecture Flow: archive requests**

W

A request to a data source for information on available data (i.e. "catalog") or a request that defines the data to be archived. The request can be a general subscription intended to initiate a continuous or regular data stream or a specific request intended to initiate a one-time response from the recipient.

**Logical Architecture Flows:**

- (1) *cv\_archive\_request*
- (2) *cv\_archive\_catalog\_request*
- (2) *cv\_archive\_data\_request*

**Physical Architecture Flow: archive status**

W

Notification that data provided to an archive contains erroneous, missing, or suspicious data or verification that the data provided appears valid. If an error has been detected, the offending data and the nature of the potential problem are identified.

**Logical Architecture Flows:**

- (1) *cv\_archive\_status*

## 6.24 Archived Data Management Subsystem → Emergency Management

**Physical Architecture Flow:** archive requests W

A request to a data source for information on available data (i.e. "catalog") or a request that defines the data to be archived. The request can be a general subscription intended to initiate a continuous or regular data stream or a specific request intended to initiate a one-time response from the recipient.

**Logical Architecture Flows:**

- (1) *em\_archive\_request*
- (2) *em\_archive\_catalog\_request*
- (2) *em\_archive\_data\_request*

**Physical Architecture Flow:** archive status W

Notification that data provided to an archive contains erroneous, missing, or suspicious data or verification that the data provided appears valid. If an error has been detected, the offending data and the nature of the potential problem are identified.

**Logical Architecture Flows:**

- (1) *em\_archive\_status*

## 6.25 Archived Data Management Subsystem → Emissions Management

**Physical Architecture Flow:** archive requests W

A request to a data source for information on available data (i.e. "catalog") or a request that defines the data to be archived. The request can be a general subscription intended to initiate a continuous or regular data stream or a specific request intended to initiate a one-time response from the recipient.

**Logical Architecture Flows:**

- (1) *emissions\_archive\_request*
- (2) *emissions\_archive\_catalog\_request*
- (2) *emissions\_archive\_data\_request*

**Physical Architecture Flow:** archive status W

Notification that data provided to an archive contains erroneous, missing, or suspicious data or verification that the data provided appears valid. If an error has been detected, the offending data and the nature of the potential problem are identified.

**Logical Architecture Flows:**

- (1) *emissions\_archive\_status*

## 6.26 Archived Data Management Subsystem → Government Reporting Systems

**Physical Architecture Flow:** government reporting system data W

Information provided by an ITS archive, formatted as appropriate, that can be used as input to government data reporting systems.

**Logical Architecture Flows:**

- (1) *tgrs\_government\_data\_report\_input*

## 6.27 Archived Data Management Subsystem → Information Service Provider

**Physical Architecture Flow:** archive requests W

A request to a data source for information on available data (i.e. "catalog") or a request that defines the

data to be archived. The request can be a general subscription intended to initiate a continuous or regular data stream or a specific request intended to initiate a one-time response from the recipient.

**Logical Architecture Flows:**

- (1) *traveler\_archive\_request*
- (2) *traveler\_archive\_catalog\_request*
- (2) *traveler\_archive\_data\_request*

**Physical Architecture Flow: archive status**

W

Notification that data provided to an archive contains erroneous, missing, or suspicious data or verification that the data provided appears valid. If an error has been detected, the offending data and the nature of the potential problem are identified.

**Logical Architecture Flows:**

- (1) *traveler\_archive\_status*

## 6.28 Archived Data Management Subsystem → Intermodal Freight Depot

**Physical Architecture Flow: archive requests**

W

A request to a data source for information on available data (i.e. "catalog") or a request that defines the data to be archived. The request can be a general subscription intended to initiate a continuous or regular data stream or a specific request intended to initiate a one-time response from the recipient.

**Logical Architecture Flows:**

- (1) *tifd\_intermodal\_archive\_request*
- (2) *intermodal\_archive\_catalog\_request*
- (2) *intermodal\_archive\_data\_request*

**Physical Architecture Flow: archive status**

W

Notification that data provided to an archive contains erroneous, missing, or suspicious data or verification that the data provided appears valid. If an error has been detected, the offending data and the nature of the potential problem are identified.

**Logical Architecture Flows:**

- (1) *tifd\_intermodal\_archive\_status*

## 6.29 Archived Data Management Subsystem → Maintenance and Construction Management

**Physical Architecture Flow: archive requests**

W

A request to a data source for information on available data (i.e. "catalog") or a request that defines the data to be archived. The request can be a general subscription intended to initiate a continuous or regular data stream or a specific request intended to initiate a one-time response from the recipient.

**Logical Architecture Flows:**

- (1) *m\_and\_c\_archive\_request*
- (2) *m\_and\_c\_archive\_catalog\_request*
- (2) *m\_and\_c\_archive\_data\_request*

**Physical Architecture Flow: archive status**

W

Notification that data provided to an archive contains erroneous, missing, or suspicious data or verification that the data provided appears valid. If an error has been detected, the offending data and the nature of the potential problem are identified.

### Logical Architecture Flows:

- (1) *m\_and\_c\_archive\_status*

## 6.30 Archived Data Management Subsystem → Map Update Provider

**Physical Architecture Flow:** map update request W

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

### Logical Architecture Flows:

- (1) *tmup\_map\_archive\_request*
- (2) *map\_archive\_catalog\_request*
- (2) *map\_archive\_data\_request*
- (1) *tmup\_map\_archive\_status*

## 6.31 Archived Data Management Subsystem → Multimodal Transportation Service Provider

**Physical Architecture Flow:** archive requests W

A request to a data source for information on available data (i.e. "catalog") or a request that defines the data to be archived. The request can be a general subscription intended to initiate a continuous or regular data stream or a specific request intended to initiate a one-time response from the recipient.

### Logical Architecture Flows:

- (1) *tmtsp\_multimodal\_archive\_request*
- (2) *multimodal\_archive\_catalog\_request*
- (2) *multimodal\_archive\_data\_request*

**Physical Architecture Flow:** archive status W

Notification that data provided to an archive contains erroneous, missing, or suspicious data or verification that the data provided appears valid. If an error has been detected, the offending data and the nature of the potential problem are identified.

### Logical Architecture Flows:

- (1) *tmtsp\_multimodal\_archive\_status*

## 6.32 Archived Data Management Subsystem → Other Archives

**Physical Architecture Flow:** archive coordination W

Catalog data, meta data, published data, and other information exchanged between archives to support data synchronization and satisfy user data requests.

### Logical Architecture Flows:

- (1) *toa\_archive\_coordination\_data*

## 6.33 Archived Data Management Subsystem → Other Data Sources

**Physical Architecture Flow:** archive requests W

A request to a data source for information on available data (i.e. "catalog") or a request that defines the data to be archived. The request can be a general subscription intended to initiate a continuous or regular data stream or a specific request intended to initiate a one-time response from the recipient.

### Logical Architecture Flows:

- (1) *tods\_other\_data\_source\_archive\_request*
- (2) *other\_data\_source\_catalog\_request*

- (2) *user\_defined\_data\_request*

**Physical Architecture Flow: archive status**

W

Notification that data provided to an archive contains erroneous, missing, or suspicious data or verification that the data provided appears valid. If an error has been detected, the offending data and the nature of the potential problem are identified.

**Logical Architecture Flows:**

- (1) *tods\_other\_data\_source\_archive\_status*

### **6.34 Archived Data Management Subsystem → Parking Management**

**Physical Architecture Flow: archive requests**

W

A request to a data source for information on available data (i.e. "catalog") or a request that defines the data to be archived. The request can be a general subscription intended to initiate a continuous or regular data stream or a specific request intended to initiate a one-time response from the recipient.

**Logical Architecture Flows:**

- (1) *parking\_archive\_request*
- (2) *parking\_archive\_catalog\_request*
- (2) *parking\_archive\_data\_request*

**Physical Architecture Flow: archive status**

W

Notification that data provided to an archive contains erroneous, missing, or suspicious data or verification that the data provided appears valid. If an error has been detected, the offending data and the nature of the potential problem are identified.

**Logical Architecture Flows:**

- (1) *parking\_archive\_status*

### **6.35 Archived Data Management Subsystem → Roadway Subsystem**

**Physical Architecture Flow: data collection and monitoring control**

W

Information used to configure and control data collection and monitoring systems.

**Logical Architecture Flows:**

- (1) *roadside\_archive\_control*
- (2) *roadside\_archive\_catalog\_request*
- (2) *roadside\_archive\_data\_request*

### **6.36 Archived Data Management Subsystem → Surface Transportation Weather Service**

**Physical Architecture Flow: archive requests**

W

A request to a data source for information on available data (i.e. "catalog") or a request that defines the data to be archived. The request can be a general subscription intended to initiate a continuous or regular data stream or a specific request intended to initiate a one-time response from the recipient.

**Logical Architecture Flows:**

- (1) *tstws\_archive\_request*
- (2) *surface\_trans\_weather\_archive\_catalog\_request*
- (2) *surface\_trans\_weather\_archive\_data\_request*

**Physical Architecture Flow: archive status**

W

Notification that data provided to an archive contains erroneous, missing, or suspicious data or verification that the data provided appears valid. If an error has been detected, the offending data and the nature of the potential problem are identified.

**Logical Architecture Flows:**

- (1) *tstws\_trans\_weather\_archive\_status*

**6.37 Archived Data Management Subsystem → Toll Administration**

**Physical Architecture Flow: archive requests**

W

A request to a data source for information on available data (i.e. "catalog") or a request that defines the data to be archived. The request can be a general subscription intended to initiate a continuous or regular data stream or a specific request intended to initiate a one-time response from the recipient.

**Logical Architecture Flows:**

- (1) *toll\_archive\_request*
- (2) *toll\_archive\_catalog\_request*
- (2) *toll\_archive\_data\_request*

**Physical Architecture Flow: archive status**

W

Notification that data provided to an archive contains erroneous, missing, or suspicious data or verification that the data provided appears valid. If an error has been detected, the offending data and the nature of the potential problem are identified.

**Logical Architecture Flows:**

- (1) *toll\_archive\_status*

**6.38 Archived Data Management Subsystem → Traffic Management Subsystem**

**Physical Architecture Flow: archive requests**

W

A request to a data source for information on available data (i.e. "catalog") or a request that defines the data to be archived. The request can be a general subscription intended to initiate a continuous or regular data stream or a specific request intended to initiate a one-time response from the recipient.

**Logical Architecture Flows:**

- (1) *traffic\_management\_archive\_request*
- (2) *traffic\_management\_archive\_catalog\_request*
- (2) *traffic\_management\_archive\_data\_request*

**Physical Architecture Flow: archive status**

W

Notification that data provided to an archive contains erroneous, missing, or suspicious data or verification that the data provided appears valid. If an error has been detected, the offending data and the nature of the potential problem are identified.

**Logical Architecture Flows:**

- (1) *traffic\_management\_archive\_status*

**6.39 Archived Data Management Subsystem → Transit Management**

**Physical Architecture Flow: archive requests**

W

A request to a data source for information on available data (i.e. "catalog") or a request that defines the data to be archived. The request can be a general subscription intended to initiate a continuous or regular data stream or a specific request intended to initiate a one-time response from the recipient.

**Logical Architecture Flows:**

- (1) *transit\_archive\_request*
- (2) *transit\_archive\_catalog\_request*
- (2) *transit\_archive\_data\_request*

**Physical Architecture Flow: archive status**

W

Notification that data provided to an archive contains erroneous, missing, or suspicious data or verification that the data provided appears valid. If an error has been detected, the offending data and the nature of the potential problem are identified.

**Logical Architecture Flows:**

- (1) *transit\_archive\_status*

## 6.40 Archived Data Management Subsystem → Weather Service

**Physical Architecture Flow: archive requests**

W

A request to a data source for information on available data (i.e. "catalog") or a request that defines the data to be archived. The request can be a general subscription intended to initiate a continuous or regular data stream or a specific request intended to initiate a one-time response from the recipient.

**Logical Architecture Flows:**

- (1) *tws\_weather\_archive\_request*
- (2) *weather\_archive\_catalog\_request*
- (2) *weather\_archive\_data\_request*

**Physical Architecture Flow: archive status**

W

Notification that data provided to an archive contains erroneous, missing, or suspicious data or verification that the data provided appears valid. If an error has been detected, the offending data and the nature of the potential problem are identified.

**Logical Architecture Flows:**

- (1) *tws\_weather\_archive\_status*

## 7. Data Dictionary Elements

This section contains the logical data dictionary element (DDE) definitions for all the logical data dictionary elements listed in this standards requirements package. The DDE's are given in alphabetical order.

### **advanced\_fare\_transactions**

This data flow is used within the Provide Electronic Payment Services function and contains data about advanced transit fare payment transactions as they take place for recording in the log of transit fare transactions.

### **advisory\_data\_request**

This data flow is used within the Provide Driver and Traveler Services function to request that advisory data be output to a driver or a traveler in a vehicle. The scope and transit route number data will be provided by the driver or transit user, and the vehicle location will be provided automatically.

### **advisory\_data\_request\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function. It is used to provide data to the data archive about requests for advisory data be output to a driver or a traveler in a vehicle.

### **advisory\_data\_scope**

This data flow is used within the Provide Driver and Traveler Services function to show the scope of the advisory data requested by the driver or transit user from a vehicle. The scope will define the types of data, such as: none, current traffic data, long term traffic data, predictive model data, planned events, prediction data, transit schedules, transit routes, current transit running data, yellow pages hotel data, yellow pages restaurant data, yellow pages theater data, or yellow pages services data.

### **ahs\_check\_identity**

This data flow is used within the Provide Vehicle Monitoring and Control function and contains the identity and location of an automatic highway system (AHS) check-in facility.

### **ahs\_checking\_records**

This data flow is used within the Provide Vehicle Monitoring and Control function and contains records of all vehicles that tried to check in for operation on automatic highway system (AHS) lanes. The number of check-in successes and failures are stored for a series of time periods.

### **ahs\_failed\_checks\_count**

This data flow is used within the Provide Vehicle Monitoring and Control function and contains a count of the number of vehicles that failed to pass through the automatic highway system (AHS) check-in procedure at a particular point over the time period of one hour.

### **ahs\_lane\_use\_data**

This data flow is used within the Provide Vehicle Monitoring and Control function and contains records of the use of all AHS lanes. This is to enable a picture to be compiled of the AHS lane use starting from the check-in point.

### **ahs\_operational\_data**

This data flow contains details of the number of vehicles that have been checked into the automatic highway system (AHS), plus details about the use of AHS lanes during the previous time period, e.g., one (1) hour.

### **ahs\_operational\_data\_attributes**

This data flow is used to provide meta data included with AHS operational data for release to the archive. Items of meta data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data, such as status of operational equipment. This meta data may also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type, and data

concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488.

**ahs\_successful\_checks\_count**

This data flow contains a count of the number of vehicles that successfully passed through the automatic highway system (AHS) check-in procedure at a particular point.

**ahs\_vehicle\_count**

This data flow contains a count of the number of vehicles that have used an automatic highway system (AHS) lane based route segment during the previous time period.

**archive\_environmental\_sensor\_data**

This data flow is used within the Manage Traffic function to collect environmental sensor data and environment sensor fault data from the roadside to send to the archive data function.

**archive\_manage\_emergency\_vehicle\_data**

This data flow is used to transfer existing emergency vehicle data to a point in the National ITS Architecture that can archive it.

**archive\_pollution\_reference\_data**

This data flow is used by processes within the Manage Traffic function and contains data about acceptable and tolerable pollution levels to be archived.

**archive\_pollution\_reference\_data\_attributes**

This data flow is used to provide meta data included with pollution reference data for release to the archive. Items of meta data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data, such as status of operational equipment. This meta data may also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type, and data concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488.

**archive\_pollution\_state\_data**

This data flow is used within the Manage Traffic function to send data to the Archive Data function. It contains the current levels of pollutants in the different parts of the geographic area covered by the function, as well as collected at the roadside and from particular vehicle types. It consists of the following data items that provide the actual levels of various pollutants.

**archive\_pollution\_state\_data\_attributes**

This data flow is used to provide meta data included with pollution state data for release to the archive. Items of meta data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data, such as status of operational equipment. This meta data may also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type, and data concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488.

**archive\_provide\_emergency\_service\_allocation\_data**

This data flow is used to transfer existing emergency service allocation data to a point in the National ITS Architecture where it can be archived.

**area\_air\_quality\_index**

This data flow contains a code for the area wide air quality level.

**asset\_archive\_catalog**

This data flow is used to provide the description of the data contained in the collection of transportation asset data from Asset Management that has been made available for the Manage Archive Function. The catalog may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g. time range of

entries, number of entries; or sample data products.

**asset\_archive\_catalog\_request**

This data flow from the Manage Archived Data function to Asset Management contains the request for a catalog of the data held by the terminator. The request for a catalog may include either or both the description of the types of data the archive is interested in or a time frame over which the requested information may be available.

**asset\_archive\_data\_request**

This data flow from the Manage Archived Data function to Asset Management contains the request for the data to be archived. The request for data may include either or both the description of the data required or a time frame over which the requested information may be available.

**asset\_data**

This data flow is sent by Asset Management and contains information that may be of interest to archive data user systems such as information describing transportation assets including pavements, bridges, and other infrastructure in the transportation network.

**asset\_data\_attributes**

This data flow is used to provide meta data included with asset management data for release to the archive. Items of meta data may include attributes that describe the source and quality of the data. This meta data may also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type, and data concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488.

**asset\_data\_for\_archive**

This data flow is sent by Asset Management and contains information that may be of interest to archive data users systems along with the meta data that is necessary to describe the imported data to the Manage Archived Data function.

**authorization\_to\_use**

This data flow describes the restrictions on the use of the data, such as a restriction on a class of users or a restriction on export of the data.

**auto\_treat equip status for m and c**

This data flow provides a report to the Manage Maintenance and Construction function of the status of automated roadway treatment systems, such as anti-icing systems, etc. and the adjoining dynamic message sign (DMS) equipment that alerts drivers to these conditions. By monitoring this data flow, the receiving process can assess the health and current status of field equipment and repair if deemed necessary.

**auto\_treatment\_activation\_data**

This data flow is used within the Manage Maintenance and Construction function and contains data about the conditions and occurrences under which the remotely controlled automated field devices along the roadway that treat the road surface (anti-icing, de-icing, etc.) were activated.

**auto\_treatment\_system\_status\_for\_archive**

This data flow contains the operational status of automated treatment devices located at the roadway including records of equipment activation. This flow is used by the Managed Archived Data function for archival of the occurrences of automated treatment.

**auto\_treatment\_system\_status\_for\_archive\_attributes**

This data flow is used to provide meta data included with maintenance and construction automated treatment system data for release to the archive. Items of meta data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data, such as status of operational equipment. This meta data may also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type, and data concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488..

**background\_strategy**

This data flow is used within the Manage Traffic function and comprises information about the traffic control strategies to be used if no overrides are in effect, i.e. there are no incidents, emergency vehicle routes, and no changes due to demand management or traffic system operator activity. Any of these may cause a special control strategy to be introduced and supersede the background strategy. The background strategy is specified for different times of the day, days of the week, and days of the year. Those for which a day of the year is specified will take preference over those for which a day of the week is specified, which in turn will take preference over those for which no date or day is specified.

**bad\_transit\_collected\_fare\_payment**

This data flow is used within the Manage Transit function and contains details from the data store about the contacts for an enforcement agency and the method by which it should be contacted. This is the agency to which data should be sent about each transit fare payment violation when it is received from the Provide Electronic Payment Services function. This data flow also contains data about a violator of the transit fare collection processes. This data will contain a digitized video image of the traveler trying to violate the fare collection process, plus information about the transit fare and the vehicle or roadside location from which payment was being attempted.

**bad\_transit\_roadside\_fare\_payment**

This data flow is used within the Manage Transit function and contains details from the data store about the contacts for an enforcement agency and the method by which it should be contacted. This is the agency to which data should be sent about each transit fare payment violation when it is received from the Provide Electronic Payment Services function. This data flow is also used by the Manage Transit function to send data about a violator of the transit fare collection processes at the roadside, i.e. a transit stop, to the Manage Emergency Services function. This data flow will contain a digitized video image of the transit user who is trying to violate the fare collection process at the roadside. It is assumed that this digitized data will include other data such as date and time, plus camera identity from which the roadside (transit stop) location can be determined.

**bad\_transit\_vehicle\_fare\_payment**

This data flow is used within the Manage Transit function and contains details from the data store about the contacts for an enforcement agency and the method by which it should be contacted. This is the agency to which data should be sent about each transit fare payment violation when it is received from the Provide Electronic Payment Services function. This data flow is also used by the Manage Transit function to send data about a violator of the transit fare collection processes on-board the vehicle to the Manage Emergency Services function. This data flow will contain a digitized video image of the transit user who is trying to violate the fare collection process on-board a vehicle. It is assumed that this digitized data will include other data such as date and time, plus camera identity from which the transit vehicle identity can be determined.

**climatic\_scale\_surface\_trans\_weather\_forecasts**

This data flow contains forecasts of surface transportation related weather trends and weather related events for time horizons and spatial range beyond those of synoptic scale forecasts.

**closure\_event\_data**

This data flow contains data to be used by traffic management to coordinate its overall operations with the HRI closures.

**collection\_conditions**

This data flow describes the conditions under which the data was collected and/or sampled.

**collection\_equipment**

This data flow describes the equipment used to collect the data. This may include a machine type or model or that it was manually collected or produced as a report of another ITS system.

**confirmation\_flag**

This data flow is used within various ITS functions to indicate the success or failure of a request or transaction.

**constraint\_on\_acceptable\_travel\_time**

This data flow is used within the Provide Driver and Traveler Services function and contains the maximum total travel time which the traveler or driver will allow for the selected route.

**constraint\_on\_ahs\_lanes**

This data flow is used within the Provide Driver and Traveler Services function and contains a flag which if set means that where possible use route segments that are automatic highway system (AHS) lanes.

**constraint\_on\_eta\_change**

This data flow is used within the Provide Driver and Traveler Services function. It contains the value by which the estimated time of arrival (eta) at the destination must change for a new route to be automatically sent to the vehicle, or used for autonomous guidance with long journey and queue times being obtained from a central source.

**constraint\_on\_interstate**

This data flow is used within the Provide Driver and Traveler Services function and contains a flag which if set means, where possible, use interstate freeways except for when access is required to particular places, e.g. origin, destination, way points along a route.

**constraint\_on\_load\_classification**

This data flow contains a three character code that specifies the load type. This is principally aimed at hazardous material (HAZMAT) type loads that may require special routing restrictions. The most hazardous type id code being used if more than one hazardous material being carried on a single vehicle.

**constraint\_on\_number\_of\_mode\_changes**

This data flow contains the maximum number of changes between different modes of transport which the traveler or driver wishes to see used in the planned trip.

**constraint\_on\_number\_of\_transfers**

This data flow is used within the Provide Driver and Traveler Services function and contains the maximum number of mode changes that a traveler or driver will allow when a multimodal route is being specified.

**constraint\_on\_special\_needs**

This data flow contains a code that covers physical and/or mental disabilities which may affect the choice of mode, route, etc., e.g. blind and will be accompanied, blind with a guide dog, deaf, mute, uses crutches, wheelchair bound, etc.

**constraint\_on\_urban**

This data flow is used within the Provide Driver and Traveler Services function and contains a flag which if set means avoid all urban roads except for when they are needed for access.

**constraint\_on\_vehicle\_type**

This data flow contains a code that specifies that the route must be suitable for a particular type or types of vehicle. If left blank then routes suitable for all types of vehicle will be chosen so that for example, routes prohibiting commercial vehicles will be avoided. When vehicle types are specified, then the route will be suitable for that type and will if possible use segments from which other types are prohibited.

**constraints**

This data flow is part of the data that enables a route involving automatic highway system (AHS) lanes to be selected. It contains the constraints being placed on the choice of route and which will override any preferences that are also specified. Unless a default value is specifically defined, a value giving the least severe requirement will be used. Some parameters will have to be supplied by the traveler or driver (or provided by a process as a default value) before the route selection process can proceed.

**coordination\_rule\_data\_for\_highways**

This data flow is used within the Manage Traffic function and contains data that defines the action to be taken by the

road system when a particular highway sign plan is used on the highway network. The action is expressed as a series of adaptive and fixed time plan numbers which are to be implemented.

**coordination\_rule\_data\_for\_roads**

This data flow is used within the Manage Traffic function and contains data that defines the action to be taken by the highway system when a particular adaptive or fixed time plan is used on the road network. The action is expressed as a series of highway sign plan numbers which are to be implemented.

**coordination\_rule\_highway\_data\_description**

This data flow and comprises a meaningful description of the coordination rule defining a particular set of data used to coordinate the actions of the road system with those of the highway system.

**coordination\_rule\_highway\_data\_number**

This data flow contains the coordination rule number that identifies a particular set of data used to coordinate the actions of the road system with those of the highway system.

**coordination\_rule\_road\_data\_description**

This data flow contains a description of the coordination rule defining a particular set of data used to coordinate the actions of the highway system with those of the road system.

**coordination\_rule\_road\_data\_number**

This data flow contains the coordination rule number that identifies a particular set of data used to coordinate the actions of the highway system with those of the road system.

**coordination\_rules\_for\_highways**

This data flow is used within the Manage Traffic function and contains data that defines the rules for the coordination of the highway and road control strategies. These rules will set out what action the road system is expected to take because a particular strategy has been implemented on the highway network.

**coordination\_rules\_for\_roads**

This data flow is used within the Manage Traffic function and contains data that defines the rules for the coordination of the road and highway control strategies. These rules will set out what action the highway system is expected to take because a particular strategy has been implemented on the road network.

**cost**

This data flow is used by several functions within ITS and contains the cost of a service, such as: the cost of a display map or navigable map database update, or the cost of a transit fare, a paratransit service, a non-motorized transportation service, etc.

**credit\_identity**

This data flow contains the identity number of a credit card which is to be used to secure preclearance from paying dues, taxes, and other commercial vehicles charges, or by a traveler or driver for payment of current or advanced tolls, fares, parking lot charges, or for yellow pages services.

**crossing\_adaptive\_data**

This data flow contains data about adaptive control data used by indicators that are multimodal crossing controllers to enable them to control traffic. The format of the data will depend upon the type of adaptive control being used.

**crossing\_close\_duration**

This data flow is used within the Manage Traffic function. It contains the time duration for which a crossing must close to vehicular (roads and highway) traffic to permit the passage of the alternate flow, e.g. railroad, river traffic, aircraft, etc. and is used to influence the control of signalized traffic intersections provided by the Provide Device Control facility.

**crossing\_close\_time**

This data flow is used within the Manage Traffic function. It contains the time period before a crossing must close to vehicular (road and highway) traffic to permit the passage of the alternate flow, e.g. railroad, river traffic, aircraft,

etc. and is used to influence the control of signalized traffic intersections provided by the Provide Device Control facility.

**crossing\_control\_commands**

This data flow is used within the Manage Traffic function and contains the actual control commands that make the multimodal crossing controller change the traffic stop/go outputs shown by its phases to traffic. The actual format of the control commands will depend on national standards being developed for controller fixed time plans, e.g. NTCIP.

**crossing\_cycle\_time**

This data flow contains data that includes the time taken to complete all the control commands in an multimodal crossing fixed time plan once only.

**crossing\_data\_for\_highways**

This data flow is used within the Manage Traffic function. It contains data received from a multimodal crossings on highways about when they are going to close and for how long.

**crossing\_data\_for\_roads**

This data flow is used within the Manage Traffic function. It contains data received from a multimodal crossings on roads about when they are going to close and for how long the closure will last.

**crossing\_equipment\_data\_for\_highways**

This data flow is used within the Manage Traffic function and provides information about each multimodal crossing so that closure of the crossing to highway traffic can be properly implemented when needed.

**crossing\_equipment\_data\_for\_roads**

This data flow is used within the Manage Traffic function and provides information about each multimodal crossing so that closure of the crossing to road traffic can be properly implemented when needed.

**crossing\_fixed\_time\_data**

This data flow is used within the Manage Traffic function and includes information about fixed time control data used by indicators that are multimodal crossing controllers to enable them to control traffic.

**crossing\_id**

This is a data element used to identify a specific highway-rail crossing at grade.

**crossing\_identity**

This data flow is used within the Manage Traffic function and contains the identity of a multimodal crossing.

**crossing\_list**

This data flow is used within the Manage Traffic function and contains a list of multimodal crossings to which the accompanying data applies.

**crossing\_offset\_time**

This data flow contains the relative start time of the cycle of multimodal crossing control commands and is set at a value that will achieve synchronization between adjacent controllers, regardless of their type.

**crossing\_phase\_data**

This data flow provides information about the way in which each multimodal crossing operates, i.e. the minimum and maximum phase timings, phase change timings, etc.

**current\_carbon\_monoxide\_pollution**

This data flow is used within the Manage Traffic function and contains the average level of carbon monoxide pollution as measured by sensors. These sensors may provide general coverage of the geographic area served by the function, or located at the roadside, or measure data for particular vehicle types. The unit of measurement will be in parts per million (ppm).

**current\_data**

This data store is used within the Manage Traffic function to hold data about the current state of traffic on the road (surface street) and freeway network served by the function. It is a sample of the traffic at a single instant in time and is updated periodically from data collected by other processes within both this and other ITS functions.

**current\_fare\_transactions**

This data flow is used within the Provide Electronic Payment Services function and contains data about current transit fare payment transactions as they take place for recording in the log of transit fare transactions.

**current\_fleet\_maintenance\_status**

This data flow is used within the Manage Maintenance and Construction function and includes information on the maintenance status of all of the maintenance and construction vehicles in the fleet.

**current\_highway\_network\_data**

This data flow is used within the Manage Traffic function and contains data about traffic conditions on links in the highway network served by the function. This data is used for determining traffic management strategies and is also sent for storage in both the long term and current data stores

**current\_hydrocarbon\_pollution**

This data flow is used within the Manage Traffic function and contains the current level of hydrocarbon pollution as measured by sensors. These sensors may provide general coverage of the geographic area served by the function, or located at the roadside, or measure data for particular vehicle types. The unit of measurement will be in parts per million (ppm).

**current\_incident\_data**

This data flow is used within the Manage Traffic function to transfer data about current incidents from the Incident Management facility to the Provide Traffic Surveillance facility for storage.

**current\_incident\_details**

This data flow is used within the Manage Traffic function and contains the details of a current incident.

**current\_nitrous\_oxide\_pollution**

This data flow is used within the Manage Traffic function and contains the average level of nitrous oxide pollution as measured by sensors. These sensors may provide general coverage of the geographic area served by the function, or located at the roadside, or measure data for particular vehicle types. The unit of measurement will be in parts per million (ppm).

**current\_other\_routes\_use**

This data flow is used within the Provide Driver and Traveler Services function and contains data about the non-vehicle portion(s) of routes that have been requested by travelers. These route portions will involve the use of modes such as cycling, walking, etc. The data will be stored in ascending route segment number order (i.e. from 1 to the maximum number of route segments).

**current\_other\_routes\_use\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function and contains data for the data archive about the non-vehicle portion(s) of routes that have been requested by travelers. These route portions will involve the use of modes such as cycling, walking, etc. The data will be stored in ascending route segment number order (i.e. from 1 to the maximum number of route segments).

**current\_ozone\_pollution**

This data flow is used within the Manage Traffic function and contains the average level of ozone pollution as measured by sensors. These sensors may provide general coverage of the geographic area served by the function, or located at the roadside, or measure data for particular vehicle types. The unit of measurement will be in parts per million (ppm).

**current\_particulate\_pollution**

This data flow is used within the Manage Traffic function and contains the average level of pollution from particulates as measured by sensors. These sensors may provide general coverage of the geographic area served by the function, or located at the roadside, or measure data for particular vehicle types. The unit of measurement will be in parts per million (ppm).

**current\_pollution\_location**

This data flow is used within the Manage Traffic function and gives the location coordinates from which a set of current pollution levels have been obtained. The location may be one at which the pollution for the geographic area served by the function is measured, or one at which roadside pollution levels are measured, or one at which pollution data for particular vehicle types is measured. These pollution levels will be defined in an associated set of data flows.

**current\_road\_network\_data**

This data flow is used within the Manage Traffic function and contains data about traffic conditions on links in the road network served by the function. This data is used for determining traffic management strategies and is also sent for storage in both the long term and current data stores.

**current\_road\_network\_use**

This data flow is sent from the Provide Driver and Traveler Services function to the Manage Traffic and Manage Maintenance and Construction functions. It contains information about how many vehicles are being guided down each route segment and the average journey time for each route segment provided by guided vehicles. The data will be stored in ascending route segment number order (i.e. from 1 to the maximum number of route segments).

**current\_road\_network\_use\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function and contains information about how many vehicles are being guided down each route segment and the average journey time for each route segment provided by guided vehicles. The data will be stored in ascending route segment number order (i.e. from 1 to the maximum number of route segments).

**current\_roadside\_pollution\_location**

This data flow is used within the Manage Traffic function and contains the location at which an associated set of current roadside atmospheric pollution values have been obtained from sensors.

**current\_roadway\_network\_data**

This data flow is used within the Manage Traffic function and contains data about traffic conditions on links in the road (surface street) and highway network served by the function. The data is used for determining traffic management strategy and is also sent for in both the long term and current data stores.

**current\_sulfur\_dioxide\_pollution**

This data flow is used within the Manage Traffic function and contains the average level of sulfur dioxide pollution as measured by sensors. These sensors may provide general coverage of the geographic area served by the function, or located at the roadside, or measure data for particular vehicle types. The unit of measurement will be in parts per million (ppm).

**cv\_archive\_catalog**

This data flow is used to provide the description of the data contained in the collection of commercial vehicle data that has been stored and made available for the Manage Archive function. The catalog may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g., time range of entries, number of entries; or simple data product.

**cv\_archive\_catalog\_request**

This data flow from the Manage Archived Data function contains the request for a catalog of the data held by the Manage Commercial Vehicles function. The request for a catalog may include either or both the description of the types of data the archive is interested in or a time frame over which the requested information may be available.

**cv\_archive\_data\_request**

This data flow from the Manage Archived Data function contains the request for the data held by the Manage Commercial Vehicles function. The request for data may include either or both the description of the data required or a time frame over which the requested information may be available.

**cv\_archived\_inspection\_data**

This data flow is used within the Manage Commercial Vehicles function and contains archived commercial vehicle inspection data collected at the commercial vehicle roadside checkstation facility.

**cv\_archived\_safety\_data**

This data flow is used within the Manage Commercial Vehicles function. It contains information that is collected at a roadside checkstation facility as the result of the safety checking of an approaching commercial vehicle. This data is stored in the log of roadside facility data.

**cv\_border\_override**

This data flow is used within the Manage Commercial Vehicles function. It contains the decision made by an inspector at a commercial vehicle roadside checkstation facility to override (or not) the automated pass or pull-in decision made by the process responsible for border crossing checking.

**cv\_border\_override\_code**

This data flow is used within the Manage Commercial Vehicles function. It contains a code which gives the results of the decision made by an inspector at a commercial vehicle roadside checkstation facility to override (or not) the automated pass or pull-in decision made by the process responsible for border crossings checking.

**cv\_border\_problem**

This data flow is used within the Manage Commercial Vehicles function to identify the nature of a problem with a commercial vehicle's data at a border crossing. It indicates whether the problem was related to data associated with the vehicle, driver, or cargo.

**cv\_border\_pull\_in\_output**

This data flow is used in the Manage Commercial Vehicles function and contains the output of the result of an analysis of the data from a commercial vehicle that is approaching a roadside checkstation facility, by the process responsible for commercial vehicle border crossing checking. The result is expressed in terms of a pull-in or pass decision for the vehicle.

**cv\_border\_record**

This data flow is used within the Manage Commercial Vehicles function. It contains information that is collected at a roadside checkstation facility as the result of the border crossing checks on an approaching commercial vehicle. This data is stored in the log of roadside facility data.

**cv\_cargo\_class**

This data flow contains the cargo classification for a particular use of a commercial vehicle route.

**cv\_cargo\_discharged**

This data flow contains an identification for cargo that was discharged from a commercial vehicle. The time, date, location, vehicle mileage, etc. when this activity took place are recorded in separate data flows. This data flow consists of an identifier of the cargo, which could include such things as news print, clothing, canned food, dairy products, or furnishings. The activity may in some cases only apply to part of the vehicle's cargo. However for every one of these discharge activities there should be a similar loading activity which is defined in a separate data flow.

**cv\_cargo\_loaded**

This data flow contains an identification code for cargo that was loaded onto a commercial vehicle. The time, date, location, vehicle mileage, etc. when this activity took place are recorded in separate data flows. This data flow consists of an identifier which specifies the type of cargo. Examples of the types of cargo could be items such as but not limited to electrical goods, washing machines, freezers, sand, sacks of sand, beef meat (frozen), beef

livestock. The activity may in some cases only apply to part of the vehicle's cargo. However for every one of these loading activities there should be a similar discharge activity which is defined in a separate data flow. This data other flow also contains further examples of the codes that can be used.

#### **cv\_carrier\_number**

This data flow contains a character code that is the carrier identification number.

#### **cv\_credentials**

This data flow is used within the Manage Commercial Vehicles function and contains details about a commercial vehicle, e.g. make, model, type, special features, etc. It is set up at manufacture when the on-board vehicle system is installed and cannot be changed by the driver.

#### **cv\_credentials\_details**

This data flow is used within the Manage Commercial Vehicles function and contains details about the carrier, driver and vehicle numbers that are used as the key identifiers for commercial vehicles credentials data.

#### **cv\_credentials\_enrollment\_attributes**

This data flow is used to provide the meta data included with the cv\_credentials\_enrollment\_data for release to archive. Items of meta data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data. This meta data may also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type and data concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488.

#### **cv\_credentials\_enrollment\_data**

This data flow is used within the Manage Commercial Vehicles function and contains information that is to be archived. The data contains information about hazardous material and vehicle origin/destination.

#### **cv\_credentials\_problem**

This data flow is used within the Manage Commercial Vehicles function to identify the nature of a problem with a commercial vehicle's credentials.

#### **cv\_daily\_logs**

This data flow is used within the Manage Commercial Vehicles function. It contains a copy of the daily log of all the activities that have taken place at a commercial vehicle roadside checkstation facility and a border crossing facility. This data is analyzed to determine problem vehicles, drivers and carriers for future pull-in requests and reports to the government administrators.

#### **cv\_daily\_logs\_attributes**

This data flow is used to provide the meta data included with the cv\_daily\_logs for release to archive. Items of meta data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data. This meta data may also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type and data concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488.

#### **cv\_data\_for\_archive**

This data flow is from the Manage Commercial Vehicles function to the Manage Archive Data function. It is used to provide details of commercial vehicle credentials, roadside and border crossing data for the archive.

#### **cv\_driver\_credentials**

This data item contains details of the commercial vehicle driver's license.

#### **cv\_driver\_details**

This data flow is used within the Manage Commercial Vehicles function and contains details about a particular commercial vehicle driver. The driver identity is held in an associated data flow.

**cv\_driver\_license\_citations**

This data item is used within the Manage Commercial Vehicles function and contains details of any citations, etc. recorded against the driver's license.

**cv\_driver\_number**

This data flow contains an alphanumeric code that is the commercial vehicle driver identification number.

**cv\_fuel\_purchase\_cost**

This data flow is used within the Manage Commercial Vehicles function. It contains the cost of a quantity of fuel purchased for a commercial vehicle. The quantity of fuel purchased together with the time and date are stored in separate data flows.

**cv\_fuel\_purchase\_data**

This data flow is used within the Manage Commercial Vehicles function. It contains details of the quantity and cost of fuel purchased for a commercial vehicle. The number of miles recorded by the vehicle, the time and the date are stored in separate data flows.

**cv\_fuel\_purchase\_quantity**

This data flow contains the quantity of fuel purchased for a commercial vehicle. The cost of this quantity of fuel together with the time and date are stored in separate data flows.

**cv\_inspection\_activities\_data**

This data flow contains a record of the inspection activities that have been carried out on the commercial vehicle.

**cv\_inspection\_data**

This data flow is used within the Manage Commercial Vehicles function and contains the results of a roadside vehicle check which are to be downloaded for storage on-board the vehicle. The data may be eventually retrieved by the driver, the commercial vehicle manager, or at a subsequent roadside inspection.

**cv\_inspector\_safety\_data\_input**

This data flow is used within the Manage Commercial Vehicles function and contains data that is input by an inspector using a hand held terminal. This data will be associated with the roadside inspection of a commercial vehicle and may include extra comments on things not found by the inspection process, or recommendations for remedial action, where problems have been found.

**cv\_log\_data**

This data flow is used within the Manage Commercial Vehicles function. It contains identification data for each entry in the vehicle details section of the data archived at a roadside checkstation facility.

**cv\_log\_entry\_date**

This data flow is used within the Manage Commercial Vehicles function. It contains the date on which an entry was made into the store of vehicle activity.

**cv\_log\_entry\_location**

This data flow is used within the Manage Commercial Vehicles function. It contains the location of the commercial vehicle when data was loaded into the store of its activities.

**cv\_log\_entry\_mileage**

This data flow contains the vehicle mileage at which an entry was made into the store of vehicle activity as this is typical of many commercial vehicles.

**cv\_log\_entry\_time**

This data flow is used within the Manage Commercial Vehicles function. It contains the time at which an entry was made into the store of vehicle activity.

**cv\_not\_pulled\_in**

This data item contains a flag which if set shows that potentially there will be the need to pull in a commercial vehicle because of a problem.

**cv\_operator\_override**

This data flow is used within the Manage Commercial Vehicles function. It contains the roadside facility operator override action.

**cv\_repairs\_and\_service\_records**

This data item contains a record of the repair and service work carried out on a commercial vehicle.

**cv\_roadside\_daily\_log**

This data flow is used within the Manage Commercial Vehicles function. It contains a copy of the daily log of all the activities that have taken place at a commercial vehicle roadside checkstation facility. This data is analyzed to determine problem vehicles, drivers and carriers for future pull-in requests.

**cv\_roadside\_facility\_identity**

This data item contains the identity of the commercial vehicle roadside checking facility. This data flow enables a unique set of alphanumeric characters to be used while it provides the option of grouping identities by State and/or area(s) within a State.

**cv\_roadside\_record**

This data flow is used within the Manage Commercial Vehicles function. It contains a copy of the details of the activities that have been logged at a commercial vehicle roadside checkstation facility.

**cv\_roadside\_report**

This data flow is used within the Manage Commercial Vehicles function and contains the results data from a commercial vehicle roadside inspection. If set to null there was no data available from which to carry-out the inspection.

**cv\_route\_data**

This data flow is sent from the Provide Driver and Traveler Services function to the Manage Commercial Vehicles function. It contains data for routes that have been selected for a commercial vehicle based on the data provided in the request from the Manage Commercial Vehicles function.

**cv\_route\_details**

This data store is used within the Manage Commercial Vehicle function to hold data about commercial vehicle routes used by the commercial vehicle driver.

**cv\_route\_number**

This data flow is used within the Manage Commercial Vehicle function and contains the number of the commercial vehicle route. It is used to associate other items of data such as taxes and duties, route details, classes, etc.

**cv\_safety\_override**

This data flow is used within the Manage Commercial Vehicles function. It contains the decision made by an inspector at a commercial vehicle roadside checkstation facility to override (or not) the automated pass or pull-in decision made by the process responsible for safety checking.

**cv\_safety\_override\_code**

This data flow is used within the Manage Commercial Vehicles function. It contains a code which gives the results of the decision made by an inspector at a commercial vehicle roadside checkstation facility to override (or not) the automated pass or pull-in decision made by the process responsible for safety checking.

**cv\_safety\_problem**

This data flow is used within the Manage Commercial Vehicles function and identifies the nature of a problem with the safety of a commercial vehicle, its driver, or the carrier in general.

**cv\_safety\_pull\_in\_output**

This data flow is used in the Manage Commercial Vehicles function and contains the output of the result of an analysis of the data from a commercial vehicle that is approaching a roadside checkstation facility, by the process responsible for commercial vehicle safety checking. The result is expressed in terms of a pull-in or pass decision for the vehicle.

**cv\_safety\_status\_code**

This data flow is used within the Manage Commercial Vehicles function and contains the status of an associated set of commercial vehicle safety data. This status may be clear, or set to indicate that there is a problem.

**cv\_safety\_systems\_diagnostics\_results**

This data item contains flags set to show the results of diagnostic checks run by a commercial vehicle's on-board safety system. Included in these diagnostics are the safety status of the driver, cargo and vehicle (including brake condition).

**cv\_screening\_override**

This data flow is used within the Manage Commercial Vehicles function. It contains the decision made by an inspector at a commercial vehicle roadside checkstation facility to override (or not) the automated pass or pull-in decision made by the process responsible for credentials checking.

**cv\_screening\_override\_code**

This data flow is used within the Manage Commercial Vehicles function. It contains a code which gives the results of the decision made by an inspector at a commercial vehicle roadside checkstation facility to override (or not) the automated pass or pull-in decision made by the process responsible for credentials checking.

**cv\_screening\_pull\_in\_output**

This data flow is used in the Manage Commercial Vehicles function and contains the output of the result of an analysis of the data from a commercial vehicle that is approaching a roadside checkstation facility, by the process responsible for commercial vehicle credentials checking. The result is expressed in terms of a pull-in or pass decision for the vehicle.

**cv\_screening\_record**

This data flow is used within the Manage Commercial Vehicles function. It contains information that is collected at a roadside checkstation facility as the result of the credentials checks on an approaching commercial vehicle. This data is stored in the log of roadside facility data.

**cv\_tag\_data**

This data flow is used within the Manage Commercial Vehicles and Provide Electronic Payment Services functions and contains the data read from a commercial vehicle's on-board tag.

**cv\_taxes\_and\_duties**

This data flow and contains a list of the taxes and duties required for the use of a particular commercial vehicle route using a particular class of vehicle, cargo and weight.

**cv\_trip\_classification\_data**

This data flow is used within the Manage Commercial Vehicles function and contains the classification data for which a particular commercial vehicle has been enrolled at commercial vehicle roadside checkstation locations for a particular route.

**cv\_trip\_identity**

This data flow contains a trip identity number that is set up by the commercial vehicle manager (or the driver acting in that capacity) for use in checking the commercial vehicle through a border crossing.

**cv\_update\_new\_credentials\_request**

This data flow is used within the Manage Commercial Vehicles function and contains a request to update the credentials for a particular commercial vehicle at the roadside checkstation and border crossing facilities along its

route, i.e. to enroll the vehicle, that are served by the local commercial vehicle administration function.

**cv\_vehicle\_characteristics**

This data flow is used within the Manage Commercial Vehicles and Provide Electronic Payment Services functions and contains the characteristics of a commercial vehicle as determined from data provided by roadside sensors.

**cv\_vehicle\_class**

This data flow contains the vehicle classification for a particular use of a commercial vehicle route.

**cv\_vehicle\_configuration**

This data flow defines the commercial vehicle configuration. Examples of data contained in this data flow may include but will not be limited to tractor unit plus articulated trailer (van type), tractor unit only, vehicle plus trailer, the motive power unit may carry payload (van type), tractor unit plus articulated trailer plus trailer (van type), tractor unit plus articulated trailer (tanker type), vehicle plus trailer, i.e. the motive power unit may carry payload (tanker type), and tractor unit plus articulated trailer plus trailer (tanker type).

**cv\_vehicle\_details**

This data flow is used within the Manage Commercial Vehicles function. It contains details about the activities involving a particular commercial vehicle over a period of time. The vehicle identity for this data is held in an associated data flow.

**cv\_vehicle\_log**

This data flow is used within the Manage Commercial Vehicles function. It contains a log of the commercial vehicle's cargo loading and unloading activities. Data about other activities is stored in separate data flows, as is the date, time, place, driver identity and vehicle mileage when the activity took place.

**cv\_vehicle\_number**

This data flow contains an alphanumeric code that is the commercial vehicle identification number.

**cv\_vehicle\_size**

This data flow contains the commercial vehicle size as measured by roadside sensors. The data will include details such as the length, width and height of the vehicle. All sizes will be measured in inches.

**cv\_vehicle\_weight**

This data flow contains the commercial vehicle weight as measured by roadside sensors, such as weigh-in-motion detectors. The weight will be shown in thousands of pounds.

**cv\_weight\_class**

This data flow contains the weight classification for a particular use of a commercial vehicle route.

**cvo\_border\_clearance**

This data flow is used within the Manage Commercial Vehicles function. It contains a copy of the daily log of activities that have taken place at a commercial vehicle border crossing facility, including acceptance or override of system decision.

**data\_aggregation**

This data flow identifies this data as an aggregation of the original data. This may be in the form of a yes/no flag or a description of the actual aggregation algorithm performed.

**data\_concept\_identifier**

This data flow defines a pointer to a common data dictionary or message set template which allows future applications to make better use of the data.

**data\_reductions**

This data flow identifies any reductions that have been made to the original data. This may be in the form of a yes/no flag or a description of the actual reduction algorithm performed.

**data\_revision**

This data flow is a flag to show that the data has been revised from its original version. The purpose of this flag is to notify users of the data from a source agency that the data being sent has been revised from its original state, either to correct an error in the data or fill in missing data.

**data\_version**

This data flow identifies the version of the data when there may be more than one set of similar data. This data flow may be used in conjunction with the data\_revision data flow to ensure the quality control in the received data.

**date**

This data flow is used within many ITS function and contains the calendar date data normally used to indicate currency or effectively of other data flows. The codification of the data is YYYYMMDD or equivalent.

**date\_archived**

This data flow is the date/time stamp of when the data being described was stored in the permanent archive.

**date\_created**

This data flow is the date/time stamp of when the data being described was created or collected at the source agency.

**date\_published**

This data flow is the date/time stamp of when the data being described was published or made available by the source agency.

**departure\_time**

This data flow is used within the Provide Driver and Traveler Services function and defines the time at which a driver or traveler's planned or requested trip is to start.

**desired\_arrival\_time**

This data flow is used within the Provide Driver and Traveler Services function and specifies the target time for arrival at the end of a driver or traveler's planned or requested trip.

**destination**

This data flow is used within the Provide Driver and Traveler Services function. It defines the destination point for a trip request or a route to be used by a traveler or a vehicle. In some instances it will be used as the origin for the use of a particular mode within a trip, e.g. the part of the route for the trip that is to be provided by walking, or ridesharing, or an multimodal service provider.

**device\_fault**

This data flow contains an indication of a fault in a roadside device. This could be a power failure, or a communications failure.

**device\_identity**

This data flow contains an identifier of devices such as smart probe beacons, automated roadway treatment systems, intrusion detection or alert devices, etc. The identifier would be a code which describes the type of the device.

**device\_status**

This data flow contains the status of a roadside device. The data flow provides an indication of the state of the device as well as configuration data for the device.

**dms\_advisory\_text**

This data flow is used within the Manage Traffic function and contains details of the actual advisory text strings that are to be output to drivers and pedestrians using indicators that are dynamic message signs (DMS). The advisory text string may be one of several types depending on the type of information being provided.

**dms\_allocation**

This data flow is used within the Manage Traffic function and contains details of the way in which dynamic message signs (DMS) are allocated to the road and highway network within the geographic area controlled by ITS.

**dms\_auto\_treat\_info**

This data flow is the DMS state which gives warning of activation of the roadway automated treatment device, indicating the condition that warranted the device's activation, or that treatment is in progress.

**dms\_downstream\_identity**

This data flow is used within the Manage Traffic function and provides the identity of the dynamic message sign (DMS) that is downstream of the DMS to which the data relates.

**dms\_equip\_status\_for\_m\_and\_c**

This data flow provides a report to the Manage Maintenance and Construction function containing the status of dynamic message signs operating at the roadside in the local geographic and/or jurisdictional area(s). By monitoring this data flow, the receiving process can monitor the health and current status of field equipment and repair if deemed necessary.

**dms\_fault**

This data flow is sent to the Manage Traffic function and contains an indication of a fault in the Dynamic Message Sign device. This could be a power failure, or a communications failure.

**dms\_highway\_open\_close**

This data flow is used within the Manage Traffic function. It is a DMS state which advises drivers that some or all of the highway(s) ahead is(are) closed. If the highway(s) are open no indication will be given as this is the normal state.

**dms\_identity**

This data flow contains a numerical identifier of an individual Dynamic Message Sign.

**dms\_incident\_warning**

This data flow is used within the Manage Traffic function and is the DMS state which gives warning of an incident to travelers.

**dms\_upstream\_identity**

This data flow is used within the Manage Traffic function and provides the identity of the dynamic message sign (DMS) that is upstream of the DMS to which the data relates.

**dms\_weather\_warning**

This data flow is used within the Manage Traffic function and is the DMS state which gives warning of weather conditions which are likely to be hazardous to driving.

**driver\_map\_update\_payments\_transactions**

This data flow is used within the Provide Payment Electronic Services function and contains records of all payment transactions for driver in-vehicle guidance map updates.

**driver\_safety\_status**

This data flow contains information about the driver's state, including the driver's ability to control the vehicle (alcohol on the breath, too many mistakes, etc.) and injuries or other detectable problems with the vehicle's occupants.

**duration**

This data flow is used within many ITS function. It contains the expected duration of particular activity.

**em\_archive\_catalog**

This data flow is used to provide the description of the data contained in the collection of emergency data that has

been stored and made available for the Manage Archive function. The catalog may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g., time range of entries, number of entries; or simple data product.

#### **em\_archive\_catalog\_request**

This data flow from the Manage Archive Data function contains the request for a catalog of the data held by the Emergency Management function. The request for a catalog may include the description of types of data the archive is interested in or a time frame over which the requested information may be available.

#### **em\_archive\_data\_request**

This data flow from the Manage Archived Data function contains the request for data collected and stored by the Emergency Management function. The request for data may include the description of the data required or a time frame over the requested information may be available.

#### **em\_data\_for\_archive**

This data flow is sent from the Manage Emergency Services function to the Manage Archived Data function. It is used to provide details of emergency operational data for release to the data archive.

#### **em\_operational\_data**

This data flow contains information about the incidents that have been responded to by the Emergency Management function. There are two sets of data, one containing detailed information about the incident such as specific location and number of persons involved. Another set containing general information such as time and date of the incident will also be used.

#### **em\_operational\_data\_attributes**

This data flow is used to provide the meta data included with the emergency management operational data for release to the archive. Items of meta data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data (such as status of the operational equipment) This meta data may also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type, and data concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488.

#### **emergency\_request**

This data defines the type of emergency to which a response is being made, e.g. road accident with no casualties, road accident with casualties, road accident with fatalities, off road/highway fire, vehicle fire, off road/highway explosion, vehicle explosion, Public Transport vehicle(s) involved, etc.

#### **emergency\_request\_transit\_details**

This data flow is sent by the Manage Emergency Services function to the Manage Transit function and contains data about an emergency declared by a traveler at a transit stop using a kiosk or other device. This can also be used by the transit user to alert the transit system operator to an emergency situation or incident within the transit operational network, i.e. not on-board a transit vehicle, or at a transit stop, but in such things as a modal interchange facility, transit depot, etc.

#### **emergency\_service\_action\_details**

This data flow is used within the Manage Emergency Services function. It contains details of the responses to each emergency that are stored in the log of emergency service actions.

#### **emergency\_service\_action\_log**

This data store is used within the Manage Emergency Services function. It contains the log of actions for each incident processed within the Manage Emergency Services area of ITS.

#### **emergency\_service\_allocations**

This data item is used within the Manage Emergency Services function and defines the type (or types) of emergency service required for a particular emergency incident. The types may be any of the following: none, cancel previous request; police; fire; ambulance; towing; paramedics; wrecking crew; aircraft fire service; rail breakdown crew;

SWAT.

**emergency\_service\_log\_for\_archive**

This data flow is used within the Manage Emergency Services function and contains the output of the emergency services action log. It contains all the data up to the current time, shown by incident number.

**emergency\_service\_type\_override**

This data flow defines the type (or types) or emergency service allocated by the Emergency Services operator for a particular emergency incident. It has the same range of values as the data for emergency service allocations, but as this is an operator override of the standard allocation, it will not have the same value for each incident.

**emergency\_service\_type\_requested**

This data item defines the type (or types) of emergency service requested for a particular emergency incident. It has the same range as the emergency\_service\_allocations data item but may not have the same value for each incident.

**emergency\_vehicle\_arrival\_time**

This data flow is used within the Manage Emergency Services function. It contains the time at which it is predicted that the emergency vehicle will arrive at the incident.

**emergency\_vehicle\_identity**

This data flow is used within the Manage Emergency Services function. It contains the identity of an individual emergency vehicle. This data is used by processes within the function to identify the source and/or ownership of other data.

**emergency\_vehicle\_operational\_data**

This data flow is sent from the manage Emergency Services function and contains information about the movements of emergency vehicles while attending incidents, and therefore shows the usage of traffic control preemption routes, the times at which the vehicles passed various points in the road and highway network etc.

**emergency\_vehicle\_route**

This data flow contains details of the emergency vehicle's route and is used to trigger a special 'green wave' route for the emergency vehicle.

**emergency\_vehicle\_status\_code**

This data flow indicates the current status of an emergency vehicle that reflects dynamic assignment of vehicles to incidents. This status will reflect the vehicle's current operating condition and will determine such things as its availability to respond to emergencies, and its current activity in response to an emergency. Status will reflect defined situations such as: Out of service, Assigned to Incident (En Route), At Incident, At Quarters, Disabled (possibly due to its own involvement in an incident), At Station, etc.

**emergency\_vehicle\_status\_data**

This data store is used within the Manage Emergency Services function. It contains details of the status reports for emergency vehicles consisting of a predefined status code, the vehicle location and a time and date stamp.

**emergency\_vehicle\_status\_details**

This data flow is used within the Manage Emergency Services function. It contains emergency vehicle status details comprising a predefined status code, the vehicle's tracking data and a time and date stamp. Note that the time and date stamp applies to the last time that the status code was updated, and not the vehicle tracking data, which carries its own time and date stamp showing when the location was last reported.

**emergency\_vehicle\_tracking\_data**

This data flow is within the Manage Emergency function and contains the current location of an emergency vehicle, which includes the time at which the location measurement was taken. In addition this data flow contains operational data for the emergency vehicle.

**emergency\_vehicle\_type**

This data flow is used within the Manage Emergency Services function and contains the type code for an emergency vehicle. Examples of the types of emergency vehicle data that could be supported by the code are ambulance with no special equipment, ambulance with paramedics and their equipment, ambulance for special services, e.g. mining disaster, a fire engine with its own pump, a fire engine which is a water tanker, a fire engine which is a ladder truck, police patrol car, police patrol van, tow vehicle, i.e. one that can tow another that will run on its own wheels, and wrecking truck.

**emissions\_archive\_catalog**

This data flow is used to provide the description of the data contained in the collection of emissions data that has been stored and made available for the Manage Archive Function. The catalog may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g. time range of entries, number of entries; or sample data products.

**emissions\_archive\_catalog\_request**

This data flow from the Manage Archive Data function contains the request for a catalog of the data held by the Manage Traffic function. The request for a catalog may include the description of types of data the archive is interested in or a time frame over which the requested information may be available.

**emissions\_archive\_data\_request**

This data flow from Manage Archive Data function contains the request for data held by the Manage Traffic function. The request for data may include the description of the data required or a time frame over which the requested information may be available.

**emissions\_data\_for\_archive**

This data flow is sent from the Manage Traffic to the Manage Archive Data function. It is used to provide detailed information on emissions data, such as pollution data.

**enforcement\_agency\_address**

This data flow contains the full postal address (including zip code) of an enforcement agency. This is one of the agency details that is used in the processing of violations reported by other processes in the ITS function.

**enforcement\_agency\_computer**

This data flow is used within the Manage Emergency Services function and contains the computer telephone number of an enforcement agency. This number provides direct but password and encrypted access to a computer within an enforcement agency, and is one of the agency details that is used in the processing of violations reported by other processes in the ITS function.

**enforcement\_agency\_contact**

This data flow contains a character string that defines the method by which an enforcement agency shall be contacted with details of a violation. The character string may describe a piece of data which may be an e-mail message, a postal service message, a voice based telephone call, or a fax message.

**enforcement\_agency\_details**

This data flow is used within the Manage Emergency Services function and contains the details of the access points for an enforcement agency. These access points comprise addresses, telephone numbers, etc. through which the agency may be sent information on violations that have been detected elsewhere within the ITS function. Not all entries may be present, and as a minimum only one is needed.

**enforcement\_agency\_email**

This data flow is used within the Manage Emergency Services function and contains the e-mail address of an enforcement agency. This is one of the agency details that is used in the processing of violations reported by other processes in the ITS function.

**enforcement\_agency\_fax**

This data flow is used within the Manage Emergency Services function and contains the telephone number of the

fax line for an enforcement agency. This is one of the agency details that is used in the processing of violations reported by other processes in the ITS function.

**enforcement\_agency\_name**

This data flow is used within the Manage Emergency Services function and contains the name of an enforcement agency. This is one of the agency details that is used in the processing of violations reported by other processes in the ITS function.

**enforcement\_agency\_phone**

This data flow is used within the Manage Emergency Services function and contains the voice line telephone number of an enforcement agency. This is one of the agency details that is used in the processing of violations reported by other processes in the ITS function.

**enforcement\_agency\_responsibility**

This data flow is used within the Manage Emergency Services function and contains the area for which a particular enforcement agency has responsibility in areas such as: commercial vehicles, traffic (general, not tolls), traffic tolls and parking, transit fares (collection and payment), etc.

**env\_info\_for\_road\_network**

This data flow contains processed environmental and road weather information for use in developing an overview of conditions on the road network. This data is the result of aggregation, fusing, filtering or analysis of the input environmental and weather data. This data flow includes road condition observations and road condition predictions. The data flow includes road weather forecasts and road weather observations.

**env\_sensor equip\_status\_for\_m\_and\_c**

This data flow provides a report to the Manage Maintenance and Construction function of the status of a set of environmental sensors. By monitoring this data flow, the receiving process can monitor the health and current status of field equipment and repair if deemed necessary.

**environment\_sensor\_attributes**

This data flow is used to provide meta data included with environment sensor data for release to the archive. Items of meta data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data, such as status of operational equipment. This meta data may also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type, and data concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488.

**environment\_sensor\_data**

This data flow is used within the Manage Traffic function and contains a set of outputs from individual environment sensors.

**environment\_sensor\_fault\_data**

This data flow is used within the Manage Traffic function to show that an environment sensor has developed a fault that means it is not operating correctly. The fault will have been found by a process that is local to the sensor itself.

**environment\_sensor\_output**

This data flow contains the raw data collected from a single sensor. This data flow could include data pertaining to wind, temperature, humidity, precipitation, radiation (sun), visibility, and pavement sensor information.

**environmental\_sensor\_status**

This data flow is used within the Manage Traffic function to report the status of an environmental sensor. By monitoring this data flow, the receiving process can monitor the health and current status of field equipment.

**equipment\_status**

This data flow describes the status of the equipment at the time of collection.

**error\_handling**

This data flow identifies the error detection or correction algorithms applied to the data to better facilitate reconstruction of the data later.

**event\_information\_advisory\_requests**

This data flow is used within the Provide Driver and Traveler Services function to request that event information be output to a driver or a transit user in a vehicle.

**event\_information\_advisory\_requests\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function to provide data to the archive about the types of event information requested by a driver or a transit user in a vehicle.

**event\_information\_requests\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function. It is used to provide data to the archive about the types of event information requested by a traveler.

**fare\_collection\_roadside\_violation\_information**

This data is used by the Manage Transit function to send data about a violator of the transit fare collection processes at the roadside, i.e. a transit stop, to the Manage Emergency Services function. This data flow will contain a digitized video image of the transit user who is trying to violate the fare collection process at the roadside. It is assumed that this digitized data will include other data such as date and time, plus camera identity from which the roadside (transit stop) location can be determined.

**fare\_collection\_vehicle\_violation\_information**

This data is used by the Manage Transit function to send data about a violator of the transit fare collection processes on-board the vehicle to the Manage Emergency Services function. This data flow will contain a digitized video image of the transit user who is trying to violate the fare collection process on-board a vehicle. It is assumed that this digitized data will include other data such as date and time, plus camera identity from which the transit vehicle identity can be determined.

**fare\_violation\_information**

This data is used by the Provide Electronic Payment Services functions to send data about a violator of the transit fare collection processes to the Manage Emergency Services function. This data will contain a digitized video image of the traveler trying to violate the transit fare collection process, plus information about the transit fare and the vehicle or roadside location from which payment was being attempted.

**fault\_data**

This data flow is used within the Manage Traffic function to collect sensor fault data from the roadside to send to the archive data function.

**fault\_data\_attributes**

This data flow is used to provide meta data included with fault data for release to the archive. Items of meta data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data, such as status of operational equipment. This meta data may also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type, and data concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488.

**field\_device\_status\_for\_archive**

This data flow is sent from the Manage Maintenance and Construction function to the Manage Archived Data function and contains information to be archived about the field equipment that require repairs.

**field\_device\_status\_for\_archive\_attributes**

This data flow is used to provide meta data included with maintenance and construction field device status data for release to the archive. Items of meta data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data, such as status of operational equipment. This meta data may

also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type, and data concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488.

**fleet\_activity\_schedule**

This data flow is used within the Manage Maintenance and Construction function and contains the work activity schedule for use by maintenance and construction vehicle fleet management. This flow includes the schedule, work activity to be performed, the site location, and any special instructions.

**fleet\_maintenance\_record**

This data flow is used within the Manage Maintenance and Construction function and includes the actual maintenance and repair record of each of the maintenance and construction vehicles in the fleet.

**fomcm\_work\_zone\_info**

This data flow contains a 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 also includes work zone resources availability and status.

**guidance\_data\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function. It is used to provide data to the data archive about the vehicle routes which are currently being used by vehicles using dynamic guidance and vehicle journey time information.

**guidance\_data\_for\_archive\_attributes**

This data flow is used within the Provide Driver and Traveler Services function. It is used to provide data attribute information to the data archive about the vehicle routes used by vehicles using dynamic guidance and vehicle journey time information.

**handicap\_access\_information**

This data flow is used to indicate the handicap access level for a business, event, or any other establishment.

**har equip\_status\_for\_m\_and\_c**

This data flow provides a report to the Manage Maintenance and Construction function of the status of the highway advisory radio equipment. This status includes an indication of the current program being broadcast and an indication of the space available for storing messages/ programs on the device. By monitoring this data flow, the receiving process can monitor the health and current status of field equipment and repair if deemed necessary.

**har\_fault**

This data flow contains an indication of a fault in the highway advisory radio device. This could be a power failure, or a communications failure.

**har\_identity**

This data flow contains a numerical identifier of an individual Highway Advisory Radio device.

**hazmat\_load\_data**

This data flow contains the manifest data plus the chemical characteristics of a hazmat load being carried by a commercial vehicle. This data is used by the emergency services to plan their responses if the vehicle on which the load is traveling is involved in an incident.

**highway\_control\_devices**

This data flow is used within the Manage Traffic function and includes information about each device used to output traffic management commands to vehicle drivers on highways. Data for devices at highway entry ramps is provided separately.

**highway\_equipment\_data**

This data flow is used within the Manage Traffic function and provides information about each highway indicator that is used to provide traffic management commands to drivers.

**highway\_network**

This data flow is used within the Manage Traffic function and contains data about each segment in the highway network and the way in which they fit together, i.e. which segment is joined to which, both upstream and downstream, plus identification of those links that interface to the road (surface street) network.

**highway\_sign\_plan\_data**

This data flow is used within the Manage Traffic function and contains data about the highway indicator sequence(s) needed to implement a specific traffic management control strategy in part of the highway in the geographic and jurisdictional area(s) served by the Manage Traffic function. A strategy can be anything from setting a speed restriction, to closing a single lane, to closing the whole highway. It may be either designed to suit specific locations on the highway network (lane closures), or for general application (speed restrictions).

**highway\_sign\_plan\_number**

This data flow contains the number of an adaptive plan for the road network controlled by the function. A plan is a set of data that enables a set of sign sequences to be applied to highway indicators to achieve a desired traffic control strategy.

**highway\_sign\_plan\_priority**

This data flow is used within the Manage Traffic function and contains data about the relative priority of each highway sign plan.

**highway\_sign\_plan\_purpose**

This data flow is used within the Manage Traffic function which defines the purpose of highway sign plans. These codes include, but not be limited to data such as close highway I695 at exit 157 northbound, set 40 mph speed limit on highway I475 southbound (may apply anywhere), close the right two lanes on highway I895 from exit 133 eastbound.

**highway\_sign\_sequence\_data**

This data flow is used within the Manage Traffic function and contains data about the sequence in which a set of highway indicators must be set in order to implement a specific action, e.g. close one lane, set a speed restriction, etc. The sequences are designed to enable the action to be implemented safely, e.g. a speed restriction of 40 mph could be preceded by warnings that it starts 'x' feet farther along the highway, where 'x' is the distance from the indicator to the start of the speed restriction. Sequences are not location specific and are standard for a particular action.

**highway\_sign\_sequence\_purpose**

This data flow is used within the Manage Traffic function and contains codes which defines the purpose of a highway sign sequence, such as close one lane, close right-hand (nearside) lane, close center lane, close left-hand (offside) lane, close two lanes, close three lanes, close all lanes, i.e. close the highway in one direction, set 40 mph speed limit (from higher limit), set 50 mph speed limit (from higher limit), set 40 mph speed limit (from no limit).

**highway\_sign\_setting\_data**

This data flow is used within the Manage Traffic function and contains sets of sequences for setting indicators on a highway to implement specific functions, e.g. close one lane, set a speed restriction, etc.

**highway\_sign\_setting\_plans**

This data flow is used within the Manage Traffic function and contains data about highway indicator plans that are used to implement specific actions. These are designed to enable the management of a variety of situations on the highway(s) in the geographic and jurisdiction area(s) served by the Manage Traffic function.

**historical\_incident\_details**

This data flow is used within the Manage Traffic function and contains the details of a historical incident.

**historical\_other\_routes\_use**

This data flow is used within the Provide Driver and Traveler Services function and contains historical data about the non-vehicle portion(s) of routes that have been requested by travelers. These route portions will involve the use of modes such as cycling, walking, etc. The data will be stored in ascending route segment number order (i.e. from 1 to the maximum number of route segments).

**historical\_parking\_lot\_storage\_data**

This data flow is used within the Manage Traffic function and contains occupancy and state data for all the parking lots in the geographic area served by the function.

**historical\_pollution\_state\_area\_collection**

This data flow is used within the Manage Traffic function and contains the historical states of the various types of pollution within the atmosphere in the geographic area served by the function. It also contains a summary indication of the area air quality.

**historical\_pollution\_state\_roadside\_collection**

This data flow contains the digitized values of pollution levels obtained from roadside sensors in the geographic area served by the function.

**historical\_processed\_data**

This data flow is used within the Manage Traffic function and contains traffic sensor data that has been processed ready for storage in both the current and historical data stores.

**historical\_stored\_incident\_data**

This data flow is used within the Manage Traffic function to transfer data about historical incidents from the Incident Management facility to the Provide Traffic Surveillance facility for storage.

**historical\_traffic\_flow\_state**

This data flow is used within the Manage Traffic function. It contains data showing the current traffic flow conditions on roads (surface streets), freeways and ramps served by the function. It also includes flows in high occupancy vehicle (hov) lanes from the same area. The data is a subset of that in the current and historical data stores and is used as a means of 'packaging' the data for distribution to users such as ISP's.

**historical\_traffic\_management\_storage\_data**

This data flow is used within the Manage Traffic function. It contains the indicator control and response states plus the selected traffic control strategy(ies) for the road (surface street) and highway network served by the function. The data is a subset of that in the current and historical data stores.

**historical\_vehicle\_smart\_probe\_stored\_data**

This data flow is used within the Manage Traffic function. It contains the historical processed vehicle smart probe data collected from roadside units.

**historical\_wide\_area\_pollution\_data**

This data flow is used within the Manage Traffic function as a means of transferring historical pollution data from the Manage Emissions facility to the Provide Traffic Surveillance facility. It contains data about the historical levels of pollution obtained from the store of pollution data in the area covered by the Traffic Management Center (TMC).

**hov\_lane\_data**

This data flow is used within the Manage Traffic function and contains the data obtained from processing the inputs from traffic sensors located on High Occupancy Vehicle (HOV) lanes around the road network.

**hov\_lane\_identity**

This data flow is used within the Manage Traffic function to identify individual high occupancy vehicle (hov) lanes used for the control of traffic on roads (surfacestreets) and highways.

**hov\_lane\_list**

This data flow is used within the Manage Traffic function and contains a list of high occupancy vehicle (hov) lanes to which the accompanying data applies.

**hov\_lane\_vehicle\_count**

This data flow contains a count of the number of vehicles legitimately using High Occupancy Vehicle (HOV) lanes in the road and highway network served by the function. The count shows the actual number of vehicles in a lane, which is not the same as the vehicle flow rate.

**hov\_lane\_violation\_count**

This data flow contains the a count of the number of vehicles illegally using High Occupancy Vehicle (HOV) lanes in the road and highway network. The count shows the actual number of illegal vehicles in a lane, which is not the same as the illegal vehicle flow rate, although this can be calculated as an average from successive values of this data flow.

**hov\_priority**

This data flow is used within the Manage Traffic function and contains data about the number of vehicles using high occupancy vehicle (hov) lanes. Data is included about vehicles that are both legal and illegal users.

**hov\_sensor\_data**

This data flow is used within the Manage Traffic function and contains the HOV data obtained from processing the inputs from sensors around the road network.

**hov\_sensor equip\_status\_for\_m\_and\_c**

This data flow is used within the Manage Maintenance and Construction function to report the status of an HOV sensor. By monitoring this data flow, the receiving process can monitor the health and current status of field equipment and repair if deemed necessary.

**hri\_closure\_data\_response**

This data flow represents an historical log of HRI closure data.

**hri\_data\_for\_roads**

This data flow is used within the Manage Traffic function and contains data about each railroad grade crossing so that closure of the crossing to road traffic can be properly implemented when needed.

**hri\_phase\_data**

This data flow contains data about the way in which each railroad grade crossing and interlocked intersection(s) operate, i.e. the minimum and maximum phase timings, phase change timings, etc.

**hri\_sensor\_data**

This data flow provides sensor data, acquired by HRI at grade crossings, that is relevant to the overall traffic surveillance functions of ITS (e.g. grade crossing rail traffic). It contains HRI closure data, status data, and other HRI information.

**hri\_state**

This data flow represents the complete state of an HRI as determined by monitoring the status of the track, traffic and equipment.

**hri\_state\_data**

This data flow is used within the Manage Traffic function and contains data about the state of the highway rail intersections as determined by processing the hri sensor data.

**hri\_status**

This data flow represents the complete status of an HRI, including train situation, vehicle traffic, equipment health and predictable near term events.

**identified\_emergency\_details**

This data flow is used within the Manage Emergency Services function. It contains details of an emergency that have been identified by inputs to a process within the function.

**imported\_map\_data\_attributes**

This data flow is used to provide meta data included with the imported map data for release to the archive. Items of meta data may include attributes that describe the source and quality of the data. This meta data may also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type, and data concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488.

**imported\_map\_data\_for\_archive**

This data flow is sent by the Map Update Provider and contains information that may be of interest to archive data users systems such as updated maps of the transportation network.

**incident\_action\_time**

This data flow is used within the Manage Emergency Services function. It contains the time at which the incident data in the emergency services action log was updated by processes in the Manage Emergency Services function.

**incident\_confidence\_level**

This data flow defines the level of confidence that can be associated with a particular set of incident data. This level will depend on a number of factors such as the source of the incident data (police, media, driver, traveler, etc.), the type of incident (this may affect how easy it is to detect), and the time at which the incident was detected.

**incident\_description**

This data flow is used within the Manage Traffic function and contains the description of an incident using a predefined dictionary of character codes.

**incident\_duration**

This data flow is used within the Manage Traffic function and gives the expected duration of an incident from its start time until the time at which it is expected that it will have no further effect on traffic conditions.

**incident\_location**

This data flow is used within the Manage Traffic function and contains the location at which an incident will take place (for planned events) or is taking place (for current incidents). The location will be defined in terms of map coordinates to enable it to be referenced spatially within the geographic area served by the local TMC.

**incident\_number**

This data item identifies each incident that has been or is active. Note that each function will have its own copy of this data so that an incident in one function does not have the same number in the other function, i.e. the numbering of incidents is independent in each function.

**incident\_report\_source**

This data flow contains information about the source of an emergency that has been identified from the inputs received within the function. Examples of the information described by these codes are: emergency telephone service, the E911 service operator, an in-vehicle emergency declared by a driver, and for a transit emergency, etc.

**incident\_reported\_time**

This data flow is used within the Manage Emergency Services function. It contains the time at which an incident was first reported and is used for record purposes.

**incident\_response\_status\_from\_emerg**

This data flow provides the current status of an incident response indicating site management strategies in effect, incident clearance status, the incident command structure that is in place, and points of contact.

**incident\_severity**

This data flow defines the severity of an incident.

**incident\_start\_time**

This data flow is used within the Manage Traffic function and shows the time at which an incident will start. The time indicated may include the time an incident is verified, confirmed, or detected. The point at which it starts to have an effect on traffic conditions will be later than this time which is used as the trigger for any corrective or mitigating action, e.g. change in traffic control strategy. Thus in the case of incidents that are some form of special event, the start time may not be the actual event start time. An example would be a baseball game, which could create an incident as spectators arrive for the start of the game. The time at which this happens will be different (before) the actual start of the game but after the time at which the gates open.

**incident\_status**

Information gathered at the incident site that more completely characterizes the incident and provides current incident response status.

**incident\_traffic\_impact**

This data flow is used within the Manage Traffic function and contains details of the impact that a particular incident will have on traffic flows.

**incident\_type**

This data flow identifies an incident type using a uniquely defined character code matched to a specific type of incident.

**incident\_vehicles\_involved**

This data flow is used within the Manage Traffic and Manage Emergency Services functions and defines the number of vehicles involved in an incident as well as the amount of property damage caused by the incident at the time of the report.

**indicator\_control\_data\_for\_highways**

This data flow is used within the Manage Traffic function and contains the actual data from which instructions to the driver and traveler can be produced by indicators at the roadside on freeways in the geographic and/or jurisdictional area(s) served by the junction.

**indicator\_control\_data\_for\_roads**

This data flow is used within the Manage Traffic function and contains the actual data from which instructions to the driver and traveler can be produced by indicators at the roadside on roads (surface streets) in the geographic and/or jurisdictional area(s) served by the function.

**indicator\_control\_storage\_data**

This data flow is used within the Manage Traffic function to transfer indicator control data from the Provide Device Control facility to Provide Traffic Surveillance facility for loading into the current and long term data stores. It contains the data currently being output to the indicators that are used to control traffic on the roads and highways served by the TMC.

**indicator\_control\_storage\_data\_for\_highways**

This data flow is used within the Manage Traffic function and contains the data currently being output to the indicators that are used to control traffic on the freeways in the geographic and/or jurisdictional area(s) served by the function.

**indicator\_control\_storage\_data\_for\_roads**

This data flow is used within the Manage Traffic function and contains the data currently being output to the indicators that are used to control traffic on the roads (surface streets) in the geographic and/or jurisdictional area(s) served by the function.

**indicator\_crossing\_control\_data\_for\_highways**

This data flow is used within the Manage Traffic function and contains the actual data from which instructions to the driver and traveler can be produced by indicators at multimodal crossings on freeways served by the function.

**indicator\_crossing\_control\_data\_for\_roads**

This data flow is used within the Manage Traffic function and contains the actual data from which instructions to the driver and traveler can be produced by indicators at multimodal crossings on roads (surface streets) served by the function.

**indicator\_equip\_status\_from\_highways\_for\_m\_and\_c**

This data flow is used within the Manage Maintenance and Construction function to detect when an indicator used on the highway has developed a fault, and therefore operating incorrectly. The fault will have been found by a process that may not be local to the indicator itself, and may be located anywhere in the geographic area covered by the indicator.

**indicator\_equip\_status\_from\_roads\_for\_m\_and\_c**

This data flow is used within the Manage Maintenance and Construction function to detect when an indicator at the roadway has developed a fault, and therefore operating incorrectly. The fault will have been found by a process that may not be local to the indicator itself, and may be located anywhere in the geographic area covered by the indicator.

**indicator\_fault**

This data flow is used within the Manage Traffic function to define the type of fault that has been found in an indicator as it is not operating correctly.

**indicator\_highway\_control\_static\_data**

This data flow is used within the Manage Traffic function and contains data about the control data which may be used by indicators, either locally or as a series of commands from a central source, to provide traffic management on the highway network controlled by the Manage Traffic function.

**indicator\_identity**

This data flow is used within the Manage Traffic function to identify individual indicators used for the control of traffic on roads (surface streets) and highways. The indicators can be either intersection signal controllers, pedestrian signal controllers or dynamic message signs (DMS).

**indicator\_input\_storage\_data**

This data flow is used within the Manage Traffic function to transfer indicator response data from the Provide Device Control facility to the Provide Traffic Surveillance facility. The latter facility will load the data into the current and long term data stores.

**indicator\_input\_storage\_data\_for\_highways**

This data flow is used within the Manage Traffic function and contains the response to control data that has been made by indicators on the freeways in the geographic and/or jurisdictional area(s) served by the function.

**indicator\_input\_storage\_data\_for\_roads**

This data flow is used within the Manage Traffic function and contains the response to control data that has been made by indicators on the roads (surface streets) in the geographic and/or jurisdictional area(s) served by the function.

**indicator\_junction\_control\_data**

This data flow is used within the Manage Traffic function and contains the actual data from which instructions to the driver and traveler can be produced by indicators at junctions on roads served by the function.

**indicator\_list**

This data flow is used within the Manage Traffic function and contains a list of indicators to which a particular traffic control strategy is to be applied. The indicators may be intersection traffic signal controllers, pedestrian

signal controllers and/or dynamic message signs (DMS), the latter being used for lane control or advisory message output purposes.

**indicator\_pedestrian\_control\_data**

This data flow is used within the Manage Traffic function and contains the actual data from which instructions to the driver and traveler can be produced by indicators at pedestrian crossings on roads served by the function.

**indicator\_ramp\_control\_data**

This data flow is used within the Manage Traffic function and contains the actual data from which instructions to the driver and traveler can be produced by indicators at entry ramps to highways served by the function.

**indicator\_response\_state**

This data element contains the current state of an indicator that is being used to control traffic on the roads (surface streets) and highways in the geographic area served by the TMC. It is used to check that the indicator is performing as requested and may form the basis for a fault report if it is not. The data flow identifies the indicator state. Examples of typical states are correct operation, not responding, stuck on phase, and phase will not respond.

**indicator\_road\_adaptive\_plan\_number**

This data flow is contains the number of an adaptive plan for the road network controlled by the function. A plan is a set of data that enables adaptive control to be applied to some or all of the indicators in a particular way. For example at one or more intersections, certain phases may be added or omitted, etc.

**indicator\_road\_adaptive\_plans**

This data flow is used within the Manage Traffic function and contains data about the adaptive control data which may be used by indicators, either locally or as a series of commands from a central source, to provide traffic management on the road network controlled by the Manage Traffic function.

**indicator\_road\_control\_static\_data**

This data flow is used within the Manage Traffic function and contains data about the control data which may be used by indicators, either locally or as a series of commands from a central source, to provide traffic management on the road network controlled by the Manage Traffic function.

**indicator\_road\_fixed\_plan\_number**

This data flow contains the number of an adaptive plan for the road network controlled by the function. A plan is a set of data that enables fixed time control to be applied to some or all of the indicators in a particular way. Thus each set of plan data will specify particular cycle times, off-sets and phase timings for indicators. There may also be special instructions which may require certain phases may be added or omitted, demand responsive operation may be prohibited, local operation may be enabled, etc.

**indicator\_road\_fixed\_plans**

This data flow is used within the Manage Traffic function and contains data about the fixed time control data which may be used by indicators, either locally or as a series of commands from a central source, to provide traffic management on the road network controlled by the Manage Traffic function.

**indicator\_type**

This data flow is used within the Manage Traffic function and contains the type of indicator to which the accompanying output or input data applies. The type may be either intersection signal controller, pedestrian signal controller, dynamic message sign (DMS) or multimodal crossing.

**infrastructure\_data\_for\_archive**

This data flow is used within the Manage Maintenance and Construction function and consists of raw and processed data concerning the condition of the infrastructure as reported from sensor equipment on the roadside and onboard maintenance and construction vehicles. This infrastructure includes bridges, culverts, signs, and other roadway infrastructure. The function receiving this flow will process this information and present it to the Manage Archived Data function.

**infrastructure\_data\_for\_archive\_attributes**

This data flow is used to provide meta data included with maintenance and construction infrastructure data for release to the archive. Items of meta data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data, such as status of operational equipment. This meta data may also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type, and data concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488.

**infrastructure\_sensor\_data\_for\_m\_and\_c**

This data flow provides data to the Manage Maintenance and Construction function on the condition of the infrastructure as reported by sensor equipment on the roadside. This infrastructure includes bridges, culverts, signs, and other roadway infrastructure. The data can either be in raw data or image form. By monitoring this data flow, the receiving process can assess the current health of the infrastructure, add it to other sources of information, and pass along to other processes for inventory update and repair if deemed necessary.

**infrastructure\_sensor\_data\_for\_mcv**

This data flow provides data to the Manage Maintenance and Construction function on the condition of the infrastructure as reported by sensor equipment on the roadside. This infrastructure includes bridges, culverts, signs, and other roadway infrastructure. The data can either be in raw data or image form. This data is collected from the roadside equipment by the maintenance and construction vehicle and passed along to the center which can then assess the current health of the infrastructure.

**infrastructure\_sensor\_data\_from\_onboard\_devices**

This data flow provides data to the Manage Maintenance and Construction function on the condition of the infrastructure as reported by sensor equipment onboard a maintenance and construction vehicle. This infrastructure includes bridges, culverts, signs, and other roadway infrastructure. The data can be in raw data or image form.

**infrastructure\_sensor\_data\_from\_roadside\_devices**

This data flow provides data to the Manage Maintenance and Construction function on the condition of the infrastructure as reported by sensor equipment on the roadside. This infrastructure includes bridges, culverts, signs, and other roadway infrastructure.

**infrastructure\_sensor\_status\_for\_m\_and\_c**

This data flow provides a report to the Manage Maintenance and Construction function of the status of the infrastructure sensor equipment itself. This field equipment includes sensors on bridges, culverts, signs, and other roadway infrastructure. By monitoring this data flow, the receiving process can monitor the configuration, health and current status of field equipment and repair if deemed necessary.

**infrastructure\_sensor\_output**

This data flow contains the raw data collected from a single sensor. This data flow could include data pertaining to the condition of bridges, culverts, signs, and other roadway infrastructure. It includes metadata describing the type of data, quality of the data, etc.

**infrastructure\_sensor\_status\_for\_m\_and\_c**

This data flow provides a report to the Manage Maintenance and Construction function of the status of infrastructure sensor equipment on the roadside. This field equipment includes sensors on bridges, culverts, signs, and other roadway infrastructure. By monitoring this data flow, the receiving process can monitor the configuration, health and current status of field equipment, add it to other sources of information, and pass along to other processes for inventory update and repair if deemed necessary.

**infrastructure\_sensor\_status\_for\_mcv**

This data flow provides a report to the Manage Maintenance and Construction function of the status of infrastructure sensor equipment on the roadside. This field equipment includes sensors on bridges, culverts, signs, and other roadway infrastructure. This data is collected from the roadside equipment by the maintenance and construction vehicle and passed along to the center which monitors the configuration, health and current status of the field equipment.

**infrastructure\_sensor\_status\_of\_roadside\_devices**

This data flow provides a report to the Manage Maintenance and Construction function of the status of infrastructure sensor equipment on the roadside. This field equipment includes sensors on bridges, culverts, signs, and other roadway infrastructure.

**intermodal\_archive\_catalog**

This data flow is used to provide the description of the data contained in the collection of intermodal data from the Intermodal Freight Depot that has been made available for the Manage Archive Function. The catalog may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g. time range of entries, number of entries; or sample data products.

**intermodal\_archive\_catalog\_request**

This data flow from the Manage Archived Data function to the Intermodal Freight Depot contains the request for a catalog of the data held by the terminator. The request for a catalog may include either or both the description of the types of data the archive is interested in or a timeframe over which the requested information may be available.

**intermodal\_archive\_data\_request**

This data flow from the Manage Archived Data function to the Intermodal Freight Depot contains the request for the data held by the terminator. The request for data may include either or both the description of the data required or a timeframe over which the requested information may be available.

**intermodal\_data**

This data flow is sent by the Intermodal Freight Depot and contains intermodal freight information that may be of interest to archive data users systems.

**intermodal\_data\_attributes**

This data flow is used to provide meta data included with intermodal data for release to the archive. Items of meta data may include attributes that describe the source and quality of the data. This meta data may also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type, and data concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488.

**intermodal\_data\_for\_archive**

This data flow is sent by the Intermodal Freight Depot and contains intermodal freight information that may be of interest to archive data users systems along with the meta data that is necessary to describe the imported data to the Manage Archived Data function.

**intersection\_adaptive\_data**

This data flow is used within the Manage Traffic function and contains data about adaptive control data used by indicators that are intersection controllers to enable them to control traffic. The format of the data will depend upon the type of adaptive control being used.

**intersection\_blocked**

This data flow contains information, obtained from sensors in the intersection, regarding blockage of the hri by a vehicle or other object. This data will be used by the traffic management functions to begin incident management procedures.

**intersection\_control\_commands**

This data flow contains the actual control commands that make the intersection controller change the traffic 'stop/go' outputs shown by its phases to traffic. The actual format of the control commands will depend on national standards being developed for controller fixed time plans, e.g. NTCIP.

**intersection\_cycle\_time**

This data flow is used within the Manage Traffic function and contains the time taken to complete all the control commands in an intersection fixed time plan once only.

**intersection\_equipment\_data**

This data flow is used within the Manage Traffic function and contains data about each road traffic intersection so that its control using adaptive, fixed time or local techniques can be properly implemented when needed. Note that the indicator type data in data that forms part of the indicator identity will be set to that for intersection controllers.

**intersection\_fixed\_time\_data**

This data flow is used within the Manage Traffic function and contains data about fixed time control data used by indicators that are intersection controllers to enable them to control traffic.

**intersection\_offset\_time**

This data flow is used within the Manage Traffic function and contains the relative start time of the cycle of intersection control commands and is set at a value that will achieve synchronization between adjacent controllers of any type.

**intersection\_phase\_data**

This data comprises data about the way in which each road traffic intersection controller operates, i.e. the minimum and maximum phase timings, phase change timings, etc. The data will be in integer format.

**intersection\_phase\_number**

This data flow contains the number of control phases that can be driven either through centrally supplied and implemented control data or by down loading data for local implementation. The phases may themselves be used to control vehicles, bicycles, transit vehicles, pedestrians, emergency vehicles, or other specialist uses.

**intrusion\_detection\_device\_output**

This data flow contains the output of an intrusion detection device indicating that an intrusion of the work zone perimeter has been detected. The output may consist of simple binary information (intrusion present or not), or it may contain information regarding the nature of the intrusion, location of the intrusion, etc.

**kiosk\_identity**

This data flow is used by the Provide Driver and Traveler Services function to identify a particular kiosk. This enables the kiosk that was the source of a data request to be identified so that the requested data can be sent back to the correct kiosk. This occurs so that a rich selection of kiosk identities can be supported.

**link\_attributes**

This data flow is used within the Provide Driver and Traveler Services function and contains details of the type of road data stored for the link by a TMC or ISP.

**link\_conditions**

This data flow is used within the Manage Traffic function and contains information about local conditions, i.e. snow, ice, rain, fog, other forms of precipitation (earth, sand, petroleum, chemicals, etc.), flooding on each link of the road and highway network served by the function. Where the link is in a tunnel, high temperature and optionally the use of fire extinguishers is monitored.

**link\_data**

This data flow contains a new version of the store of link data used to determine which other TMC to contact to obtain traffic data relating to another geographic area.

**link\_data\_from\_avl**

This data flow contains the link journey and queue times calculated by processing the times at which AVL data was collected from vehicles on the road (surface street) and highway network served by the function.

**link\_data\_from\_tags**

This data flow is used within the Manage Traffic function. It contains the link journey and queue times calculated by processing the times at which tag data was collected from vehicles on the road (surface street) and highway network served by the function.

**link\_delay**

This data flow is used within the Manage Traffic function and contains the calculated delay for vehicles driving along a particular link in the road and highway network served by the function. This delay is the additional time it will take above that recorded during free flow conditions to travel from one end of the link to the other and will either be calculated from sensor and/or probe data, or produced by the predictive model process within the function.

**link\_environment\_conditions**

This data flow contains environment conditions (e.g. rain, wind, sun, etc) computed for a single link.

**link\_identity**

An identifier assigned to a link is where a link is a topological connection between two nodes. Link-IDs may be arbitrary, or may be assigned by convention to assure that multiple occurrences of the same ID will not occur within one network or within the universe of similar networks or databases.

**link\_identity\_list**

This data flow contains a list of the links in the road and freeway network that are covered by a transit route segment.

**link\_journey\_time**

This data flow is used within the Manage Traffic function and contains the current journey time for vehicles on a particular link. This will have been determined using sensor data that measures traffic on the road and highway network served by the function or produced by the predictive model process.

**link\_list**

This data flow is used within the Manage Traffic function and contains a list of links for which data is being provided. These links will comprise all of those on both the road (surface street) and highway network served by the function.

**link\_list\_for\_highways**

This data flow is used within the Manage Traffic function and contains a list of links for which data is being provided. These links will comprise all of those on the the highway network served by the function.

**link\_list\_for\_roads**

This data flow is used within the Manage Traffic function and contains a list of links for which data is being provided. These links will comprise all of those on the road (surface street) network served by the function.

**link\_occupancy**

This data item contains an average measure of occupancy, for a single link or sequence of links in the transportation network. The data is measured in seconds and may subsequently be converted to give a percentage value, the percentage of time for which the detector was occupied by a vehicle.

**link\_queue\_time**

This data flow is used within the Manage Traffic function and contains the current queuing time for vehicles on a particular link. This will have been determined using sensor data that measures traffic on the road and highway network served by the function or produced by the predictive model process.

**link\_speed**

This data item contains an average measure of vehicle speed, for a single link or sequence of links in the transportation network.

**link\_speed\_limit**

This data flow is sent from the traffic operations personnel to the Manage Traffic function and contains the posted speed limit of the vehicles using the link. It also includes speed limits for special vehicles traveling on a link.

**link\_state\_data**

This data flow is used within the Manage Traffic function and contains data about traffic conditions on each link within the road (surface street) and highway network in the geographic area served by the TMC. The data will apply to all links regardless of whether it is used for other purposes such as strategy selection, parking lot management, etc.

**link\_strategy\_data**

This data flow is used within the Manage Traffic function and contains processed data from sensors on a link that forms part of the road and highway network served by the TMC. The data is used as one of the inputs for the selection of the most appropriate traffic control strategy by the Provide Device Control facility.

**link\_TMC\_identity**

This data flow is used within the Provide Driver and Traveler Services function and contains the identity of the TMC with which each road link is associated.

**link\_traffic\_conditions**

This data flow contains processed sensor data providing traffic conditions for a single link.

**link\_type**

This data flow is used within the Manage Traffic function and contains an identifier to show the type of link to which associated data applies. The link type varies according to how it fits into the road and highway network. It can be all or part of a surface street, a lane of a surface street, a lane on a highway, or all of a highway, and can have other characteristics such as high occupancy vehicles (hov) use only, etc.

**list\_size**

This data flow is a general parameter used throughout ITS functions to specify the number of data items included in a data flow. For example it can be the number of indicators in a strategy selection message, or the number of data items that have been collected in a particular time period.

**local\_sensor\_data\_for\_highways**

This data flow is used within the Manage Traffic function. It contains sensor data for use in traffic management when traffic management cannot be implemented by anything other than local roadside (freeway) means.

**local\_sensor\_data\_for\_roads**

This data flow is used within the Manage Traffic function. It contains sensor data for use in traffic management when traffic management cannot be implemented by anything other than local roadside means.

**location\_identity**

This data element is used by many of the ITS functions to communicate the location of any transportation feature, entity, or event in an unambiguous and mutually understandable way. The Society of Automotive Engineer's Information Report SAE J2374 describes a suite of alternative location referencing interface profiles for use in Intelligent Transportation Systems. The location referencing interface profiles included in J2374 are in varying states of development and will continue to evolve as ITS user requirements and results of computer and field tests become available. The current set of interface profiles includes:

- Geometry Profile
- Geographic Coordinate Profile
- Grid Profile
- Linear Referencing Profile
- Cross-streets Profile
- Address Profile

The profiles, when incorporated into relevant standards, will provide a common language for the expression of location between the different elements of an integrated transportation system.

**long\_term\_data**

This data store is used within the Manage Traffic function to contain data about the previous (historical) state of traffic on the road (surface street) and highway network served by the function. The data is accumulated in real time

at periodic time intervals from other processes within both this and other ITS functions. The traffic flow, other routes use, o-d matrix, parking lot, processed and wide area pollution data may be stored in hourly time intervals for each day over a rolling two week period, after which it may be consolidated into a single smoothed or average set of data for normal weekday flows. The traffic management data may be stored in fifteen minute intervals daily for a long period of time as a record of the indicator state.

#### **m\_and\_c\_activity\_schedule**

This data store is used within the Manage Maintenance and Construction function and contains the current schedule for maintenance and construction activities.

#### **m\_and\_c\_activity\_schedule\_for\_archive**

This data flow is used within the Manage Maintenance and Construction function and contains the current schedule for maintenance and construction activities for archival.

#### **m\_and\_c\_activity\_schedule\_for\_archive\_attributes**

This data flow is used to provide meta data included with maintenance and construction activity data for release to the archive. Items of meta data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data, such as activity schedules for various maintenance and construction work. This meta data may also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type, and data concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488.

#### **m\_and\_c\_activity\_status**

This data store is used within the Manage Maintenance and Construction function and contains the current status of M&C activities, including work status, materials availability, vehicle fleet status, asset status, field equipment maintenance status, and work zone status.

#### **m\_and\_c\_activity\_status\_for\_archive**

This data flow is used within the Maintenance and Construction function and contains the current status of M&C and activities, including work status, materials availability, vehicle fleet status, asset status, field equipment maintenance status, etc.

#### **m\_and\_c\_activity\_status\_for\_archive\_attributes**

This data flow is used to provide meta data included with maintenance and construction activity data for release to the archive. Items of meta data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data, such as status of operational equipment. This meta data may also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type, and data concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488.

#### **m\_and\_c\_archive\_catalog**

This data flow is used to provide the description of the data contained in the collection of maintenance and construction data from the Manage Maintenance and Construction function that has been made available for the Manage Archive Function. The catalog may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g. time range of entries, number of entries; or sample data products.

#### **m\_and\_c\_archive\_catalog\_request**

This data flow from the Manage Archived Data function to the Construction and Maintenance function contains the request for a catalog of the data held by the function. The request for a catalog may include either or both the description of the types of data the archive is interested in or a time frame over which the requested information may be available.

#### **m\_and\_c\_archive\_data\_request**

This data flow from the Manage Archived Data function to the Manage Maintenance and Construction function contains the request for the data to be archived. The request for data may include either or both the description of the data required or a time frame over which the requested information may be available.

**m\_and\_c\_data\_for\_archive**

This data flow is sent by the Manage Maintenance and Construction function and contains information that may be of interest to archive data users systems along with the meta data that is necessary to describe the imported data to the Manage Archived Data function.

**m\_and\_c\_equipment\_quantity**

This data flow contains the quantity of equipment (cones, portable dynamic message signs, etc.) often used to support construction and maintenance activities.

**m\_and\_c\_equipment\_type**

This data flow contains the type of equipment (cones, portable dynamic message signs, etc.) often used to support construction and maintenance activities.

**m\_and\_c\_fleet\_manager\_status**

This data flow is used by the fleet management function to report the status of the fleet of maintenance and construction vehicles. It includes for each vehicle the type, equipment configuration, location, operational status, maintenance record, work activity status, and crew/operator status. Additionally, incident information and road network information are included.

**m\_and\_c\_fleet\_status**

This data flow is used within the Manage Maintenance and Construction function and contains a list of the maintenance and construction fleet vehicles available for use.

**m\_and\_c\_maint\_resource\_needs\_for\_archive**

This data flow consists of a report to be archived consisting of the maintenance and construction resources requested by emergency, traffic, and from within the Manage Maintenance and Construction function. These resources include portable dynamic message signs, cones, and other assets

**m\_and\_c\_maint\_resource\_needs\_for\_archive\_attributes**

This data flow is used to provide meta data included with maintenance and construction resource needs data for release to the archive. Items of meta data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data, such as status of operational equipment. This meta data may also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type, and data concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488.

**m\_and\_c\_materials\_quantity**

This data flow contains the quantity of materials (sand, salt, etc.) often used to support construction and maintenance activities.

**m\_and\_c\_materials\_type**

This data flow contains the type of materials (sand, salt, etc.) often used to support construction and maintenance activities.

**m\_and\_c\_materials\_usage\_rate**

This data flow contains the rate of application of materials (sand, salt, etc.) often used to support construction and maintenance activities.

**m\_and\_c\_resource\_request\_from\_emerg**

This data flow is used to request maintenance and construction resources to include portable signs, cones, and other assets that can be used to assist in incident management and clearance, including hazard removal, repair of damage, and any other incident response.

**m\_and\_c\_resource\_request\_from\_traffic**

This data flow is used to request maintenance and construction resources to include portable signs, cones, and other

assets that can be used to divert traffic, create detours, and otherwise manage traffic. It also includes requests for any other assets that may be needed to support of incident management.

#### **m\_and\_c\_roadway\_maint\_needs\_for\_archive**

This data flow is used within the Manage Maintenance and Construction function and provides information for archival concerning the roadway maintenance plan, materials, and vehicle requirements, together with the time and date needed for later analysis.

#### **m\_and\_c\_roadway\_maint\_needs\_for\_archive\_attributes**

This data flow is used to provide meta data included with maintenance and construction roadway maintenance needs data for release to the archive. Items of meta data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data, such as status of operational equipment. This meta data may also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type, and data concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488.

#### **m\_and\_c\_view\_of\_road\_network**

This data flow is used within the Manage Maintenance and Construction function and contains a view of the road network appropriate for assisting the maintenance and construction center personnel, the vehicle fleet manager when dispatching and routing vehicles, and the automated Maintenance Decision Support function. This information represents a consolidation of inputs from private vehicle probes, road network information including travel times, route usage, and incidents and incident response, and environmental information collected from the Manage Traffic and Manage Emergency Services functions. A listing of incident and weather data is provided, as well as a listing by link of road network data, roadway conditions, etc.

#### **m\_and\_c\_winter\_maint\_needs\_for\_archive**

This data flow is used within the Manage Maintenance and Construction function and provides information for archival concerning the winter treatment plan, materials, and vehicle requirements, together with the time and date needed for later analysis.

#### **m\_and\_c\_winter\_maint\_needs\_for\_archive\_attributes**

This data flow is used to provide meta data included with winter maintenance needs data for release to the archive. Items of meta data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data, such as status of operational equipment. This meta data may also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type, and data concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488.

#### **m\_and\_c\_work\_performance**

This data flow is used within the Manage Maintenance and Construction function and contains data about the status of the work activity performed in the field, including a work activity identifier, progress against expectations, work issues, etc.

#### **m\_and\_c\_work\_plans**

This data flow contains information about scheduled maintenance and construction work activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations.

#### **map\_archive\_catalog**

This data flow is used to provide the description of the data contained in the collection of map data from the Map Update Provider that has been made available for the Manage Archive Function. The catalog may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g. time range of entries, number of entries; or sample data products.

#### **map\_archive\_catalog\_request**

This data flow from the Manage Archived Data function to the Map Update Provider contains the request for a catalog of the data held by the terminator. The request for a catalog may include either or both the description of the

types of data the archive is interested in or a timeframe over which the requested information may be available.

**map\_archive\_data\_request**

This data flow from the Manage Archived Data function to the Map Update Provider contains the request for the data held by the terminator. The request for data may include either or both the description of the data required or a timeframe over which the requested information may be available.

**map\_data\_for\_archive**

This data flow is sent by the Map Update Provider and contains information that may be of interest to archive data users systems along with the meta data that is necessary to describe the imported data to the Manage Archived Data function.

**map\_transit\_data**

This data flow is used by many processes within ITS functions and forms part of the store of digitized map data. It contains data which enables maps of the transit route network to be produced. These will be produced to suit the geometry of the actual display unit on which the data will be shown in either visual or hardcopy format.

**materials\_availability\_for\_status**

This data flow is used within the Manage Maintenance and Construction function and contains data about the types and quantities of materials available at the storage facilities. It is used to assist in determining the current status of materials usage and availability in maintenance and construction activities.

**materials\_status**

This data flow is used within the Manage Maintenance and Construction function and contains information about the types and quantities of materials used for construction and maintenance activities.

**mcv\_crew\_status**

This data flow is used within the Manage Maintenance and Construction function and contains data about the field personnel working on a given maintenance and construction activity. It includes some form of personnel identifiers, vehicle assignments, and other pertinent crew status.

**mcv\_equipment\_configuration**

This data flow contains the configuration of the equipment on a maintenance and construction vehicle. For example, this could include the types of special attachments to the vehicle that transform a snowplow truck into some other type of maintenance vehicle during the summer.

**mcv\_infrastructure\_sensor\_data**

This data flow provides data to the Manage Maintenance and Construction function on the condition of the infrastructure as reported by sensors on maintenance and construction vehicles and roadside equipment. This infrastructure includes bridges, culverts, signs, and other roadway infrastructure. The data can be in raw data or image form. The data is collected by the maintenance and construction vehicle and passed along to a center which can then assess the current health of the infrastructure.

**mcv\_operator\_status**

This data flow is used within the Manage Maintenance and Construction function and contains data about the operator or a maintenance and construction vehicle, including some form of personnel identifier, vehicle assignment, and other pertinent driver status.

**mcv\_vehicle\_type**

This data flow is used within the Manage Maintenance and Construction function and contains information about the type of maintenance and construction vehicle. This flow represents an identifier to distinguish between snowplows, bucket trucks, salt/sand trucks, etc.

**mcv\_work\_activity\_status**

This data flow is used within the Manage Maintenance and Construction function and contains data about the status of the work activity performed in the field, including a work activity identifier, progress against expectations, work

issues, etc.

#### **median\_type**

This data flow is sent from the traffic operations personnel to the Manage Traffic function and contains the standard type of median for the separation of opposing or parallel traffic links.

#### **meso\_scale\_surface\_trans\_weather\_forecasts**

This data flow contains forecasts of surface transportation related weather variables and weather related events at time horizons from one to several hours and spatial horizon of one to 100 km. The time horizon is defined as the time between the observations on which the forecast is based (alternatively, when the forecast process is started) and the time that the forecast applies to. Weather forecasts of this scale could include 'nowcasts'.

#### **methods\_applied**

This data flow defines any methods that have been applied to the original data and includes a description of the actions performed on the data, e.g. aggregations, summarizations, transformations, privacy data stripped, etc.

#### **micro\_scale\_surface\_trans\_weather\_forecast**

This data flow contains forecasts of surface transportation related weather variables and weather related events at a time horizon of several minutes and a spatial horizon of several meters or less. The time horizon is defined as the time between the observations on which the forecast is based (alternatively, when the forecast process is started) and the time that the forecast applies to.

#### **miso\_scale\_surface\_trans\_weather\_forecasts**

This data flow contains forecasts of surface transportation related weather variables and weather related events at time horizons from approximately minutes to an hour, and a spatial horizon of meters to a kilometer. The time horizon is defined as the time between the observations on which the forecast is based (alternatively, when the forecast process is started) and the time that the forecast applies to. Weather forecasts of this scale could include 'nowcasts'.

#### **modes**

This data flow is used within many functions and forms part of the data used for route requests and trip plans. It defines the mode(s) of transport to be used on a requested route or proposed trip. The following different modes are supported using the associated character codes and may be used in any trip request. The data that the codes describe may include but are not limited to own private car, part of public transit services, part of public transit services, scheduled air service, sea borne transport other than ferry, passenger or vehicle ferry, pedal or motor powered bicycle, walking, van pool, car pool, express bus service, specialized\_service, and emergency vehicle.

#### **multimodal\_archive\_catalog**

This data flow is used to provide the description of the data contained in the collection of multimodal data from the Multimodal Transportation Service Provider that has been made available for the Manage Archive Function. The catalog may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g. time range of entries, number of entries; or sample data products.

#### **multimodal\_archive\_catalog\_request**

This data flow from the Manage Archived Data function to the Multimodal Transportation Service Provider contains the request for a catalog of the data held by the terminator. The request for a catalog may include either or both the description of the types of data the archive is interested in or a timeframe over which the requested information may be available.

#### **multimodal\_archive\_data\_request**

This data flow from the Manage Archived Data function to the Multimodal Transportation Service Provider contains the request for the data held by the terminator. The request for data may include either or both the description of the data required or a timeframe over which the requested information may be available.

#### **multimodal\_crossing\_sensor\_data**

This data flow is used within the Manage Traffic function and contains the multimodal crossing data obtained from

processing the other inputs from sensors around the road network.

**multimodal\_data**

This data flow is sent by the Multimodal Transportation Service Provider and contains multimodal passenger information such as origin and destination data or fare information that may be of interest to archive data users systems.

**multimodal\_data\_attributes**

This data flow is used to provide meta data included with multimodal data for release to the archive. Items of meta data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data, such as status of operational equipment. This meta data may also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type, and data concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488.

**multimodal\_data\_for\_archive**

This data flow is sent by the Multimodal Transportation Service Provider and contains multimodal passenger information that may be of interest to archive data users systems along with the meta data that is necessary to describe the imported data to the Manage Archived Data function.

**need\_date**

This data flow contains the calendar date on which a specific activity or item is needed.

**need\_time**

This data flow contains the time at which a specific activity or item is needed.

**node\_list**

This data flow is used within the Manage Traffic function and contains a list of nodes for which data is being provided. These nodes will comprise all of those on both the road (surface street) and highway network served by the function.

**number\_of\_lanes**

This data flow is sent from the traffic operations personnel to the Manage Traffic function and contains the lowest number of lanes at any point in the link.

**o\_d\_matrix**

This data flow contains an origin-destination (o-d) matrix that has been derived from the other traffic data, such as that obtained from video images of traffic. It will apply to the road (surface street) and highway network in the geographic area served by the function. The data will comprise a list of o-d pairs and the traffic flow between them, where the pairs will be identified by link identities.

**operational\_data\_for\_mcv**

This data flow is used within the Manage Maintenance and Construction function and contains information about the maintenance and construction activity performed by the vehicle. Operational data includes the operational state of the maintenance equipment (e.g., blade up/down, spreader pattern, equipment configuration) and a record of the actual work performed.

**origin**

This data flow is used within the Provide Driver and Traveler Services function. It defines the origin point for a trip request or a route to be used by a traveler or a vehicle. In some instances it will be used as the origin for the use of a particular mode within a trip, e.g. the part of the route for the trip that is to be provided by walking, or ridesharing, or an multimodal service provider.

**other\_data\_source\_catalog**

This data flow is used to provide the description of the data from Other Data Sources that has been made available for the Manage Archive Function. The catalog may include descriptions of the schema or structure of the data, a

description of the contents of the data; e.g. time range of entries, number of entries; or sample data products.

**other\_data\_source\_catalog\_request**

This data flow from the Manage Archived Data function to the Other Data Sources terminator contains the request for a catalog of the data held by the terminator. The request for a catalog may include either or both the description of the types of data the archive is interested in or a timeframe over which the requested information may be available.

**owner\_entities**

This data flow identifies the source or owning agency of the data which may be used as a point of contact when trying to make use of the data.

**paratransit\_arrival\_time**

This data flow is used within the Manage Transit function and contains the time at which the requested paratransit service will get the traveler to the requested destination. The location of the destination is provided in a separate data flow.

**paratransit\_availability\_time**

This data flow is used within the Manage Transit function and contains a time window of availability of the requested paratransit service. If the traveler does not confirm the use of the service within this time frame, the details will no longer be valid, and the traveler will have to re-request the service. This is to allow for the fluctuating nature of demand for paratransit services and to enable the best possible service to be provided at any time.

**paratransit\_destination**

This data flow is used within the Manage Transit function and contains destination of the requested paratransit service, which may not be the traveler's final destination, since the remainder of the trip may be completed by other means, e.g. regular public transit.

**paratransit\_personal\_schedule**

This data flow is sent from the Manage Transit function to the Provide Driver and Traveler Services function.

**paratransit\_pickup\_location**

This data flow is used within the Manage Transit function and contains the location at which the requested paratransit service will pick up the traveler. The time at which the traveler will be picked up is contained in a separate data flow.

**paratransit\_pickup\_time**

This data flow is used within the Manage Transit function and contains the time at which the requested paratransit service will pick up the traveler. The location of the pick-up point is provided in a separate data flow.

**paratransit\_service\_confirmation**

This data flow is sent by the Provide Driver and Traveler Services function to the Manage Transit function to confirm that the traveler wants to use the previously identified paratransit service.

**paratransit\_service\_cost**

This data flow is used within the Manage Transit function and contains the cost of the requested paratransit service.

**paratransit\_service\_data\_for\_archive**

This data flow is used within the Manage Transit function to send data about paratransit services that have been requested but not confirmed by travelers.

**paratransit\_service\_details**

This data flow is used within the Manage Transit function to provide details of the response to a requested paratransit service.

**paratransit\_service\_identity**

This data flow provides a unique identity number for a requested paratransit service.

**paratransit\_services\_for\_transit\_drivers**

This data flow is used within the Manage Transit function to provide data about a confirmed paratransit service to a transit driver.

**parking\_archive\_catalog**

This data flow is used to provide the description of the data contained in the collection of parking data that has been stored and made available for the Manage Archive Function. The catalog may include description of the schema or structure of the data, a description of the contents of the data; e.g. time range of entries, number of entries; or sample data products.

**parking\_archive\_catalog\_request**

This data flow from the Manage Archive Data function contains the request for a catalog of the data held by the Manage Traffic function. The request for a catalog may include the description of types of data the archive is interested in or a timeframe over which the requested information may be available.

**parking\_archive\_data\_request**

This data flow from the Manage Archive Data function contains the request for the data held by the Manage Traffic function. The request for data may include the description of the data required or a timeframe over which the requested information may be available.

**parking\_charge\_attributes**

This data flow is used to provide meta data included with parking charge data for release to the archive. Items of meta data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data, such as status of operational equipment. This meta data may also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type, and data concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488.

**parking\_charge\_response\_for\_archive**

This data flow is sent from the Provide Electronic Payment Services function to the Manage Traffic function. It contains the response to a previous request for the current parking lot charges to be stored in the data archive. It will store data about the prices charged for parking lot spaces, by time of day, day of week and vehicle type.

**parking\_data\_for\_archive**

This data flow is sent from the Manage Traffic to the Manage Archive Data function. It is used to provide detailed information on parking data, such as parking availability and parking lot charges.

**parking\_lot\_availability**

This data flow contains details of the number of spaces available in the lot in response to a previous request for this data. It also contains data on the hours of operation of parking lots. This data is used in transactions requiring electronic payment of parking lot services, as well as for a traveler making a parking lot reservation.

**parking\_lot\_bookings\_request**

This data flow is used within the Provide Electronic Payment Services function and contains details of the advanced booking being requested for space(s) in a parking lot.

**parking\_lot\_calculated\_occupancy**

This data flow contains the current occupancy of a parking lot, i.e. the number of vehicles present, calculated from traffic sensors located at its entrance(s) and exit(s).

**parking\_lot\_charge\_application\_time**

This data flow is used within the Provide Electronic Payment Services function and contains the time at which a parking lot charge applies for a particular toll segment. The time is held as the number of seconds since a fixed

reference point, from which the actual time and date can be easily computed.

**parking\_lot\_current\_occupancy**

This data flow is used within the Manage Traffic function and contains the parking lot identity and current occupancy.

**parking\_lot\_data\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function. It is used to provide data to the data archive about the capacity of the parking lot, i.e., the total number of spaces for vehicles, and any advanced bookings that have been made.

**parking\_lot\_data\_for\_archive\_attributes**

This data flow is used within the Provide Driver and Traveler Services function. It is used to provide data attribute information to the data archive about the capacity of the parking lot and any advanced bookings that have been made.

**parking\_lot\_decreasing\_threshold**

This data flow is used within the Manage Traffic function and contains the threshold at which the parking lot state will change, e.g. from 'spaces' to 'almost full', etc., as the number of vehicles in the parking lot decreases.

**parking\_lot\_dms\_allocation**

This data flow is used within the Manage Traffic function and contains the identity(ies) of dynamic message signs that are allocated to parking lots to show the state of the parking lot, and (possibly) give alternate parking information.

**parking\_lot\_hours\_of\_operation**

This data flow is sent from the Provide Electronic Payment Services function to the Provide Driver and Traveler Services function and contains data on the hours of operation of parking lots. This data is used in transactions requiring electronic payment of parking lot services, as well as for a traveler making a parking lot reservation.

**parking\_lot\_identity**

This data flow is used within the Provide Electronic Payment Services and Manage Traffic function. It contains the identity of an individual parking lot so that its charges can be defined and a control strategy applied to its use.

**parking\_lot\_increasing\_threshold**

This data flow is used within the Manage Traffic function and contains the threshold at which the parking lot state will change, e.g. from 'spaces' to 'almost full', etc., as the number of vehicles in the parking lot increases.

**parking\_lot\_input\_data**

This data flow is used within the Manage Traffic function and contains data that is used to calculate the occupancy of parking lots.

**parking\_lot\_list**

This data flow is used within the Manage Traffic function and contains a list of parking lots to which a particular strategy is to be applied. The strategy will either promote or discourage the use of the parking lots to generally improve traffic flow conditions in the geographic area controlled by the TMC.

**parking\_lot\_occupancy**

This data flow is used within the Manage Traffic function and contains the current occupancy of a parking lot, i.e. the number of vehicles present.

**parking\_lot\_price**

This store is used within the Provide Electronic Payment Service function to hold data about the prices to be charged for parking lot spaces.

**parking\_lot\_sensor\_allocation**

This data flow is used within the Manage Traffic function and contains the identity(ies) of the traffic sensors that are used to determine the number of spaces in the parking lot that are currently occupied. There are two types of sensor, those measuring input flow (vehicles entering the lot) and those measuring output flow (vehicles leaving the lot).

#### **parking\_lot\_sensor\_type**

This data flow is used within the Manage Traffic function and contains a character that indicates the type of parking lot lane to which a traffic sensor has been applied to count the number of vehicles that pass. The following two types are provided:

- N - for sensors on entry lanes,
- X - for sensors on exit lanes.

#### **parking\_lot\_spaces**

This data flow is used within the Provide Driver and Traveler Services function and contains the number of spaces available in a parking lot. This may be either currently or at some point in the future depending on accompanying data.

#### **parking\_lot\_state**

This data flow contains the current state of a parking lot. It will have been determined from data provided by either the parking lot operator, the parking service provider, or a comparison of the actual occupancy of the parking lot determined from vehicle detectors sited at the lot entrance(s) and exit(s) with threshold values for each status condition. The state is stored as a character code. Some of the messages the data could describe about parking lots might include spaces, almost full, full, or closed.

#### **parking\_lot\_state\_attributes**

This data flow is used to provide meta data included with parking data for release to the archive. Items of meta data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data, such as status of operational equipment. This meta data may also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type, and data concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488.

#### **parking\_lot\_state\_for\_archive**

This data flow is used within the Manage Traffic function and contains the identity of the parking lot plus its current status and occupancy. The data flow contains parking availability information to be sent to the data archive process.

#### **parking\_lot\_state\_thresholds**

This data flow is used within the Manage Traffic function and contains the thresholds at which the parking lot states will change, e.g. from 'spaces' to 'almost full', etc. There are two sets of thresholds, one set for use when the parking lot occupancy is increasing and the other set for use when the occupancy is decreasing.

#### **parking\_lot\_static\_data**

This data flow is used within the Manage Traffic function and contains information about the allocation of vehicle counting sensors, and signs to parking lots, plus details of the thresholds used to decide the parking lot state, i.e. the occupancies at which the 'almost full' and 'full' states will apply.

#### **parking\_lot\_storage\_data**

This data flow is used within the Manage Traffic function and contains occupancy and state data for all the parking lots in the geographic area served by the function.

#### **parking\_space\_details**

This data flow is used within the Provide Electronic Payment Services function and contains details of the parking lot space requirements for a particular user.

#### **pavement\_type**

This data flow is sent from the traffic operations personnel to the Manage Traffic function and contains information about the type of material from which the pavement is constructed (e.g. concrete, asphalt).

**pedestrian\_adaptive\_data**

This data flow is used within the Manage Traffic function and contains data about adaptive control data used by indicators that are pedestrian controllers to enable them to control traffic. The format of the data will depend upon the type of adaptive control being used.

**pedestrian\_control\_commands**

This data flow is the actual control commands that make the pedestrian controller change the traffic 'stop/go' and pedestrian 'walk/don't walk' outputs shown by its phases. The actual format of the control commands will depend on national standards being developed for controller fixed time plans, e.g. NTCIP. However the data flow can handle all projected type of controller and control commands formats.

**pedestrian\_cycle\_time**

This data flow contains data about the time taken to complete all the control commands in an pedestrian fixed time plan once only.

**pedestrian\_data**

This data flow is used within the Manage Traffic function and contains a list of indicators for which pedestrian demands have been found to be present. These indicators are in fact traffic signal controllers that are capable of servicing the pedestrian demand and enabling pedestrians to cross the road or highway in a safe and coordinated manner. This data is used to determine the traffic control strategy for signalized traffic intersections.

**pedestrian\_demand**

This data flow is used within the Manage Traffic function. It contains processed pedestrian surveillance data obtained from sensors within the road (surface street) and highway network served by the TMC. The data is used to determine the traffic control strategy for signalized traffic intersections.

**pedestrian\_equipment\_data**

This data flow provides information about each pedestrian intersection, i.e. an interface between pedestrians and road vehicles that enables one or the other to have controlled right of way. The information is required so that its control using adaptive, fixed time or local techniques can be properly implemented when needed. Note that the indicator type data in data that forms part of the indicator identity will be set to that for pedestrian controllers.

**pedestrian\_fixed\_time\_data**

This data flow contains data about fixed time control data used by indicators that are pedestrian controllers to enable them to control traffic.

**pedestrian\_offset\_time**

This data flow is the relative start time of the cycle of pedestrian control commands and is set at a value that will achieve synchronization between adjacent controllers.

**pedestrian\_phase\_data**

This data flow contains information about the way in which each pedestrian controller operates, i.e. the minimum and maximum phase timings, phase change timings, etc. The data will be in integer format.

**pedestrian\_sensor\_data**

This data flow is used within the Manage Traffic function and contains the pedestrian data obtained from processing the other inputs from sensors around the road network.

**perishability\_date**

This data flow is the date/time stamp of when the data being described will be removed from the archive, either the local source agencies storage or the permanent archive store.

**personal\_identification\_status**

This data flow provides information about the status of any personal identifiers associated with the described data. This data flow describes either the presence of personal information or whether the identifying data has been hashed

(replaced with system unique codes) or stripped out completely.

#### **planned\_event\_data**

This data flow is used within the Manage Traffic function to transfer data about planned events from the Incident Management facility to the Provide Traffic Surveillance facility for storage.

#### **planned\_event\_details**

This data flow is used within the Manage Traffic function and contains the details of a planned event.

#### **pollution\_archive\_data\_log**

This data flow contains data collected and logged within the pollution data log. It contains a periodic average of the pollution data collected from specific roadside locations and by sensors from actual vehicles.

#### **pollution\_archive\_data\_log\_attributes**

This data flow is used to provide meta data included with pollution data for release to the archive. Items of meta data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data, such as status of operational equipment. This meta data may also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type, and data concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488.

#### **pollution\_area\_acceptance\_data**

This data flow contains the levels of atmospheric pollutants which are acceptable, i.e. the presence of pollutants within the geographic area served by the function at or below these levels will not create an out of specification condition that may ultimately lead to a pollution incident being reported. A pollution incident will only be reported if the value for the particular pollutant is exceeded for the length of time specified in the area acceptance time data flow. These levels will be set at lower values than those defined in the area tolerance levels data flow.

#### **pollution\_area\_acceptance\_times**

This data flow contains the times for which the levels of atmospheric pollution defined in the area acceptance data flow may exist before they create an out of specification condition that may ultimately result in a pollution incident being reported. These times will be longer than those for the levels defined in the area tolerance data flow.

#### **pollution\_area\_tolerance\_data**

This data flow contains the levels of atmospheric pollutants which are tolerable, i.e. the presence of pollutants within the geographic area served by the function at or below this level will not create an out of specification condition that may result in a pollution incident being reported. A pollution incident will only be reported if the value for the particular pollutant is exceeded for the length of time specified in the area tolerance time data flow.

#### **pollution\_area\_tolerance\_times**

This data flow contains the times for which the levels of atmospheric pollution defined in the area tolerance data flow may exist before they create an out of specification condition that may ultimately result in a pollution incident being reported. These times will be shorter than those for the levels defined in the area acceptance data flow.

#### **pollution\_roadside\_acceptance\_data**

This data flow contains the levels of atmospheric pollutants which are acceptable, i.e. the presence of pollutants at the roadside in the geographic area served by the function at or below these levels will not create an out of specification condition that may ultimately lead to a pollution incident being reported. A pollution incident will only be reported if the value for the particular pollutant is exceeded for the length of time specified in the roadside acceptance time data flow. These levels will be set at higher values than those defined in the roadside tolerance levels data flow.

#### **pollution\_roadside\_acceptance\_times**

This data flow contains the times for which the levels of atmospheric pollution defined in the roadside acceptance data flow may exist before they create an out of specification condition that may ultimately result in a pollution incident being reported. These times will be longer than those for the levels defined in the roadside tolerance data

flow.

**pollution\_roadside\_tolerance\_data**

This data flow contains the levels of atmospheric pollutants which are tolerable, i.e. the presence of pollutants at the roadside in the geographic area served by the function at or below these levels will not create an out of specification condition that may ultimately lead to a pollution incident being reported. A pollution incident will only be reported if the value for the particular pollutant is exceeded for the length of time specified in the roadside tolerance time data flow. These levels will be set at lower values than those defined in the area acceptance levels data flow.

**pollution\_roadside\_tolerance\_times**

This data flow contains the times for which the levels of atmospheric pollution defined in the roadside tolerance data flow may exist before they create an out of specification condition that may ultimately result in a pollution incident being reported. These times will be shorter than those for the levels defined in the roadside acceptance data flow.

**pollution\_state\_area\_collection**

This data flow is used within the Manage Traffic function and contains the current states of the various types of pollution within the atmosphere in the geographic area served by the function. It also contains a summary indication of the area air quality.

**pollution\_state\_roadside\_collection**

This data flow is used within the Manage Traffic function and contains the digitized values of pollution levels obtained from roadside sensors in the geographic area served by the function.

**pollution\_state\_static\_log\_data**

This data flow is used within the Manage Traffic function and contains a periodic average of the pollution data collected from both the general area served by the function and from specific roadside locations, i.e. static pollution data.

**pollution\_state\_vehicle\_collection**

This data flow is used within the Manage Traffic function and contains the average levels of the various types of pollution that were being output by a particular type of violating vehicle.

**pollution\_state\_vehicle\_log\_data**

This data flow is used within the Manage Traffic function and contains a periodic average of the pollution data measured by sensors from actual vehicles.

**pollution\_vehicle\_acceptance\_conditions**

This data flow contains the vehicle operating conditions at which the associated levels of atmospheric pollutants must not be exceeded. If they are then a pollution incident will be generated for the vehicle leading the details being passed to the enforcement agency terminator, which may result in eventual prosecution of the vehicle's owner.

**pollution\_vehicle\_acceptance\_data**

This data flow contains the levels of atmospheric pollutants which are acceptable, i.e. the presence of pollutants from vehicles at or below these levels will not create an out of specification condition that may ultimately lead to a pollution incident being reported. A pollution incident will only be reported if the value for the particular pollutant is exceeded at the vehicle operating condition to which it applies.

**predicted\_highway\_network\_data**

This data flow is used within the Manage Traffic function and contains data about predicted traffic conditions on links in the highway network served by the function. This data is produced by the predictive model process.

**predicted\_hov\_lane\_data**

This data flow is used within the Manage Traffic function and contains prediction of the numbers of both legal and illegal vehicles using High Occupancy Vehicle (HOV) lanes in the road and highway network served by the function

**predicted\_o\_d\_matrix**

This data flow contains an origin-destination (o-d) matrix that has been produced by the predictive model within the function. It will apply to the road (surface street) and highway network in the geographic area served by the function. The data will comprise a list of o-d pairs and the traffic flow between them, where the pairs will be identified by link identities.

**predicted\_other\_routes\_use**

This data flow is used within the Manage Traffic function. It is produced by the predictive model process and contains information about how many travelers it is predicted will be guided down each non-vehicle and non-transit route segment and the average journey time for each route segment. The data will be stored in ascending route segment number order (i.e. from 1 to the maximum number of route segments).

**predicted\_parking\_lot\_data**

This data flow is used within the Manage Traffic function and contains predicted parking lot states produced by the predictive model process. It will apply to all the parking lots in the geographic area served by the function.

**predicted\_road\_network\_data**

This data flow is used within the Manage Traffic function and contains data about predicted traffic conditions on links in the road network served by the function. This data is produced by the predictive model process.

**predicted\_road\_network\_use**

This data flow is used within the Manage Traffic function. It is produced by the predictive model process and contains information about how many vehicles it is predicted will be guided down each route segment and the average journey time for each route segment. The data will only apply to those route segments that are related to links in the road and highway network served by the Manage Traffic function. It will be stored in ascending route segment number order (i.e. from 1 to the maximum number of route segments).

**predictive\_model\_data**

This data store is used within the Manage Traffic function and contains the model of the predicted traffic conditions on the road network served by the function. This data is produced by the predictive model generation process and is used for determining traffic management strategies.

**preferences**

This data flow is used within the Provide Driver and Traveler Services function and is also sent to that function by the Provide Vehicle Monitoring and Control function as part of the data needed to request a route involving automatic highway system (AHS) lanes. It contains the preferences being placed on the choice of a route being requested by a driver or traveler.

**preferred\_alternate\_routes**

This data flow contains the number of alternate routes that are to be provided to the driver or traveler making the route request. These alternate routes will be in addition to the primary route, which will be the one that most nearly meets the specified preferences and constraints.

**preferred\_ridesharing\_options**

This data flow is used within the Provide Driver and Traveler Services function and contains the details of options that a traveler can associate with a ridesharing request as part of a proposed trip.

**preferred\_route\_segments**

This data flow contains a list of preferred route segments. This is actually a list of preferred types of route segment, e.g. those containing automatic highway system (AHS) lanes. If no preference is identified, the route selection process will assume that it is free to choose any type of segment, although this will not include those with AHS lanes unless this is specifically identified.

**preferred\_routes**

This data flow contains a list of preferred route choices, e.g. a route must go via a particular place or avoid another place. The list will comprise a list of place names and enables a reasonable choice to be made.

**preferred\_transit\_options**

This data flow is used within the Provide Driver and Traveler Services function and contains details of the transit route options that a traveler has requested as part of a trip request.

**preferred\_weather\_conditions**

This data flow is used within the Provide Driver and Traveler Services function and contains preferences about weather conditions that the traveler has selected for a portion of a trip, e.g. only travel on dry weather, avoid freezing conditions, etc.

**private\_vehicle\_occupants**

This data item is used within the Manage Traffic function and contains a count of the number of occupants in a vehicle as measured by a detector located on, or near to the highway, as the vehicles pass by its sensor.

**processed\_data**

This data flow is used within the Manage Traffic function and contains traffic sensor data that has been processed ready for storage in both the current and historical data stores.

**processed\_infrastructure\_sensor\_data**

This data flow consists of processed information concerning the condition of the roadway infrastructure and is based on data from sensor equipment located on the roadside and onboard maintenance and construction vehicles.

**quality\_control\_attribute**

This data flow identifies the data quality control screening technique applied to the data by the source function. Screening techniques may include flagging suspicious or anomalous data or removal of erroneous or suspicious values.

**rail\_schedules\_data**

This data flow contains information about scheduled rail operations for a specific locality and time frame. It includes train and maintenance schedules that may have an impact on traffic management.

**ramp\_controls**

This data flow is used within the Manage Traffic function and contains the actual control data to be passed to a ramp meter controller. The state will show either a proceed (green) or stop (red) state dependent on what has been determined as the best strategy for traffic entering the highway via the ramp.

**ramp\_data**

This data flow is used within the Manage Traffic function and contains data which is used to control access to freeways etc. from ramps.

**ramp\_devices**

This data flow includes information about each device used to output traffic management commands to vehicle drivers at highway entrance ramps. These devices are used as a means of controlling access to highways particularly during periods of peak traffic flow.

**ramp\_identity**

This data flow is used within the Manage Traffic function to identify individual ramp metering equipment used for the control of traffic entering highways.

**ramp\_list**

This data flow is used within the Manage Traffic function and contains a list of the ramps to which a particular traffic control strategy is to be applied. The ramps are served by ramp metering equipment which has the ability to control vehicle access to the highway.

**ramp\_phase\_data**

This data flow provides information about the way in which each highway ramp entry lane controller operates, i.e. the minimum and maximum phase timings, phase change timings, etc. plus the criteria which cause access to the

highway to be restricted. The data will be in integer format.

**ramp\_signal\_state**

This data flow is used within the Manage Traffic function to indicate the required state of the ramp meter controllers at the entrance to the highway ramps controlled by the TMC.

**record\_size**

This data flow identifies the number of records contained within the set of data being described, held within either the local agencies storage or in the permanent archive.

**reservation\_status**

This data flow is used within the ITS functions to show the status of a reservation that is being or has been requested. If the flag is set to true the reservation was accepted, but if set to false, then the reservation was denied.

**resource\_needs\_from\_scheduler**

This data flow is used within the Manage Maintenance and Construction function and contains the resources needed by the function that schedules maintenance and construction activities.

**rideshare\_confirmation\_data**

This data flow is used within the Provide Driver and Traveler Services function and contains data about confirmed rideshare requests.

**rideshare\_data\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function to provide data to the data archive about the available rideshare routes and travelers.

**rideshare\_details**

This data flow is used within the Provide Driver and Traveler Services function and contains a list of potential ridesharing matches for output to the traveler. This data will provide information on the other participants in the proposed rideshare, pick-up and drop-off points, etc.

**rideshare\_eligibility\_data**

This data flow is used within the Provide Driver and Traveler Services function to identify potential rideshare participants and to determine their eligibility.

**rideshare\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function to provide data to the data archive about the requests for rideshare and available rideshare routes and travelers

**rideshare\_for\_archive\_attributes**

This data flow is used within the Provide Driver and Traveler Services function to provide data attribute information to the data archive about the requests for rideshare and available rideshare routes and travelers.

**rideshare\_selection\_number**

This data flow is used within the Provide Driver and Traveler Services function to provide the identification number for a rideshare selection that has been made in response to a traveler's request. This number is used to identify a rideshare selection in all subsequent transactions.

**road\_conditions**

This data flow contains current and forecasted road conditions. Road conditions includes surface or subsurface temperature, state(e.g. dry, wet, ice, snow, flooded), and residual chemical factors of the road surface as well as visibility near the road surface.

**road\_control\_devices**

This data flow includes information about each device used to output traffic management commands to vehicle drivers at road junctions, including those that control vehicles at multimodal and railroad grade crossings. Data for

devices at highway entry ramps is provided separately.

**road\_network**

This data flow comprises data about each segment in the road (surface street) network and the way in which they fit together, i.e. which segment is joined to which, both upstream and downstream, plus identification of those links that interface to the highway network.

**road\_segment\_conditions**

This data flow contains current and forecasted road conditions for a single road segment. Road conditions includes temperature, state (e.g. dry, wet, ice, snow, flooded), and residual chemical factors of the road surface as well as visibility near the road surface.

**road\_segment\_weather\_conditions**

This data flow contains current and forecasted road weather conditions for a single road segment. Road weather conditions includes temperature, humidity, precipitation, as well as wind conditions near the road surface.

**road\_weather\_conditions**

This data flow contains current and forecasted road weather conditions. Road weather conditions includes temperature, humidity, precipitation, as well as wind conditions near the road surface. This data is provided by road segment.

**roadside\_archive\_catalog**

This data flow is used to provide the description of the data contained in the collection of roadside data that has been stored and made available for the Manage Archived Data function. The catalog may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g. time range of entries, number of entries; or sample data products.

**roadside\_archive\_catalog\_request**

This data flow from the Manage Archive Data function contains the request for a catalog of the data held by the Manage Traffic function. The request for a catalog may include the description of types of data the archive is interested in or a timeframe over which the requested information may be available.

**roadside\_archive\_data\_request**

This data flow from the Manage Archive Data function contains the request for the data held by the Manage Traffic function. The request for data may include the description of the data required or a timeframe over which the requested information may be available.

**roadside\_conditions**

This data flow is used within the Manage Traffic function and contains information about local road and highway conditions, i.e. snow, ice, rain, fog, other forms of precipitation (earth, sand, petroleum, chemicals, etc.), flooding.

**roadside\_crew\_warning\_given**

This data flow contains a time-stamped indication that an intrusion warning was generated via a roadside device, along with details of the warning (to whom was it sent or how was it sent).

**roadside\_data\_for\_archive**

This data flow is sent from the Manage Traffic to the Manage Archive Data function. It is used to provide detailed data collected from the roadside.

**roadside\_device\_status**

This data flow is used to collect device status data, including fault information, from roadside devices such as smart probe beacons, CCTVs, in-vehicle signing equipment, automated roadway treatment systems, etc.

**roadway\_characteristics**

This data flow is sent from the traffic operations personnel to the Manage Traffic function. It contains analog information which includes shoulder widths, pavement types, and other general information pertaining to standard

characteristics.

**roadway\_environment\_conditions**

This data flow contains processed environment sensor information which provides a summary of environment conditions referenced to a link.

**roadway\_maint\_plan**

This data flow consists of the selected roadway maintenance plan, including the type of activity to be performed (field equipment repair, grass-cutting, etc.), schedule, etc. and is provided to assist the maintenance and construction activities scheduling function.

**roadway\_traffic\_conditions**

This data flow contains sensor information which has been processed to provide traffic conditions for a link.

**route**

This data flow is used within the Provide Driver and Traveler Services function and contains details of a route. This will have been produced to fit the origin, destination, preferences and constraints requirements provided by a traveler through the trip request data. The route segment(s) will be in sets, one for a primary route (the nearest fit to the traveler's requirements), plus one or more alternates that may give a better modal split, or improved journey time, etc. There may be one or many route segments depending on the length of the route.

**route\_cost**

This data item is used within the Provide Driver and Traveler Services function and contains the cost of using a particular route. This is made up of some or all of such things as tolls, fares, port charges, plus the cost of commercial vehicle credential filing and tax payments.

**route\_guidance\_data\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function. It is used to provide data to the data archive about details of all the vehicle routes which are currently being used by vehicles using dynamic guidance.

**route\_identity**

This data flow contains the identity of a route that is to be used for either on-line vehicle or traveler guidance. The data is for internal use within the function and identifies the route when the driver or traveler subsequently accepts it for use.

**route\_list**

This data flow contains a list of the number of route segments in each route that is being provided to a traveler. The primary route will be that which most closely fits the traveler's requirements, while the others will be alternates that may give such things as improved journey time, shorter distance, lower cost, different modal split, etc.

**route\_point**

This data flow is used within the Provide Driver and Traveler Services function. It defines a point that may be on the route that is provided in response to a trip request, or it may be part of the trip specification produced by the traveler as the trip request. In either case it may be the origin, destination, or an intermediate point which the traveler wishes to pass through, or where the trip planning facility has decided that it is necessary to change modes.

**route\_segment**

This data flow is used within the Provide Driver and Traveler Services function and forms the basic building block for a route.

**route\_segment\_commercial\_details**

This data flow is sent from the Provide Driver and Traveler Services function to the Manage Commercial Vehicles function. It contains data about each of the route segments that have been included in a commercial vehicle route.

**route\_segment\_description**

This data flow is used within the Provide Driver and Traveler Services function and contains a description of the physical details for the entire route segment. This data is used to provide information from which guidance can be produced in a form which is understood by the driver, e.g. lane selection, right/left turns, etc.

**route\_segment\_downstream\_identity**

This data flow provides the identity of the route segment that is immediately downstream of the route segment with which the data flow is associated. This may be another route segment of the same type (highway or road), or of the alternative type (road or highway) where there is an interface to the other network.

**route\_segment\_end\_point**

This data flow is used within the Provide Driver and Traveler Services function and the Manage Traffic function. It contains the location of the end of a route segment.

**route\_segment\_estimated\_condition**

This data flow contains the traffic conditions expected on the route segment at the time at which it will be used.

**route\_segment\_estimated\_travel\_time**

This data flow contains the estimated time it will take a vehicle to travel the route segment taking account of the expected conditions defined in other data.

**route\_segment\_guided\_travelers**

This data flow contains the number of travelers being guided along a route segment in one minute of real time. This data only applies to non-vehicle route segments and those not provided by transit services. The travelers may not actually be on the segment at the time the data is used, but will have it included in their current personal guidance data.

**route\_segment\_guided\_vehicles**

This data flow contains the number of vehicles being guided along a route segment in one minute of real time. The vehicles may not actually be on the segment at the time the data is used, but will have it included in their current route guidance data. This data flow will only apply to those route segments that are used by road vehicles other than transit vehicles.

**route\_segment\_identity**

This data flow contains the identity number of a route segment. A link may not be the same physical entity as a surface street or highway link (defined elsewhere), but in some cases they could be the same.

**route\_segment\_journey\_time**

This data flow contains the average route segment journey time calculated from data being provided by guided vehicles. These vehicle are acting as probes in the road network by reporting their position to request fresh (updated) guidance at the beginning of each new route segment on their current route.

**route\_segment\_number**

This data flow is used within the Provide Driver and Traveler Services function and contains the number of segments in a route that is being provided in response to a trip request from a traveler.

**route\_segment\_predicted\_weather**

This data flow contains the weather conditions expected on the road segment at the time at which it will be used.

**route\_segment\_report\_position\_points**

This data flow is used within the Provide Driver and Traveler Services function and contains a list of any points other than those at the route segment start and end where the vehicle's position is to be reported.

**route\_segment\_start\_point**

This data flow is used within the Provide Driver and Traveler Services function and the Manage Traffic function. It contains the location of the start of a route segment.

**route\_segment\_total\_number**

This data flow is used to define the total number of route segments in the road (surface street) and highway network served by the Manage Traffic function. This may be different from that served by the Provide Driver and Traveler Services function, and in this instance is used to define the number of route segments for which probe vehicle data is being provided to the Manage Traffic function, or the total number of route segments used by non-vehicle modes (walking, cycling, etc.) for which journey times are available.

**route\_segment\_type**

This data flow contains the definition of the type of route segment which will depend on the types of use it will support. The data flow may describe but not be limited to messages such as any type of vehicle, commercial vehicles only, transit vehicles only, commercial and transit vehicles, private cars and vans only, bicycles only, all pedestrians, no vehicles, disabled pedestrians, road route segment, and highway route segment.

**route\_segment\_upstream\_identity**

This data flow provides the identity of the route segment that is immediately upstream of the route segment with which the data flow is associated. This may be another route segment of the same type (road or highway), or of the alternative type (highway or road) where there is an interface to the other network.

**route\_segment\_use\_prediction**

This data flow is used within the Provide Driver and Traveler Services function. It contains data about the number of guided vehicles that will be using a route segment over a set of time periods.

**route\_segment\_way\_point**

This data flow is used within the Provide Driver and Traveler Services function and contains the location of a point part way along a route segment at which a vehicle's position is to be reported.

**route\_start\_time**

This data flow is used within the Provide Driver and Traveler Services function. It contains the date and time at which a route will start taken from the time specified in the request for the route.

**route\_statistics**

This data flow is used within the Provide Driver and Traveler Services function and contains the overall predicted statistics associated with a route which may assist the traveler in making a final route selection. The statistics will include such things as itinerary, estimated net travel time, time of arrival, total distance, anticipated delays/congestion, etc.

**route\_type**

This data flow contains an indication of the type of route requested, or that for which data is available. It is stored and may have but not be limited to having a value of no data, dynamic route, or static route.

**safety\_data\_for\_mcv**

This data flow contains data about vehicle safety, including the status of the driver in terms of their ability to control the vehicle, and the status of the vehicle, in terms of its continued ability to operate in a safe manner.

**security**

This data flow identifies any special security constraints on the data described by these attributes. This data flow may include an indication of whether the data is to be stored or sent encrypted.

**selected\_emergency\_strategy**

This data flow is used within the Manage Traffic function to specify the type of traffic control strategy to be applied to some or all of the road (surface streets) and highway traffic control units controlled by a TMC. The strategy will be based on the emergency vehicle route provided by the route selection facility in the Provide Driver and Traveler Services function. It will give preemption to the emergency vehicle(s) by ensuring that they are given the proceed indication (green signal) as they approach each individual intersection, pedestrian and ramp meter control unit along

the emergency vehicle route. Another feature of the strategy may be the direction of other vehicles to use particular lanes on a surface street or highway so that the emergency vehicle(s) have a lane for their sole use.

**selected\_emergency\_vehicle\_strategy**

This data flow is used within the Manage Traffic function and contains the strategy which has been selected to enable preemption to be given to emergency vehicles through the road (surface street) and highway network controlled by the TMC. It will cover intersection controllers, pedestrian controllers, dynamic message signs (DMS) that control lane use and ramp metering controllers. The strategies for each of these individual types of unit will be sent out as the strategies to their individual control processes. The strategy may be applied to some or all of the units on the roads and highways in the geographic area served by the TMC.

**selected\_highway\_control\_strategy**

This data flow is used within the Manage Traffic function and contains the strategy which has been selected for implementation at some or all of the indicators on the highways in the geographic and jurisdictional area(s) served by the function. The strategy may be one of several depending on that which is best suited to control of traffic on the highways.

**selected\_parking\_lot\_control\_strategy**

This data flow is used within the Manage Traffic function and contains the strategy which has been selected for implementation at parking lots to control their use. The strategy will be designed to promote or discourage the use of a parking lot by directing vehicles to or away from it through the use of dynamic message signs (DMS). The decision on which strategy to employ will depend upon such things as the overall traffic management strategy, the need to restrict vehicle use because of a number of factors e.g. congestion, pollution, and the desire to encourage travelers to make use of alternative modes of transport by using park and ride (P+R) facilities. The strategy may be applied to some or all of the parking lots in the geographic area served by the TMC.

**selected\_parking\_lot\_strategy\_type**

This data flow is used within the Manage Traffic function to specify the type of strategy to be applied to some or all of the parking lots controlled by a TMC. The strategy type will be designed to promote or discourage the use of a particular parking lot and thus may either 'open' or 'close' the lot, indicate the state of the lot, i.e. the number of spaces remaining, or give priority to vehicles that are part of car or van pools.

**selected\_ramp\_control\_strategy**

This data flow is used within the Manage Traffic function and contains the strategy which has been selected for implementation at highway entry ramps by the local ramp metering equipment. The strategy may be either 'open', 'closed' or 'admit vehicles when not congested' and may be applied to some or all of the ramps in the geographic area served by the TMC.

**selected\_ramp\_strategy\_type**

This data flow is used within the Manage Traffic function and contains the strategy which has been selected for implementation by ramp metering equipment. The strategy may typically be one which either permanently opens or closes the ramp, or enables traffic to join the highway under certain conditions. These would be things such as low congestion on the highway, or situations where additional traffic entering the highway will not increase the level of congestion such that free flow conditions break down. An override will be provided to enable the ramp to be opened if closing it will cause unacceptable congestion to the surrounding surface streets.

**selected\_road\_control\_strategy**

This data flow is used within the Manage Traffic function and contains the strategy which has been selected for implementation at some or all of the indicators on the roads in the geographic and jurisdictional area(s) served by the function. The strategy may be one of several depending on that which is best suited to control of traffic on the roads.

**selected\_roadway\_control\_strategy**

This data flow is used within the Manage Traffic function and contains the strategy which has been selected for implementation at traffic signal and lane use control devices on the roads in the geographic and jurisdictional area(s) served by the function. In this context, roadway means roads (surface streets) and highways.

**selected\_strategy**

This data flow is used within the Manage Traffic function to transfer the current traffic control strategies being implemented on highways and roads (surface streets) from the Provide Device Control facility to the Provide Traffic Surveillance facility for loading into the store of long term data.

**selected\_strategy\_data**

This data flow specifies supplementary data that goes with the strategy type data. Thus it may be anything from a simple fixed time traffic signal control plan number, to a set of adaptive control parameters.

**selected\_strategy\_type**

This data flow specifies the type of traffic control strategy to be applied to some or all of the road (surface street) and highway indicators controlled by a TMC.

**sensor\_allocation**

This data flow contains details of the way in which sensors are allocated to the various types of road and highway control and output devices, detection devices, and other units capable of collected data from traffic within the geographic area controlled by the function.

**sensor\_allocation\_for\_controllers**

This data flow contains details of the way in which vehicle and pedestrian sensors are allocated to the various types of road and highway control and output devices within the geographic area controlled by ITS.

**sensor\_allocation\_for\_hov\_lanes**

This data flow contains details of the way in which vehicle sensors are allocated for the detection of vehicles in high occupancy vehicle (hov) lanes.

**sensor\_allocation\_for\_probes**

This data flow contains details of the way in which vehicle smart probe data collection units are located and allocated to links in the road and freeway network served by the function.

**sensor\_allocation\_for\_tags**

This data flow contains details of the way in which vehicle provide data receiving equipment is located within the road and freeway network served by the function. If no equipment is allocated to a link then the entries for the identity and location of the equipment will be left blank.

**sensor\_attributes**

This data flow is used to provide meta data included with sensor data for release to the archive. Items of meta data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data, such as status of operational equipment. This meta data may also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type, and data concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488.

**sensor\_data\_archive\_input**

This data flow is used within the Manage Traffic function to collect sensor data from the roadside to send to the data archive function. The data consists of HOV, pedestrian, traffic, and local sensor data for roads and highways.

**sensor\_data\_attributes**

This data flow is used to provide meta data included with sensor data for release to the archive. Items of meta data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data, such as status of operational equipment. This meta data may also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type, and data concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488.

**sensor\_data\_for\_reversible\_lanes**

This data flow is used within the Manage Traffic function and contains data from which a wrong way vehicle is detected in a reversible lane through the use of sensors located.

**sensor\_description**

This data flow is used within the Manage Traffic function to identify individual sensors used to provide data for the control of traffic on roads (surface streets) and highways. The sensors can be of any type and may detect vehicles of all types, and/or cycles, and/or pedestrians

**sensor\_fault\_data**

This data flow is used to show that a sensor has developed a fault or that it is not operating correctly. The fault will have been found by a process that is local to the sensor itself.

**sensor\_identity**

This data flow contains an identifier of an individual sensor or a sensor managed by a sensor station. The identifier is either the actual equipment identifier or a code indicating the type of the sensor (e.g., wind, temperature, precipitation, traffic flow, etc).

**sensor\_list**

This data flow includes a list of the identity(ies) of the traffic and pedestrian sensors that are associated with a particular indicator, which may be an intersection, pedestrian or highway entry ramp controller. The sensors are used to provide details of traffic and pedestrian movements and are used in the management of conditions on the road and highway network controlled by the Manage Traffic function.

**sensor\_output\_data**

This data flow is used within the Manage Traffic function and contains information obtained from data analyzed by traffic sensors. It is sent to the process traffic data store for current and long term data.

**sensor\_status**

This data flow is used to collect sensor status data from the roadside.

**sensor\_type**

This data flow contains the type for a particular sensor. The type defines both what the sensor will detect and the type of unit that it is. The type is represented by character codes and may be but are not limited to appearing as ground based sensor for all types of vehicles, ground based sensor for emergency vehicles, ground based sensor for transit vehicles, above ground based sensor for all types of vehicles, above ground based sensor for emergency vehicles, above ground based sensor for transit vehicles, ground based sensor for cycles, above ground based sensor for cycles, ground based sensor for pedestrians, above ground based sensor for pedestrians.

**service\_req\_and\_confirm\_data**

This store is used within the Provide Driver and Traveler Services function. It contains details of all of the service requests and confirmations input by the traveler via a personal device or kiosk.

**service\_req\_and\_confirm\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function. It is used to provide data to the data archive about traveler service requests and confirmations input by the traveler via a personal device or kiosk.

**service\_req\_and\_confirm\_for\_archive\_attributes**

This data flow is used within the Provide Driver and Traveler Services function. It is used to provide data attribute information to the data archive about traveler service requests and confirmations input by the traveler via a personal device or kiosk.

**shoulder\_width**

This data flow is sent from the traffic operations personnel to the Manage Traffic function and contains the standard width of the right shoulder and left shoulder of a link.

**smart\_probe equip\_status\_for\_m\_and\_c**

This data flow contains an indication to the Manage Maintenance and Construction function that the output of the vehicle smart probe beacon is faulty. This may be due to faulty data received from a vehicle smart probe by the beacon, or the beacon itself may be malfunctioning. By monitoring this data flow, the receiving process can monitor the health and current status of field equipment and repair if deemed necessary.

**special\_vehicle\_speed\_limit**

This data flow contains information on speed limits for special vehicles. Speed limits may be posted on signs at the roadside. Special vehicles include commercial vehicles, government vehicles, etc.

**speed\_limit**

This data flow contains the actual speed limit is the legal speed for a specific section of roadway to be set according to traffic engineering standards and should not exceed design speed of the roadway.

**standard\_data\_attribute**

This data flow is used to identify the presence and use of meta-data attributes for data as defined in an industry standard such as IEEE P1489, Standard for Data Dictionaries for Intelligent Transportation Systems.

**standard\_message\_attribute**

This data flow is used to identify the presence and use of meta-data attributes for messages as defined in an industry standard such as IEEE P1488, Standard for Message Set Template for Intelligent Transportation Systems.

**static\_data\_attributes**

This data flow is used to provide meta data included with static traffic data for release to the archive. Items of meta data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data, such as status of operational equipment. This meta data may also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type, and data concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488.

**static\_data\_for\_archive**

This data flow contains a copy of that loaded into a store and is for use by the Manage Archived Data function.

**static\_data\_for\_traffic\_control**

This data store contains data used in the processing of data provided by traffic sensors and in the control of indicators (intersection signals, pedestrian crossing signals, etc) that manage traffic flow.

**station\_id**

This data flow contains the identifier of a specific piece of field equipment.

**storage\_facility\_id**

This data flow is used within the Manage Maintenance and Construction function and contains the unique facility identification number assigned to each maintenance and construction storage facility.

**stored\_credit**

This data flow is contains the value of the credit currently stored by the traveler card / payment instrument.

**stored\_incident\_data**

This data flow is used within the Manage Traffic function. It contains the current incidents and planned events at a single point in time.

**strategy\_data**

This data flow is used within the Manage Traffic function. It contains processed surveillance data which is used to determine the traffic control strategy for the road and highway network served by the function.

**strategy\_data\_for\_highways**

This data flow is used within the Manage Traffic function. It contains processed traffic data, plus data about the closure of multimodal crossings, which is used to determine the traffic control strategy for the highway network served by the function.

**strategy\_data\_for\_roads**

This data flow is used within the Manage Traffic function. It contains processed traffic and pedestrian surveillance data, plus data about the closure of multimodal crossings, which is used to determine the traffic control strategy for the road network served by the function.

**strategy\_date**

This data flow is the date of the year on which a traffic control strategy is to be implemented on the road and highway network (including parking lots) served by the Manage Traffic function. The strategy implemented on this date will be the background strategy, i.e. that which is used when no overrides due to incidents, emergency vehicle routes, traffic systems operator intervention, or demand management changes are in force.

**strategy\_day**

This data flow is the day of the week on which a traffic control strategy is to be implemented on the road and highway network (including parking lots) served by the Manage Traffic function. The strategy implemented on this day will be the background strategy, i.e. that which is used when no overrides due to incidents, emergency vehicle routes, traffic systems operator intervention, or demand management changes are in force.

**strategy\_end\_time**

This data flow is the end time for a traffic control strategy to be implemented on the road and highway network (including parking lots) served by the Manage Traffic function. The strategy that is removed at this time will be the background strategy, i.e. that which is used when no overrides due to incidents, emergency vehicle routes, traffic systems operator intervention, or demand management changes are in force.

**strategy\_start\_time**

This data flow is the start time for a traffic control strategy to be implemented on the road and highway network (including parking lots) served by the Manage Traffic function. The strategy implemented at this time will be the background strategy, i.e. that which is used when no overrides due to incidents, emergency vehicle routes, traffic systems operator intervention, or demand management changes are in force.

**surface\_trans\_weather\_advisories**

This data flow provides an indication of surface transportation related weather situations that cause significant impact upon the surface transportation network. Examples of these might be frost warnings or high profile vehicle advisories for strong winds. Advisories are issued for significant events that are occurring, are imminent, or have a very high probability of occurrence.

**surface\_trans\_weather\_archive\_catalog**

This data flow is used to provide the description of the data contained in the collection of surface transportation weather data from the Surface Transportation Weather Service terminator that has been made available for the Manage Archive Function. The catalog may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g., time range of entries, number of entries; or sample data products.

**surface\_trans\_weather\_archive\_catalog\_request**

This data flow from the Manage Archived Data function to the Surface Transportation Weather Service contains the request for a catalog of the data held by the terminator. The request for a catalog may include either or both the description of the types of data the archive is interested in or a time frame over which the requested information may be available.

**surface\_trans\_weather\_archive\_data\_request**

This data flow from the Manage Archived Data function to the surface Transportation Weather Service contains the request for the data held by the terminator. The request for data may include either or both the description of the data required or a timeframe over which the requested information may be available.

**surface\_trans\_weather\_data\_for\_archive**

This data flow is sent by the Surface Transportation Weather Service terminator and contains weather information that may be of interest to archive data users systems along with the meta data that is necessary to describe the imported data to the Manage Archived Data function.

**surface\_trans\_weather\_forecast\_details**

This data flow contains forecasts of specific surface transportation related weather variables including temperature (ambient, dew point and pavement), pressure, wind parameters (direction, speed, and character), humidity, precipitation, roadway visibility, light conditions, and pavement conditions. The data flow also contains weather variable attributes such as ensemble statistics, initialization time of forecast, source of boundary conditions, means of forecast, the application location of the forecast and the applicable time of the forecast.

**surface\_trans\_weather\_observations**

This data flow contains surface transportation related weather observations including temperature(ambient, dew point and pavement), pressure, wind parameters (direction, speed, and character), humidity, precipitation (amount and type), roadway visibility, light conditions, pavement conditions, etc.

**surface\_trans\_weather\_scale\_forecast\_data\_attributes**

This data flow contains meta data about the meteorological scale surface transportation weather forecast including persistence of an observation or previous forecast, numerical model used, model output statistics (MOS), and any description of how forecast types are combined.

**synoptic\_scale\_surface\_trans\_weather\_forecasts**

This data flow contains forecasts of surface transportation related weather and weather related events at time horizons from 12 hours to several days and spatial horizon of 100 to 5000 kilometers. The time horizon is defined as the time between the observations on which the forecast is based (alternatively, when the forecast process is started) and the time that the forecast applies to.

**time**

This data flow is used within many ITS functions. It contains the current time of day and will be associated with other data flows and (possibly) a date.

**toll\_archive\_catalog**

This data flow is used to provide the description of the data contained in the collection of toll data that has been stored and made available for the Manage Archived Data function. The catalog may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g., time range of entries number of entries; or sample data products.

**toll\_archive\_catalog\_request**

This data flow from the Manage Archived Data function contains the request for a catalog of the data held by the Provide Electronic Payment Services function. The request for a catalog may include either or both the description of the types of data the archive is interested in or a time frame over which the requested information may be available.

**toll\_archive\_data\_request**

This data flow from the Manage Archived Data function contains the request for the data held by the Provide Electronic Payment Services function. The request for data may include either or both the description of the data required or a timeframe over which the requested information may be available.

**toll\_cost**

This data flow is used within the Provide Electronic Payment Services function and defines the cost of the toll for a particular vehicle through a toll plaza, thus giving it the ability to use the toll segment governed by the toll plaza.

**toll\_data\_for\_archive**

This data flow is sent from the Provide Electronic Payment Services to the Manage Archived Data function. It is

used to provide detailed data on the operations of the electronic toll collection process.

#### **toll\_operational\_data**

This data flow contains data about the cost of toll segments and the number of users of those segments during the time period since the data was last sent.

#### **toll\_operational\_data\_attributes**

This data flow is used to provide meta data included with toll operational data for release to the archive. Items of meta data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data, such as status of operational equipment. This meta data may also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type, and data concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488.

#### **toll\_price**

This data flow is used within the Provide Electronic Payment Services function and contains the price for each road segment to which a toll can be applied.

#### **toll\_price\_application\_time**

This data flow is used within the Provide Electronic Payment Services function and contains the time at which a toll price applies for a particular toll segment. The time is held as the number of seconds since a fixed reference point, from which the actual time and date can be easily computed.

#### **toll\_prices\_for\_archive**

This data flow is used within the Provide Electronic Payment Services function. It contains the price for each road segment to which a toll applies, with the time and date for when it applies. This data is used to maintain a store or archive of pricing data to be forwarded when needed to the Manage Archived Data function. This data flow includes data on the price for the use of each toll segment by time of day, day of week, special days, and vehicle type.

#### **toll\_prices\_for\_archive\_attributes**

This data flow is used to provide meta data included with toll operational data for release to the archive. Items of meta data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data, such as status of operational equipment. This meta data may also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type, and data concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488.

#### **toll\_segment\_identity**

This data flow is used within the Provide Electronic Payment Services function and the Provide Driver and Traveler Services function. It contains the identity number of a toll segment, which may not be the same physical entity as a route segment or a link as used by traffic management processes.

#### **toll\_segment\_users**

This data flow contains a calculation of the number of users of a toll segment.

#### **traffic\_archive\_catalog**

This data flow is used to provide the description of the data contained in the collection of traffic data that has been stored and made available for the Manage Archived Data function. The catalog may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g. time range of entries, number of entries; or sample data products.

#### **traffic\_data\_for\_archive**

This data flow is sent from the Manage Traffic to the Manage Archived Data function. It is used to provide detailed data on the traffic flowing in the road network.

**traffic\_data\_for\_deployment**

This data flow is sent from the Manage Traffic function to the Manage Archived Data function. It is used to provide data on the traffic flowing in the road network, plus that which is predicted to flow in the network.

**traffic\_data\_kiosk\_request**

This data flow is sent by the Provide Driver and Traveler Services function to the Manage Traffic function and contains the request for the provision of traffic data for output at a kiosk.

**traffic\_data\_kiosk\_request\_for\_archive**

This data flow is sent from the Manage Traffic Function to the Provide Driver and Traveler Services function. It is used to provide data to the data archive about requests made for traffic data via a kiosk.

**traffic\_data\_personal\_request**

This data flow contains the request for the provision of traffic data for output at a traveler's personal device.

**traffic\_data\_personal\_request\_for\_archive**

This data flow is sent from the Manage Traffic Function to the Provide Driver and Traveler Services function. It is used to provide data to the data archive about requests made for traffic data via a traveler's personal device.

**traffic\_data\_request**

This data flow is used by several ITS functions to request the Manage Traffic function to provide current, long term and predictive traffic data. It will be accompanied by other data flows to provide the origin and hence the return destination for the retrieved traffic data.

**traffic\_deployment\_data\_attributes**

This data flow is used to provide meta data included with traffic deployment operational data for release to the archive. Items of meta data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data, such as status of operational equipment. This meta data may also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type, and data concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488.

**traffic\_flow\_state**

This data flow is used within the Manage Traffic function. It contains data showing the current traffic flow conditions on roads (surface streets), freeways and ramps served by the function. It also includes flows in high occupancy vehicle (hov) lanes from the same area. The data is a subset of that in the current and historical data stores and is used as a means of 'packaging' the data for distribution to users such as ISP's.

**traffic\_management\_archive\_catalog\_request**

This data flow from the Manage Archived Data function to the Manage Traffic function contains the request for a catalog of the data held by the Manage Traffic function. The request for a catalog may include either or both the description of the types of data the archive is interested in or a timeframe over which the requested information may be available.

**traffic\_management\_archive\_data\_request**

This data flow from the Manage Archived Data function contains the request for the data held by the Manage Traffic function. The request for data may include either or both the description of the data required or a timeframe over which the requested information may be available.

**traffic\_management\_storage\_data**

This data flow is used within the Manage Traffic function. It contains the indicator control and response states plus the selected traffic control strategy(ies) for the road (surface street) and highway network served by the function. The data is a subset of that in the current and historical data stores.

**traffic\_sensor\_data**

This data flow is used within the Manage Traffic function and contains the data obtained from processing the inputs from sensors around the road network.

**traffic\_sensor equip\_status\_for\_m\_and\_c**

This data flow provides a report to the Manage Maintenance and Construction function of the status of a traffic sensor. By monitoring this data flow, the receiving process can monitor the health and current status of field equipment. By monitoring this data flow, the receiving process can monitor the health and current status of field equipment and repair if deemed necessary.

**traffic\_sensor\_output**

This data flow is the output of a single sensor. The output is either raw or aggregated data calculated over a period of time from that sensor.

**traffic\_sensor\_status**

This data flow is used to report the status of a sensor. By monitoring this data flow, the receiving process can monitor the health and current status of field equipment.

**traffic\_video\_camera\_number**

This data flow is used within the Manage Traffic function. It contains the identity of a high resolution video camera used for traffic surveillance.

**traffic\_video\_image**

This data flow is used within the Manage Traffic function and contains a video image of sufficient fidelity to support operator monitoring applications. This image can be a by-product of a machine vision application or the end-product of a system dedicated to traffic surveillance.

**traffic\_video\_image\_data**

This data flow is used within the Manage Traffic function. It contains the video image which is used by a roadside device to measure traffic flow measures.

**transit\_archive\_catalog**

This data flow is used to provide the description of the data contained in the collection of transit data that has been stored and made available for the Manage Archive function. The catalog may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g., time range of entries, number of entries; or simple data product.

**transit\_archive\_catalog\_request**

This data flow from the Manage Archived Data function to the Manage Transit function contains the request for a catalog of the data held by the Manage Transit function. The request for a catalog may include either or both the description of the types of data the archive is interested in or a time frame over which the requested information may be available.

**transit\_archive\_data\_request**

This data flow from the Manage Archive Data function to the Manage Transit function contains the request for the data held by the Manage Transit function. The request for data may include the description of the data required or a time frame over which the requested information may be available.

**transit\_area\_surveillance\_information**

This data flow is sent from the Manage Emergency Services function to the Manage Transit function and represents information about conditions found in a transit network. This information includes video, audio, and other image data. The data may have been obtained from closed circuit television (cctv), or other systems that are monitoring activity in the transit operational network, i.e. not on-board a transit vehicle, but at a transit stop, or in such areas as a modal interchange facility, transit depot, etc. The data can be used for incident detection using automatic analysis techniques.

**transit\_confirmation\_flag**

This data flow is used within the Manage Transit function to indicate that a paratransit service is to be used or not.

**transit\_data\_for\_archive**

This data flow is sent from the Manage Transit function to the Manage Archived Data function. It is used to provide details of transit operational data for release to the data archive.

**transit\_deviation\_kiosk\_request**

This data flow is sent by the Provide Driver and Traveler Services function to the Manage Transit function and is a request for data on current transit service deviations for output to a kiosk.

**transit\_deviation\_kiosk\_request\_for\_archive**

This data flow is sent by the Manage Transit function to the Provide Driver and Traveler Services function. It is used to provide data to the data archive about requests made for current transit service deviations via a kiosk.

**transit\_deviations\_personal\_request**

This data flow is sent by the Provide Driver and Traveler Services function to the Manage Transit function and is a request for data on current transit service deviations for output to a traveler's personal device. When a portable device is being used by the traveler. The request can be modified so that only the data for a transit route specified by the traveler from the portable device is requested.

**transit\_deviations\_personal\_request\_for\_archive**

This data flow is sent by the Manage Transit function to the Provide Driver and Traveler Services function. It is used to provide data to the data archive about requests made for current transit service deviations via a traveler's personal device. Both portable, customized data and non-portable requests are included.

**transit\_driver\_availability**

This data flow is used within the Manage Transit function and contains information that represents the transit driver's current, future hourly, daily weekly and monthly calendar availability. The data will be stored for future access by the transit fleet manager.

**transit\_driver\_availability\_considerations**

This data flow is used within the Manage Transit function and contains information that is used in assessing the transit driver's availability for work. It will comprise details of such things as the driver's vacation status, health status, accumulated work hours, and any laws and policies that will affect the driver. The data is used in assessing the driver's eligibility for future work assignments.

**transit\_driver\_cost\_effectiveness**

This data flow is used within the Manage Transit function and contains the transit driver's cost effectiveness and is used primarily to reduce overtime pay and to assign higher paid drivers to the more demanding route assignments. The data will be stored for future access by the transit fleet manager.

**transit\_driver\_cost\_effectiveness\_considerations**

This data flow is used within the Manage Transit function and contains information that is used in assessing the transit driver's cost effectiveness. It will contain such things as the driver's accumulated work hours, and hourly wage. The data is used in assessing the driver's eligibility for future work assignments.

**transit\_driver\_details**

This data flow is used within the Manage Transit function and contains data about an individual transit driver. The data is used to assess the driver's eligibility for future work assignments and as a source of data about drivers for the transit fleet manager.

**transit\_driver\_eligibility**

This data flow is used within the Manage Transit function and contains the transit driver's eligibility to perform a route assignments. The data will be stored for future access by the transit fleet manager.

**transit\_driver\_eligibility\_considerations**

This data flow is used within the Manage Transit function and contains information that is used in assessing the transit driver's eligibility. It will contain such things as a list of driver certifications, experience, and education. The data is used in assessing the driver's eligibility for future work assignments.

**transit\_driver\_emergency\_request**

This data flow is used within the Manage Transit function and contains a request for action because a transit driver has identified an emergency situation on-board or close to a transit vehicle. Details of the transit vehicle identity and location are provided through accompanying data flows.

**transit\_driver\_identity**

This data flow is used within the Manage Transit function and contains the identity of an individual transit driver. It is used by processes in the Manage Transit function that allocate work assignments to drivers.

**transit\_driver\_info\_for\_archive**

This data flow is used within the Manage Transit function. It contains data from the store of transit driver information that has been previously requested by the transit fleet manager and may relate to one or more of the transit drivers.

**transit\_driver\_performance**

This data flow is used within the Manage Transit function and contains a transit driver's past and current route assignment performance. The data will be stored for future access by the transit fleet manager.

**transit\_driver\_performance\_considerations**

This data flow is used within the Manage Transit function and contains information that is used in assessing a transit driver's performance in carrying out previously assigned work. It will contain such things as details of any moving violations and accidents in which the driver has been involved, plus comments from supervisors on the driver's performance. The data will be used in deciding the allocation of future work to the driver.

**transit\_driver\_route\_assignment\_considerations**

This data flow is used within the Manage Transit function and contains information that is used in making driver route assignments. It will contain such things as details of any driver route preferences and the driver's seniority. The data will be used in deciding the allocation of future work to the driver.

**transit\_driver\_route\_details**

This data flow is used within the Manage Transit function and contains the assignment of the transit driver to a previous transit route and schedule. This data will be used to provide the driver with new work assignments.

**transit\_emergency\_data**

This data flow is sent from the Manage Transit function to the Manage Emergency Services function and contains details of an emergency on-board a transit vehicle.

**transit\_emergency\_data\_for\_archive**

This data flow is used within the Manage Transit function and contains details of an emergency on-board a transit vehicle to be stored for later use.

**transit\_emergency\_details**

This data flow is used within the Manage Transit function and contains details of emergency requests that have been input on-board a transit vehicle.

**transit\_emergency\_request**

This data flow is used to carry data about an emergency situation that applies to a traveler in the transit system.

**transit\_fare**

This data flow is used within the Manage Transit function and contains the actual cost for the transit user to travel over a route in the transit network, i.e. the cost of going from a particular origin on a transit route to a particular

destination on (possibly another) transit route.

**transit\_fare\_collection\_data**

This data item is used within the Manage Transit function. It contains data about the transit services that have been used and the fares that have been collected for their use.

**transit\_fare\_transactions**

This data flow is used by processes in the Manage Transit function and contains records of transit fare payment transactions.

**transit\_incident\_details**

This data flow is sent from the Manage Transit function to the Manage Emergency Services function and contains details of an incident in the transit operations network.

**transit\_incident\_extra\_data**

This data flow is used within the Manage Transit function and contains details from the transit system operator of any additional data relevant to a transit incident.

**transit\_incident\_info\_for\_archive**

This data flow is used within the Manage Transit function and contains information about an incident in the transit operations network to be stored for later use. It

**transit\_incident\_required\_action**

This data flow is used within the Manage Transit function and contains details of the action(s) required concerning the security problem previously identified to the transit system operator. The action(s) is(are) to be taken by the receiving process.

**transit\_media\_emergency\_interface\_parameters**

This data flow is used within the Manage Transit function and contains parameters used to define the content and form of data that is automatically output to the media following an emergency in the transit operations network. It covers incidents to both transit users and vehicles and is principally concerned with emergencies that have taken place on-board transit vehicles. The data in the flow is set up by the transit system operator and enables some control to be exercised of the information being output, e.g. the suppression of some details where such things as acts of terrorism may be involved.

**transit\_media\_incident\_interface\_parameters**

This data flow is used within the Manage Transit function and contains parameters used to define the content and form of data that is automatically output to the media following an incident in any part of the transit facilities. It covers incidents to transit users, and may have taken place at a transit stop or in some other transit operating facility. The data in the flow is set up by the transit system operator and enables some control to be exercised of the information being output, e.g. the suppression of some details where such things as acts of terrorism may be involved.

**transit\_operational\_data**

This data store is used within the Manage Transit function and contains operational data which can be used to generate transit routes and schedules

**transit\_operational\_data\_attributes**

This data flow is sent from the Manage Transit function to the Manage Archived Data function. It is used to provide the meta data included with transit operational data for release to the data archive. Items of meta data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data, such as status of operational equipment. This meta data may also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type, and data concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488.

**transit\_operational\_data\_for\_archive**

This data flow is used by processes within the Manage Transit function and contains data about operations of the fleet operated by the function. This data is stored for later use.

**transit\_operator\_security\_action**

This data flow is used within the Manage Transit function and contains details of security action(s) that the transit system operator has requested having been presented with details of an incident within the transit operations network.

**transit\_passenger\_numbers**

This data flow contains the number of passengers (transit users) carried by a transit vehicle on each of its transit route segments. This data is measured by counting the numbers of passengers that pass the transit fare collection point on a transit vehicle, and is determined independently of any passenger counting process. The size has been set to enable the number of passengers on a transit vehicle to reach its maximum, which may be possible with multi-carriage units of the type employed on some metro and mass-transit systems.

**transit\_passenger\_operational\_data**

This data flow contains information about the number of passengers (transit users) who have used transit stops and vehicles being operated by the Manage Transit function. There are therefore two sets of data, one showing the numbers of passengers using each transit stop and the other showing the number of passengers on-board transit vehicles on each route segment.

**transit\_roadside\_fare\_collection\_data**

This data store contains details of the transit fare transactions that have been processed at a roadside location, i.e. a transit stop, as a result of transit users passing through the location to board transit vehicles.

**transit\_roadside\_operational\_data**

This data flow is used within the Manage Transit function and contains operational data collected from the roadside, i.e. from transit stops

**transit\_roadside\_passenger\_data**

This data flow is used within the Manage Transit function. It contains the number of transit users (passengers) who, in a certain time period, have passed through a transit stop plus data about the ride which they purchased. The data is derived from roadside fare collection data and is for use in the determination of future transit services.

**transit\_route**

This data flow is used within the Provide Driver and Traveler Services function and contains data for a special form of 'route' which only uses transit services.

**transit\_route\_assign\_for\_archive**

This data flow is used within the Manage Transit function to store data that is used in the assignment of new routes to transit drivers. The data is provided by other processes within the function.

**transit\_route\_number**

This data flow is used within the Manage Transit function and contains the number of a regular transit route. This is stored so that the route number may be the same as that seen by transit users, e.g. 141A, or N177, etc.

**transit\_route\_operational\_data**

This data flow is used within the Manage Transit function and contains operational data about the number of passengers using each transit route. This data is the average value over short time periods, e.g. five (5) minutes, for a whole day and shows the number of passengers present on transit vehicles for each transit route segment.

**transit\_route\_schedule\_number**

This data flow contains the number of the transit service that is operating on a particular route.

**transit\_route\_segment\_cost**

This data flow is used within the Manage Transit function and contains the cost of the use of a particular transit

route segment. It can only be used in association with the segment number, the category of the transit user and the time at which the route is used.

**transit\_route\_segment\_identity**

This data flow is used within the Manage Transit function. It contains the identity of a transit route segment. The identity is in two parts, the route number on which the segment lies, and the number of the segment along the route. A transit route segment is defined as the link between two successive transit stops, either of which may also be points of interchange with other routes. It is possible for the segments on two or more routes to apply to the same physical link between two stops.

**transit\_route\_segment\_list**

This data flow is used within the Manage Transit function. It contains a list of the transit route segments that make up a particular transit route, plus the cost to a transit user for using each segment and the identity of the road or freeway link(s) over which the route segment runs.

**transit\_route\_segment\_number**

This data flow contains the number of a transit route segment within the transit route on which it lies.

**transit\_route\_stop\_data**

This data flow is used within the Manage Transit function and contains data for each of the transit stops that make up a particular transit route.

**transit\_route\_stop\_list**

This data flow is used within the Manage Transit function and is a list of the transit stops that make up a particular transit route and the time at which services on the route will arrive at each stop.

**transit\_route\_stop\_number**

This data flow contains the identity number of a transit stop on a transit route. The identity of the route number that goes with the stop is carried in an accompanying data flow.

**transit\_route\_use\_time**

This data flow is used within the Manage Transit function and contains the time at which the associated transit fare will apply, e.g. weekday morning peak, Sunday, public holiday, etc.

**transit\_routes\_data**

This data flow is used within the Manage Transit function. It contains details of the routes being provided by the transit operation. The list of route segments contains the identity of each link in the road and freeway network associated with the segment to enable them to be output on top of a display of digitized map data.

**transit\_schedule\_data**

This data flow is used within the Manage Transit function and contains the schedule of services on each transit vehicle route and the cost to the transit user of the use of each route segment.

**transit\_schedule\_identity**

This data flow contains the identity of a particular set of transit schedules. This data flow may include a short description of when (day and/or period) the schedule is expected to apply.

**transit\_schedules**

This data flow is used within the Manage Transit function. It contains the schedule of the timings of services on each regular transit route.

**transit\_services**

This data flow is sent by the Manage Transit function to other ITS functions. It contains a complete set of all the transit routes and the services that run upon them, including timings, etc. that are currently being provided by the transit fleet. This data is a processed version of the raw data to enable it to be easily understood by the recipients such as drivers and travelers.

**transit\_services\_for\_deployment**

This data flow contains details of the current transit services for use in the analysis of ITS operating performance.

**transit\_services\_for\_transit\_drivers**

This data flow is used within the Manage Transit function. It is sent to the Generate Transit Driver Schedules facility and contains a complete set of all the transit routes and the services that run upon them, including timings, etc. that are provided by the transit fleet from which the data was requested.

**transit\_stop\_locations**

The data flow is used within the Manage Transit function and provides the location of stops on transit routes.

**transit\_stop\_scheduled\_time**

This data flow is used within the Manage Transit function and contains the time at which a transit vehicle is scheduled to reach each stop on a transit route. This will thus be the scheduled time of arrival at the end of a transit route segment. The identity of the transit route segment to which this data applies is carried in an accompanying data flow.

**transit\_technician\_detail**

This data flow is used within the Manage Transit function and contains data about transit technicians.

**transit\_technician\_identity**

This data flow is used within the Manage Transit function and contains the identity of an individual transit technician. It is used to identify other data about the technician, which will be found in associated data flows.

**transit\_technician\_info**

This data flow is used within the Manage Transit function and contains data about all the transit technicians available to carry out maintenance work on the vehicles in a transit fleet.

**transit\_technician\_seniority**

This data flow contains the seniority of an individual transit technician.

**transit\_technician\_work\_assignment**

This data flow is used within the Manage Transit function and contains information on the work assignment that has been given to the transit technician to carry out. It will involve some transit vehicle maintenance work.

**transit\_technician\_work\_hours**

This data flow contains the number of hours per week, per month and per year that an individual transit technician is able to work. The identity of the technician is contained in a separate data flow.

**transit\_technician\_work\_log**

This data flow is used within the Manage Transit function and contains the log of maintenance work carried out by an individual transit technician.

**transit\_technician\_work\_preferences**

This data flow contains the work preferences of an individual transit technician. They are defined as a series of character codes, which include but are not limited to day time working only, night time working only, weekday working only, i.e. no weekend working, limited day time hours, no working constraints, i.e. can work any hours on any days, limited night time hours, can work outside of the maintenance facility, e.g. on the road.

**transit\_technician\_work\_skills**

This data flow contains the skills that are possessed by an individual transit technician. These skills are defined as character codes and may describe but not be limited to general maintenance technician (no specialties), vehicle engine specialist, vehicle transmission specialist, vehicle running gear specialist, vehicle body work specialist, has a transit vehicle driving license.

**transit\_user\_category**

This data flow is used within the Manage Transit function and contains the category of transit user to which the associated transit fare applies, e.g. adult, child, senior citizen, disabled, etc.

**transit\_user\_emergency\_request**

This data flow is used within the Manage Transit function and contains a request for action because a transit user has identified an emergency situation on-board or close to a transit vehicle. Details of the transit vehicle identity and location are provided through accompanying data flows.

**transit\_user\_journey\_end**

This data flow is used within the Manage Transit function. It contains the identity of the route segment at the end of a transit user's journey. The identity will be that at which the transit user will leave the transit vehicle at the end of the ride.

**transit\_user\_journey\_start**

This data flow is used within the Manage Transit function. It contains the identity of the route segment at the start of a transit user's journey. The identity will either be that of the transit stop at which the transit user purchases a ride, or the segment at which the transit vehicle was located when the transit user purchased a ride from on-board the vehicle.

**transit\_user\_payments\_transactions**

This data flow is sent from the Provide Electronic Payment Services function to the Manage Transit function and contains records of all payment transactions for the provision of other (yellow pages) services to transit users.

**transit\_user\_roadside\_image**

This data flow is sent from the Manage Transit function to the Provide Electronic Payment Services function. It contains an JPEG compressed image of the transit user who has violated the transit fare collection process at the roadside, i.e. at a transit stop. The data will be used in subsequent transit fare violation processing.

**transit\_user\_roadside\_tag\_identity**

This data is used within the Manage Transit function. It provides the identity of a transit user, at the roadside, i.e. at a transit stop, for fare payment.

**transit\_user\_vehicle\_image**

This data flow is sent from the Manage Transit function to the Provide Electronic Payment Services function. It contains a compressed image of the transit user who has violated the transit fare collection process on-board a transit vehicle. The data will be used in subsequent transit fare violation processing.

**transit\_user\_vehicle\_tag\_identity**

This data is used within the Manage Transit function and provides the identity of a transit user on a transit vehicle for fare payment.

**transit\_vehicle\_achieved\_time**

This data flow is used within the Manage Transit function and contains the time at which a transit vehicle actually reached the end of a transit route segment. This point is usually a transit stop and the data is thus the arrival time of a transit vehicle at each of the transit stop(s) along the transit route. The identity of the transit route segment to which this data applies is carried in an accompanying data flow.

**transit\_vehicle\_availability**

This data flow is used within the Manage Transit function and contains details of a transit vehicle's availability for work.

**transit\_vehicle\_collected\_maintenance\_data**

This data flow is used by processes within the Manage Transit function and contains data collected from the transit vehicle. The data is produced by sensors analyzing conditions on-board the vehicle during the course of its operation.

**transit\_vehicle\_collected\_trip\_data**

This data flow is used by processes within the Manage Transit function and contains data collected from the transit vehicle. The data is produced by sensors analyzing conditions on-board the vehicle during the course of its operation.

**transit\_vehicle\_data**

This data flow is used by processes within the Manage Transit function and contains data about transit vehicles in the fleet operated by the function. This data is used in the planning of routes and schedules for regular transit services. It will have been obtained from processing the input to sensors on-board each transit vehicle during the course of their operation.

**transit\_vehicle\_data\_for\_archive**

This data flow within the Manage Transit function contains data about transit vehicles in the fleet operated by the function. This data is to be stored for later use.

**transit\_vehicle\_deviation\_request**

This data flow is sent by the Provide Driver and Traveler Services function to the Manage Transit function. It contains a request for the provision of data on the current transit service deviations for output to a traveler at a kiosk.

**transit\_vehicle\_deviation\_update**

This data flow is used within the Manage Transit function. It contains the estimated time of arrival of several transit vehicles at stop(s) along their route(s) plus the route and service number on which they are operating. It is used for multiple transit vehicle deviations where one or more routes are affected.

**transit\_vehicle\_eta**

This data flow is used within the Manage Transit function. It contains the estimated time of arrival of a transit vehicle at the end of a transit route segment, which is usually a stop, plus the route and service number on which it is operating. It is used for individual transit vehicle deviations.

**transit\_vehicle\_fare\_collection\_data**

This data store contains details of the transit fare transactions that have been processed on the vehicle as a result of transit users coming on-board and requesting rides that they have not paid for at the roadside, i.e. a transit stop.

**transit\_vehicle\_identity**

This data flow is used within the Manage Transit function and contains the identity of an individual transit vehicle. This data is used by processes within the function to identify the source and/or ownership of other data.

**transit\_vehicle\_information**

This data flow is used by processes within the Manage Transit function and contains data about an individual transit vehicle.

**transit\_vehicle\_location**

This data flow is used within the Manage Transit function to provide the exact location of the transit vehicle. It contains the transit vehicle location plus the its identity.

**transit\_vehicle\_location\_data**

This data flow is used within the Manage Transit function to provide the exact location of the transit vehicle. It is based on the standard vehicle location data supplemented with additional data that is only relevant to transit vehicles.

**transit\_vehicle\_maintenance**

This data flow contains data on the need for maintenance of an individual transit vehicle based on its current condition. This maintenance work will be in addition to the maintenance that is scheduled to take place because the vehicle has covered a proscribed number of miles, or has achieved a certain age.

**transit\_vehicle\_maintenance\_date**

This data flow is used within the Manage Transit function. It contains the date on which unscheduled maintenance activity on a particular transit vehicle must take place and is used as one of the identifiers of data within the vehicle's maintenance log. The vehicle's identity is stored in a separate data flow.

**transit\_vehicle\_maintenance\_details**

This data flow is used within the Manage Transit function and contains information about the maintenance required by an individual transit vehicle of a particular type.

**transit\_vehicle\_maintenance\_info**

This data flow is used within the Manage Transit function. It contains maintenance and other information about transit vehicles for use by processes within the schedule transit vehicle maintenance facility.

**transit\_vehicle\_maintenance\_log**

This data flow contains a log of the maintenance carried out on an individual transit vehicle, the identity of which is stored in a separate data flow.

**transit\_vehicle\_maintenance\_log\_activity**

This data flow contains a brief description of the maintenance activity that has taken place on a particular transit vehicle took place. The vehicle's identity, plus the date, time and mileage at which the activity took place are stored in separate data flows. The data flow to accommodate a simple brief description of the activity.

**transit\_vehicle\_maintenance\_log\_date**

This data flow is used within the Manage Transit function. It contains the date at which maintenance activity on a particular transit vehicle took place and is used as one of the identifiers of data within the vehicle's maintenance log. The vehicle's identity is stored in a separate data flow.

**transit\_vehicle\_maintenance\_log\_mileage**

This data flow contains the vehicle mileage at which maintenance activity on a particular transit vehicle took place and is used as one of the identifiers of data within the vehicle's maintenance log. The vehicle's identity is stored in a separate data flow.

**transit\_vehicle\_maintenance\_log\_time**

This data flow is used within the Manage Transit function. It contains the time at which maintenance activity on a particular transit vehicle took place and is used as one of the identifiers of data within the vehicle's maintenance log. The vehicle's identity is stored in a separate data flow.

**transit\_vehicle\_maintenance\_mileage**

This data flow contains the mileage at which unscheduled maintenance activity on a particular transit vehicle must take place and is used as one of the identifiers of data within the vehicle's maintenance log. The vehicle's identity is stored in a separate data flow.

**transit\_vehicle\_maintenance\_required**

This data flow contains a brief description of the unscheduled maintenance activity that must take place on a particular transit vehicle. The vehicle's identity, plus the date and mileage at which the activity must take place are stored in separate data flows.

**transit\_vehicle\_maintenance\_schedule**

This data flow contains the schedule for the maintenance of an individual transit vehicle. The identity of the vehicle is stored in a separate data flow.

**transit\_vehicle\_maintenance\_schedule\_activity**

This data flow contains a brief description of the maintenance activity that is to be carried out on a transit vehicle, either when it achieves a particular mileage, or on a particular date. Both mileage and date will be measured from the date of the vehicle's manufacture and are stored in separate data flows within the store of the maintenance schedules.

**transit\_vehicle\_maintenance\_schedule\_date**

This data flow is used within the Manage Transit function. It contains the date on which maintenance activity must take place on a transit vehicle. This date will be related to the date of manufacture of the vehicle and will ensure that if the vehicle covers no more than the expected number of miles it will be serviced on particular dates. Vehicles exceeding the expected mileage will be serviced on a miles covered basis, which is stored in a separate data flow within the store of the maintenance schedules.

**transit\_vehicle\_maintenance\_schedule\_mileage**

This data flow contains the mileage at which maintenance activity must take place on a transit vehicle. This will be the number of miles that the vehicle has covered since manufacture and will ensure that if it is regularly maintained if its mileage exceeds that which is expected. Those vehicles covering no more than the expected mileage will be serviced on particular dates, which are defined in a separate data flow within the store of maintenance schedules.

**transit\_vehicle\_maintenance\_specs**

This data flow is used within the Manage Transit function and contains the maintenance specifications for individual transit vehicles by type and identity.

**transit\_vehicle\_maintenance\_work**

This data flow contains information on the maintenance work to be carried out on a transit vehicle. These will include but not be limited to change engine oil, change engine cooling water, add anti-freeze to engine cooling water, check driver's windshield washer system and top up if necessary, check engine fluid levels and top up if necessary, check vehicle battery levels and top up if necessary, check vehicle brakes and replace pads and/or top up fluid levels if necessary, carry out maintenance based on vehicle mileage, clean external of vehicle, clean interior of vehicle, check transmission state and top up fluid levels if necessary, and check vehicle running equipment (springs, dampers, muffler, etc.)

**transit\_vehicle\_mileage\_accumulated**

This data flow contains the total mileage accumulated by a transit vehicle.

**transit\_vehicle\_operating\_condition**

This data flow is used by processes within the Manage Transit function and contains the status of transit vehicle's drive-line, e.g. high temperature, low oil pressure, etc., plus other operating conditions such as brake wear, internal lighting failures, incorrect operation of the environmental control unit, etc.

**transit\_vehicle\_operational\_data**

This data flow is used within the Manage Transit function and contains operational data collected from transit vehicles while in service.

**transit\_vehicle\_operations\_details**

This data flow is used within the Manage Transit function. It contains information about the maintenance of a transit vehicle.

**transit\_vehicle\_passenger\_data**

This data flow is used within the Manage Transit function and contains the number of passengers carried by a transit vehicle while in service. It is derived from on-board vehicle fare collection data and may be used for calculating future transit schedules.

**transit\_vehicle\_passenger\_loading**

This data flow is used by processes within the Manage Transit function and contains the number of passengers (transit users) carried by a transit vehicle on each part of its route, i.e. each transit route segment.

**transit\_vehicle\_passenger\_operational\_data**

This data flow is used within the Manage Transit function and contains the number of passengers carried by a transit vehicle while in service. It is derived from the numbers of passengers on the vehicle for each transit route segment as counted by on-board vehicle sensors.

**transit\_vehicle\_passengers**

This data flow contains a count of the number of passengers (transit users) that were on-board a transit vehicle on a particular transit route segment. This data is measured by counting the numbers of transit users that enter and leave the vehicle at each transit stop, and is determined independently of any transit fare collection process.

**transit\_vehicle\_running\_times**

This data flow is used within the Manage Transit function. It contains the time at which it is expected that a transit vehicle will reach the end of each transit route segment on its route and is used to determine any schedule deviations. The end of a transit route segment is usually a transit stop and the data is thus the expected arrival time of a transit vehicle at each of the transit stop(s) along the transit route

**transit\_vehicle\_schedule\_deviations**

This data flow is sent from the Manage Transit function to processes in the Provide Driver and Traveler Services function. It contains the deviations of transit vehicles from their published routes and schedules at transit route segments that have already been completed, i.e. at transit stops that have been passed by the vehicle. The data is used to provide information about the current state of the transit service operation to a traveler.

**transit\_vehicle\_time**

This data flow is used within the Manage Transit function. It contains the estimated time of arrival of a transit vehicle at the end of the next transit route segment not so far reached during its journey along the transit route. The end of a transit route segment is usually a transit stop and the data is thus the estimated arrival time of a transit vehicle at each of the remaining transit stop(s) along the transit route. The identity of the transit route segment to which this data applies is carried in an accompanying data flow.

**transit\_vehicle\_type**

This data flow identifies transit vehicles by their type and is used by processes within the Manage Transit function.

**transit\_video\_camera\_command**

This data flow is used within the Manage Transit function and contains control parameters for closed circuit television (cctv) systems located in the secure area environment. These parameters may cover things such as camera pan, tilt, and zoom, plus other picture controls.

**traveler\_archive\_catalog**

This data flow is used in to provide the description of the data contained in the collection of traveler information data that has been stored and made available for the Manage Archive Function. The catalog may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g. time range of entries, number of entries; or sample data products.

**traveler\_archive\_catalog\_request**

This data flow from the Manage Archived Data function to the Provide Driver and Traveler Services function contains the request for a catalog of the data held by the Provide Driver and Traveler Services function. The request for a catalog may include either or both the description of the types of data the archive is interested in or a time frame over which the requested information may be available.

**traveler\_archive\_data\_request**

This data flow from the Manage Archived Data function to the Provide Driver and Traveler Services function contains the request for the data held by the Provide Driver and Traveler Services function. The request for data may include either or both the description of the data required or a time frame over which the requested information may be available.

**traveler\_confirm\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function. It is used to provide data to the data archive about the confirmation of trip details provided as the result of a traveler's previous trip request input from a personal device or kiosk.

**traveler\_current\_condition\_request**

This data flow is used within the Provide Driver and Traveler Services function and contains a request for details of the current conditions, e.g. weather, events, incidents, etc. The request includes the identity of the kiosk from which the request was input by the traveler so that the response can be correctly returned.

**traveler\_current\_condition\_request\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function. It is used to provide data to the data archive about requests made for details of the current conditions, e.g., weather, events, incidents, etc. via a kiosk.

**traveler\_data\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function. It contains details of all of the service requests and confirmations input by the traveler via a personal device or kiosk, route guidance data, vehicle guidance probe data, parking lot data, trip requests and traveler rideshare requests and data, other-routes data, road network use data, and traveler payment transaction data.

**traveler\_event\_information\_request**

This data flow is used within the Provide Driver and Traveler Services function to transfer requests for event information from the traveler kiosk interface facility to the event information collection facility.

**traveler\_event\_information\_request\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function to provide data to the archive about the types of event information requested by a traveler at a kiosk.

**traveler\_identity**

This data flow contains the identity of the traveler who is making a request for information or guidance, so that the results of the request can be sent back to the originating traveler. It may be passed to processes in functions outside the Provide Driver and Traveler Services function for the same purpose. The identity can be alphanumeric characters so that (for example) the traveler's family name and initials can be used.

**traveler\_info\_payments\_transactions**

This data flow is sent by the Provide Electronic Payment Services function to the Provide Driver and Traveler Services function. It is used to provide data about records of all payment transactions for the provision of other (yellow pages) services, driver and traveler map update services, traveler trip services, and rideshare services, and registration of suppliers of these services.

**traveler\_info\_payments\_transactions\_attributes**

This data flow is used within the Provide Driver and Traveler Services function to provide data attribute information to the data archive about records of all payment transactions for the provision of other (yellow pages) services, driver and traveler map update services, traveler trip services, and rideshare services, and registration of suppliers of these services.

**traveler\_location**

This data flow is used within the Provide Driver and Traveler Services function and contains the traveler's location as computed from sensor data.

**traveler\_location\_for\_emergencies**

This data flow is used within the Provide Driver and Traveler Services function and contains the traveler's location as computed from sensor data. This is a high precision data flow that enables the location of the traveler to be pinpointed to a high degree of accuracy and is used to provide the destination for the emergency services to the emergency call-out message.

**traveler\_map\_update\_payments\_transactions**

This data flow is used within the Provide Payment Electronic Services function and contains records of all payment transactions for driver map updates.

**traveler\_personal\_current\_condition\_request**

This data flow is used within the Provide Driver and Traveler Services function and contains a request for details of the current conditions, e.g. weather, events, incidents, etc. The request includes the identity of the personal device from which the request was input by the traveler so that the response can be correctly returned.

**traveler\_personal\_current\_condition\_request\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function. It is used to provide data to the data archive about requests made for details of the current conditions, e.g., weather, events, incidents, etc. via a personal device.

**traveler\_personal\_event\_information\_request**

This data flow is used within the Provide Driver and Traveler Services function to transfer requests for event information from the traveler interface facility in a personal device to the yellow pages data collection facility.

**traveler\_personal\_event\_information\_request\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function to provide data to the archive about the types of event information requested by a traveler using a handheld device.

**traveler\_personal\_transaction\_request**

This data flow is used within the Provide Driver and Traveler Services function and contains data input by the traveler at a personal device to make reservations for various other (yellow pages) services.

**traveler\_personal\_transaction\_request\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function to provide data to the data archive about requests for reservations for various other(yellow pages) services via a personal device.

**traveler\_personal\_trip\_confirmation**

This data flow is used within the Provide Driver and Traveler Services function to confirm the trip details provided as the result of a traveler's previous trip request input from a personal device.

**traveler\_personal\_trip\_confirmation\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function. It is used to provide data to the data archive about the confirmation of trip details provided as the result of a traveler's previous trip request input from a personal device.

**traveler\_personal\_trip\_request**

This data flow is used within the Provide Driver and Traveler Services function and contains data about a traveler's trip request which has been input from a personal device.

**traveler\_personal\_trip\_request\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function. It is used to provide data to the data archive about requests made for trips via a personal device.

**traveler\_personal\_yellow\_pages\_information\_request**

This data flow is used within the Provide Driver and Traveler Services function and contains a request for data on other (yellow pages) services to be provided to a traveler using a personal device. The traveler identity is used as the means of ensuring that the data produced in response to the request is returned to the correct traveler. As no filtering components are included, all the data currently available will be provided.

**traveler\_personal\_yellow\_pages\_information\_request\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function to provide data to the data archive about requests for data on other(yellow pages) services to be provided to a traveler via a personal device.

**traveler\_rideshare\_confirmation**

This data flow is used within the Provide Driver and Traveler Services function and contains a traveler's request to confirm a rideshare based trip.

**traveler\_rideshare\_constraints**

This data flow is used within the Provide Driver and Traveler Services function to provide details of the constraints for a rideshare being requested as part of a traveler's proposed trip.

**traveler\_rideshare\_data**

This data flow is used within the Provide Driver and Traveler Services function to provide details about a rideshare requested as part of a traveler's proposed trip.

**traveler\_rideshare\_payments\_transactions**

This data flow is used within the Provide Payment Electronic Services function and contains records of all payment transactions for traveler ridesharing provision.

**traveler\_rideshare\_preferences**

This data flow is used within the Provide Driver and Traveler Services function to provide details of the preferences for a rideshare being requested as part of a traveler's proposed trip.

**traveler\_rideshare\_request**

This data flow is used within the Provide Driver and Traveler Services function to request a rideshare as part of a traveler's proposed trip request.

**traveler\_rideshare\_request\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function. It is used to provide data to the data archive about the requests for rideshare as part of a traveler's proposed trip request.

**traveler\_route\_accepted**

This data flow is used within the Provide Driver and Traveler Services function and contains the acceptance by the traveler of the previously provided route for on-line infrastructure based guidance. Acceptance must be provided before guidance can begin.

**traveler\_route\_accepted\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function. It is used to provide data to the data archive about acceptance by the traveler of the previously provided route for on-line infrastructure based guidance.

**traveler\_route\_request**

This data flow is used within the Provide Driver and Traveler Services function and contains data from which the route requested by a traveler can be determined, or that the previously provided data has been accepted.

**traveler\_route\_request\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function. It is used to provide data to the data archive about data from which the route requested by a traveler can be determined, or that the previously provided data has been accepted.

**traveler\_transaction\_request**

This data flow is used within the Provide Driver and Traveler Services function and contains data input by the traveler at a kiosk to make reservations for various other (yellow pages) services.

**traveler\_transaction\_request\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function to provide data to the data archive about requests for reservations for various other (yellow pages) services via a kiosk.

**traveler\_trip\_and\_cond\_requests\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function. It is used to provide data to the data archive about requests made for trips or details of the current conditions, e.g., weather, events, incidents, etc. via a personal device or kiosk.

**traveler\_trip\_confirmation**

This data flow is used within the Provide Driver and Traveler Services function to confirm the trip details provided as the result of a traveler's previous trip request input from a kiosk.

**traveler\_trip\_confirmation\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function. It is used to provide data to the data archive about the confirmation of trip details provided as the result of a traveler's previous trip request input from a kiosk.

**traveler\_trip\_payments\_transactions**

This data flow is used within the Provide Payment Electronic Services function and contains records of all payment transactions for the provision of other (yellow pages) services and advance toll, parking lot charges, or transit fares as part of travelers' confirmed trips.

**traveler\_trip\_request**

This data flow is used within the Provide Driver and Traveler Services function and contains data about a traveler's trip request which has been input from a kiosk.

**traveler\_trip\_request\_for\_archive**

This data flow is used within the Provider Driver and Traveler Services function. It is used to provide data to the data archive about requests made for trips via a kiosk.

**traveler\_yellow\_pages\_information\_request**

This data flow is used within the Provide Driver and Traveler Services function and contains a request for data on other (yellow pages and non-motorized transportation) services to be provided to a traveler at the identified kiosk. As no filtering components are included, all the data currently available will be provided.

**traveler\_yellow\_pages\_information\_request\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function to provide data to the data archive about requests for data on other (yellow pages) services to be provided to a traveler via the identified kiosk.

**traveler\_yellow\_pages\_requests\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function to provide data to the data archive about requests for reservations or data to be returned to the traveler for various other (yellow pages) services via a personal device or kiosk.

**trip\_request**

This data flow is used within the Provide Driver and Traveler Services function as a means of specifying the parameters needed for a trip or route to be provided to a driver or traveler

**trip\_request\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function. It is used to provide data to the data archive about the parameters needed for a trip or route to be provided to a driver or traveler.

**trip\_request\_for\_archive\_attributes**

This data flow is used within the Provide Driver and Traveler Services function. It is used to provide data attribute information to the data archive about the parameters needed for a trip or route to be provided to a driver or traveler.

**unit\_number**

This data flow is used within the Manage Traffic function to provide an identification number of a particular piece of equipment, e.g. intersection signal controller, pedestrian signal controller, dynamic message sign (DMS), ramp meter, parking lot, road/highway link, toll segment, traffic sensor, etc.

**usage\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function to provide data to the data archive

about current usage travelers are making of roads and other (non-transit) methods of transport.

**usage\_for\_archive\_attributes**

This data flow is used within the Provide Driver and Traveler Services function to provide data attribute information to the data archive about current usage travelers are making of roads and other (non-transit) methods of transport.

**user\_defined\_data**

This data flow is sent by the Other Data Sources and contains information that may be of interest to archive data users systems such as economic data, demographic data, project data, or other data that users of the archive have requested be imported into the archive.

**user\_defined\_data\_attributes**

This data flow is used to provide meta data included with the user defined data that has been imported into the archive. Items of meta data may include attributes that describe the source and quality of the data. This meta data may also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type, and data concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488.

**user\_defined\_data\_for\_archive**

This data flow is sent by the Other Data Sources and contains information that may be of interest to archive data users systems along with the meta data that is necessary to describe the imported data to the Manage Archived Data function.

**user\_defined\_data\_request**

This data flow from the Manage Archived Data function to the Other Data Sources terminator contains the request for the data held by the terminator. The request for data may include either or both the description of the data required or a time frame over which the requested information may be available.

**vehicle\_attitude\_data**

This data flow is used within the Provide Vehicle Monitoring and Control function and contains data about a vehicle's attitude, e.g. upright, rolled to the left, right, nose down, etc.

**vehicle\_class**

This data flow is used within the Manage Traffic function and contains an identifier for the class of vehicle for which special speed limits apply.

**vehicle\_count**

This data item contains a count of the number of vehicles which have been detected by a detector located on the highway or at a parking lot entrance or exit, as the vehicles flow over its sensor. The units are vehicles-per-hour (veh/hr).

**vehicle\_detection\_data**

This data flow is used within the Manage Traffic function and contains vehicle detection data, i.e. data that provides information about vehicles moving on the road and highway network served by the function.

**vehicle\_guidance\_probe\_data\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function. It is used to provide data to the data archive about the time at which a vehicle was at a route segment end point. This data could be used to calculate the actual vehicle journey time for the route segment which may supplement or replace data gathered from other sources.

**vehicle\_guidance\_route\_accepted**

This data flow is used within the Provide Driver and Traveler Services function and contains the acceptance by the driver of the previously provided route for on-line guidance. Acceptance must be provided before guidance can begin.

**vehicle\_guidance\_route\_accepted\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function. It is used to provide data to the data archive about acceptance by the driver of the previously provided route for on-line guidance.

**vehicle\_guidance\_stored\_data**

This data flow is used within the Provide Driver and Traveler Services function and contains the route provided to a vehicle that is using dynamic guidance. This data is loaded into a store and provides information about which routes are being used. The identity of the vehicle is removed for privacy reasons.

**vehicle\_headway**

This data item contains the measure of time between two successive vehicles in a traffic lane as they pass a point on the roadway. Measurements are taken from front bumper of vehicle to front bumper of other vehicle in seconds.

**vehicle\_id\_for\_mcv**

This data flow is used within the Manage Maintenance and Construction function and contains the unique vehicle identification number assigned to each maintenance and construction vehicle.

**vehicle\_identity**

This data flow contains the identity of a vehicle that may be stored electronically on the vehicle and compared with license data.

**vehicle\_location\_for\_advisories**

This data flow is used within the Provide Driver and Traveler Services function and contains the vehicle's location as computed from data input to sensors controlled by the processes that determines vehicle location. This is a low precision data flow that has sufficient accuracy for filtering traveler and driver in-vehicle advisory data to make it relevant to the current geographic area where the vehicle is located.

**vehicle\_location\_for\_dynamic\_guidance**

This data flow is used within the Provide Driver and Traveler Services function and contains the vehicle's location as computed from sensor data. This is a high precision data flow that enables the location of the vehicle to be pinpointed to a high degree of accuracy and is used for in-vehicle dynamic guidance purposes.

**vehicle\_location\_for\_emergency\_services**

This data flow is sent from the Provide Driver and Traveler Services function to the Manage Emergency Services function and contains a vehicle's location along with the time at which it was recorded. This is a high precision data flow that enables the location of an emergency vehicle to be pinpointed to a high degree of accuracy by the Manage Emergency Services function.

**vehicle\_location\_for\_mcv**

This data flow is sent from the Provide Driver and Traveler Services function to the Manage Maintenance and Construction function and contains a vehicle's location as computed from data input to sensors controlled by the process that determines vehicle location. This is a high precision data flow that enables the location of a maintenance and construction vehicle to be pin-pointed to a high degree of accuracy.

**vehicle\_location\_for\_mcv\_tracking**

This data flow is within the Manage Maintenance and Construction function and contains the current location of a maintenance and construction vehicle, together with the time and date to which the location applies for use in tracking the maintenance and construction vehicle fleet.

**vehicle\_motion\_data**

This data flow is used within the Provide Vehicle Monitoring and Control function and contains data about the motion of a vehicle, e.g. forwards, to the left, etc.

**vehicle\_occupancy**

This data item contains a count of the time for which a vehicle occupied the point in the surface street or highway at which a detector is located. The data is measured in seconds and may subsequently be converted to give a

percentage value, the percentage of time for which the detector was occupied by a vehicle.

**vehicle\_proximity\_data**

This data flow is used within the Provide Vehicle Control and Monitoring function and contains information on the closeness of any other vehicle or object to the vehicle in any direction.

**vehicle\_queue\_length**

This data item contains a measure of the length of queue as measured by a traffic sensor. This may be on the roadway (surface street or highway), or at specific locations such as the entrance to a parking lot. The data contains the approximate number of vehicles, based on the average vehicle length and the position of the detector relative to a fixed point from which the queue needs to be measured.

**vehicle\_route\_request**

This data is flow used within the Provide Driver and Traveler Services function and contains a request for on-line guidance of the vehicle. This will have been generated by the driver and will include the necessary source and destination data from which a route can be computed.

**vehicle\_route\_request\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function to provide data to the data archive about requests for on-line guidance of the vehicle. This will have been generated by the driver and will include the necessary source and destination data from which a route can be computed.

**vehicle\_safety\_status**

This data flow contains data about the extent of a vehicle's collision damage.

**vehicle\_sign equip\_status\_for\_m\_and\_c**

This data flow is used within the Manage Maintenance and Construction function and contains an indication that a fault has been found with the equipment that outputs in-vehicle sign data at the roadside. By monitoring this data flow, the receiving process can monitor the health and current status of field equipment and repair if deemed necessary.

**vehicle\_signage\_output\_identity**

This data flow is used within the Manage Traffic function to identify individual indicators used for the control of traffic on roads (surface streets) and highways. The indicators can be either intersection signal controllers, pedestrian signal controllers or dynamic message signs (DMS).

**vehicle\_smart\_probe\_data\_for\_storage**

This data flow is used within the Manage Traffic function. It contains the processed vehicle smart probe data collected from a roadside unit, which in turn have received data output by suitably equipped vehicles as they pass by.

**vehicle\_smart\_probe\_data\_indication**

This data flow contains the data from a vehicle smart probe, processed to provide an indication of the type of hazard that the vehicle found on the road or freeway. The indication may include: bridge down, i.e. broken, or in some way hazardous to traffic; earth or mud slide; fog, smoke or mist reducing visibility; the road surface is icy; road covered by a liquid, e.g. oil, which makes it hazardous to traffic; obstacle on road, e.g. fallen tree, telegraph pole, etc.; road subsidence, i.e. part of the road surface has fallen away.

**vehicle\_smart\_probe\_data\_source**

This data flow is used within the Manage Traffic function. It contains the identity and location of the roadside unit that has collected a particular vehicle smart probe data.

**vehicle\_smart\_probe\_data\_source\_identity**

This data flow is used within the Manage Traffic function. It contains the identity of the roadside unit that has collected a particular vehicle smart probe data.

**vehicle\_smart\_probe\_data\_source\_location**

This data flow is used within the Manage Traffic function. It contains the location of the roadside unit that has collected a particular vehicle smart probe data.

**vehicle\_smart\_probe\_stored\_data**

This data flow is used within the Manage Traffic function. It contains the processed vehicle smart probe data collected from roadside units.

**vehicle\_speed**

This data item contains the speed of a vehicle which has been detected by a detector located on the highway as the vehicle flowed over its sensor.

**vehicle\_tag\_data\_source\_identity**

This data flow is used within the Manage Traffic function. It contains the identity of the roadside unit that has collected a particular vehicle tag data.

**vehicle\_tag\_data\_source\_location**

This data flow is used within the Manage Traffic function. It contains the location of the roadside unit that has collected a particular vehicle tag data.

**vehicle\_type**

This data flow is used within the Manage Traffic function and contains an identifier for the type of vehicle for which pollution violations have been detected. The data is stored as up to eight alphanumeric characters.

**vehicle\_type\_for\_charges**

This data flow is used within the Provide Electronic Payment Services function and contains the vehicle type as determined from processing of the vehicle's characteristics for the purpose of paying for parking lot charges.

**vehicle\_type\_for\_tolls**

This data flow is used within the Provide Electronic Payment Services function and contains the vehicle type and identity as determined from processing of the vehicle's characteristics for the purpose of charging for tolls.

**video\_device equip\_status\_for\_m\_and\_c**

This data flow provides a report to the Manage Maintenance and Construction function of the status of CCTV equipment at the roadside. By monitoring this data flow, the receiving process can monitor the health and current status of field equipment and repair if deemed necessary.

**weather\_archive\_catalog**

This data flow is used to provide the description of the data contained in the collection of weather data from the Weather Service terminator that has been made available for the Manage Archive Function. The catalog may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g., time range of entries, number of entries; or sample data products.

**weather\_archive\_catalog\_request**

This data flow from the Manage Archived Data function to the Weather Service contains the request for a catalog of the data held by the terminator. The request for a catalog may include either or both the description of the types of data the archive is interested in or a time frame over which the requested information may be available.

**weather\_archive\_data\_request**

This data flow from the Manage Archived Data function to the Weather Service contains the request for the data held by the terminator. The request for data may include either or both the description of the data required or a timeframe over which the requested information may be available.

**weather\_data**

This data flow is sent by the Weather Service Provider and contains weather information that may be of interest to archive data users systems.

**weather\_data\_attributes**

This data flow is used to provide meta data included with weather data for release to the archive. Items of meta data may include attributes that describe the source and quality of the data. This meta data may also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type, and data concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488.

**weather\_data\_for\_archive**

This data flow is sent by the Weather Service terminator and contains weather information that may be of interest to archive data users systems along with the meta data that is necessary to describe the imported data to the Manage Archived Data function.

**weather\_observation\_attributes**

This data flow contains meta data about weather observations. This meta data includes time of observation, observation facility characteristics, and identification of filtering or assimilation performed on the observations.

**wide\_area\_pollution\_data**

This data flow is used within the Manage Traffic function as a means of transferring current pollution data from the Manage Emissions facility to the Provide Traffic Surveillance facility. It contains data about the current levels of pollution obtained from the store of pollution data in the area covered by the Traffic Management Center (TMC).

**winter\_treatment\_plan**

This data flow consists of the selected winter maintenance treatment plan, including the type of activity to be performed, schedule, etc. and is provided to assist the maintenance and construction activities scheduling function.

**work\_zone\_activity\_plan**

This data flow is used within the Manage Maintenance and Construction function and contains the work activity schedule for use by construction activities in work zones. This flow includes the schedule, work activity to be performed, the site location, and any special instructions.

**work\_zone\_data\_for\_archive**

This data flow contains data that describes the current status of work zone activities, including work status, resource status, device status, and sensor data. This status is created for later archival.

**work\_zone\_data\_for\_archive\_attributes**

This data flow is used to provide meta data included with maintenance and construction work zone data for release to the archive. Items of meta data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data, such as status of operational equipment. This meta data may also include flags to identify the presence of privacy sensitive information. Other meta data attributes such as class names, data type, and data concept identifiers may be present when a standard data dictionary or message set template is used as in IEEE P1489 and P1488.

**work\_zone\_data\_for\_status**

This data flow contains an overall status of work zone activity created by combining inputs from work zone devices being monitored or controlled, work zone sensors (such as speed monitoring or intrusion detection sensors) and maintenance and construction field personnel. The data flow also contains work zone plans and work zone information status collected from work zones under the control of other maintenance and construction organizations. This data flow represents the formatting, filtering, and aggregation of these data inputs to create the overall status.

**work\_zone\_device\_status**

This data flow contains the status of all roadside devices monitored or controlled by the maintenance and construction management function. These devices include dynamic message signs, highway advisory, radios, closed circuit television cameras, intrusion detection devices, and intrusion alert devices. The data flow provides configuration data on the devices as well as device fault indication.

**work\_zone\_equipment\_status**

This data flow contains the status of maintenance and construction equipment assigned to a specific work zone. Each equipment status would also contain an equipment identifier.

**work\_zone\_identifier**

This data flow contains an identifier that is assigned to a particular work zone for status and reporting purposes.

**work\_zone\_intrusion\_alert**

This data flow contains a timestamped indication that a work zone intrusion alert has been generated. The data flow could also identify the form in which the alert was given (e.g. audible warning, visual warning, or in-vehicle warning).

**work\_zone\_intrusion\_alert\_on\_board**

This data flow contains a timestamped output of an on-board intrusion alert device indicating that an intrusion alert has been given to field personnel.

**work\_zone\_intrusion\_detected**

This data flow contains an indication from an intrusion detection sensor that an intrusion into the perimeter of the work zone has occurred

**work\_zone\_intrusion\_video\_image**

This data flow contains timestamped high resolution digitized video images of a work zone. These images are used to identify that a work zone intrusion has taken place.

**work\_zone\_intrusion\_warning\_data**

This data flow contains a summary view of work zone intrusion data.

**work\_zone\_intrusion\_warning\_notification**

This data flow contains a timestamped indication that a work zone intrusion warning has been generated on-board a maintenance and construction vehicle.

**work\_zone\_personnel\_status**

This data flow contains the status of personnel who are currently working in a work zone. The data flow would attach some form of personnel identifier to the status indication.

**work\_zone\_resource\_status**

This data flow contains the status of work zone resources, including personnel, vehicles, and equipment.

**work\_zone\_status\_from\_mcv**

This data flow contains inputs on work zone status provided by the maintenance and construction field personnel on-board a maintenance and construction vehicle. These inputs include field personnel status, vehicle status, and work activity status. The work zone status inputs include current location (and future locations for moving work zones), impact to the roadway, required lane shifts, expected time(s) and duration of impact, anticipated delays, alternate routes, and suggested speed limits.

**work\_zone\_vehicle\_status**

This data flow contains the status of maintenance and construction vehicles at a specific work zone. The data flow would also contain a vehicle identifier.

**work\_zone\_warning\_given\_on\_board**

This data flow contains a timestamped indication that an on-board device monitoring crew movements has generated an intrusion warning alert. The data flow would contain to whom was sent or how it was sent).

**yellow\_pages\_advisory\_requests**

This data flow is used within the Provide Driver and Traveler Services function to request that data about yellow pages services be output to a driver or a transit user in a vehicle or that a yellow pages services reservation be made.

The scope and transit route number data will be provided by the driver or transit user, while the vehicle location will be provided automatically.

**yellow\_pages\_advisory\_requests\_for\_archive**

This data flow is used within the Provide Driver and Traveler Services function. It is used to provide data to the data archive about requests for yellow pages services to be output to a driver or a transit user in a vehicle or for a yellow page service reservation to be made

**yellow\_pages\_dining\_reservation**

This data flow is used within the Provide Driver and Traveler Services function and contains a request for the information and service providers to make a dining reservation at a restaurant, hotel, etc. The reservation will be based on the data already provided to the traveler through a previous request.

**yellow\_pages\_lodging\_reservation**

This data flow is used within the Provide Driver and Traveler Services function and contains a request for the information and service providers to make a lodging reservation at a hotel or motel etc. from the information already provided to the traveler through a previous request.

**yellow\_pages\_non\_motorized\_reservation**

This data flow is used within the Provide Driver and Traveler Services function and contains a request for the information and service providers to make a lodging reservation at a non-motorized transportation service provider, service station, etc. The reservation will be based on the data already provided to the traveler through a previous request.

**yellow\_pages\_provider\_payments\_transactions**

This data flow is used within the Provide Payment Electronic Services function and contains records of all payment transactions for the provision of other (yellow pages) services and registration of suppliers of these services.

**yellow\_pages\_ticket\_purchase**

This data flow is used within the Provide Driver and Traveler Services function and contains a request for the information and service providers to make a ticket purchase for a special event, theater, tourist attraction, etc. from the information already provided to the traveler through a previous request.