Intelligent Transportation Systems (ITS)
Commercial Vehicle Operations (CVO)

Commercial Vehicle Information Systems and Networks (CVISN) Architecture

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U.S. Department of Transportation
Federal Motor Carrier Safety Administration

The Motor Carrier Safety Improvement Act was signed into law on December 9, 1999. This act established a new Federal Motor Carrier Safety Administration (FMCSA) within the US Department of Transportation (DOT), effective January 1, 2000. Prior to that, the motor carrier and highway safety program was administered under the Federal Highway Administration (FHWA).

The mission of the FMCSA is to improve truck and commercial passenger carrier safety on our nation's highways through information technology, targeted enforcement, research and technology, outreach, and partnerships. The FMCSA manages the Intelligent Transportation Systems (ITS)/Commercial Vehicle Operations (CVO) Program, a voluntary effort involving public and private partnerships that uses information systems, innovative technologies, and business practice reengineering to improve safety, simplify government administrative systems, and provide savings to states and motor carriers. The FMCSA works closely with the FHWA's ITS Joint Program Office (JPO) to ensure the integration and interoperability of ITS/CVO systems with the national ITS program.

As part of the CVISN program, FMCSA defined an initial set of core capabilities that could be deployed incrementally by a state and its motor carriers. The core capabilities focus on electronically exchanging safety and credentialing information, electronically processing interstate registration and fuel tax credentials, and implementing roadside electronic screening at one fixed or mobile site. CVISN capabilities beyond the core set are part of Expanded CVISN.

This is Version 3 of a Baseline Issue

This document has completed internal and external reviews of previously published draft versions. All comments received to date have been incorporated or addressed.

Note: This document and other CVISN-related documentation are available for review and downloading by the ITS/CVO community from the FMCSA CVISN site on the World Wide Web. The URL for the CVISN site is: http://cvisn.fmcsa.dot.gov/.

Review and comments to this document are welcome. Please send comments to:

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CVISN Architecture

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1. INTRODUCTION

1.1. Background

This document establishes a new baseline for the CVISN Architecture. The CVISN Architecture baseline was aligned with the National Intelligent Transportation Systems (ITS) and International Border Clearance (IBC) Architectures in 2001-2002 [References 1 – 3]. The CVISN Architecture was subsequently revised to align with Version 5.0 of the National ITS Architecture [Reference 4]. This version of the CVISN Architecture has been updated to align with Versions 5.1 and 5.1.1 of the National ITS Architecture [Reference 5]. In addition, this document reflects changes to the CVISN architecture to provide additional support for Expanded CVISN concepts [References 6 – 14]. The National ITS Architecture is expected to make the Expanded CVISN updates during their next revision cycle. The CVISN Architecture uses terminology and components that the National ITS Architecture uses.

1.2. Scope

CVISN represents a subset of the National ITS Architecture <http://www.iteris.com/itsarch/> [Reference 5]. CVISN comprises the information systems and networks that support commercial vehicle operations.

A diagram that depicts subsystems, equipment packages, architecture flows, and terminators represents the CVISN Architecture [Figure 2–1]. Tables in this document provide additional information about each item shown on the diagram. The architecture reflects the vision for CVISN over the next few years.

In this version of the document, for the first time, appendices have been added to make it easy for stakeholders to find key high-level information about what CVISN comprises. Appendix A is a simplified overview of Core CVISN capabilities. Appendix B lists the 40 priority Expanded CVISN capabilities that stakeholders identified in 2004-2005. For details about Core and Expanded CVISN capabilities and requirements, the reader should review the CVISN Operational and Architectural Compatibility Handbook (COACH) [References 15 – 20]. The COACH provides a comprehensive checklist of what is required to conform with the CVISN operational concepts, architecture, and design.

The CVISN Architecture recommends that the stakeholder community adopt and use standard primary identifiers for carrier, vehicle, transponder, driver, shipment, and international trip in all data exchanges. Appendix C shows the recommended identifiers. This information was extracted from References 9 and 21 and updated slightly.

1.3. Maintaining the CVISN Architecture

The CVISN Architecture is under configuration management. There is a three-tier process for proposing a change to the architecture. First, the proposed change will be presented to and

reviewed by the CVISN Architecture Configuration Control Board (ACCB). The ACCB is made up of FMCSA and state representatives, and is staffed by JHU/APL. Change Requests (CRs) are reviewed in regular (monthly) meetings. Once the ACCB has reached consensus about a proposed change that may also impact the National ITS Architecture, the CR recommended for approval will be discussed with the National ITS Architecture team. If the National ITS Architecture team concurs, in the final stage of the process, the proposed change will be presented to FMCSA for consideration. If FMCSA approves the proposed change, it will be implemented in CVISN. At the next release, it will be implemented in the National ITS Architecture.

If a new user service requires that CVO-related functions be added to the National ITS Architecture, then existing components may need to be changed or other components added. The CVISN Architecture team will work with the National ITS Architecture team to develop the proposed changes to the architecture, and then go through the CR process with the CVISN ACCB.

Chapter 3 explains the change requests that are incorporated in this version of the CVISN Architecture. In Chapter 2, impacted rows are flagged with the change request number(s) (CR #).

2. CVISN ARCHITECTURE

The CVISN Architecture reflects alignment with the National ITS Architecture using these ground rules:

- The elements of the physical architecture (subsystems, terminators and architecture flows) are aligned. The logical architectures were not aligned as part of this process.
- The scope includes Core and Expanded CVISN functions plus toll, international border crossing, other safety functions, and Commercial Vehicle Operations (CVO) security. This particular version of the CVISN Architecture document reflects the alignment with Versions 5.1 and 5.1.1 of the National ITS Architecture and modifications to support Expanded CVISN capabilities.
- Human terminators, except the Commercial Vehicle (CV) Driver, are not part of the alignment.

Figure 2-1 is based on the National ITS Architecture's "sausage" diagram. It highlights the components of the National ITS Architecture that are relevant to commercial vehicle operations.

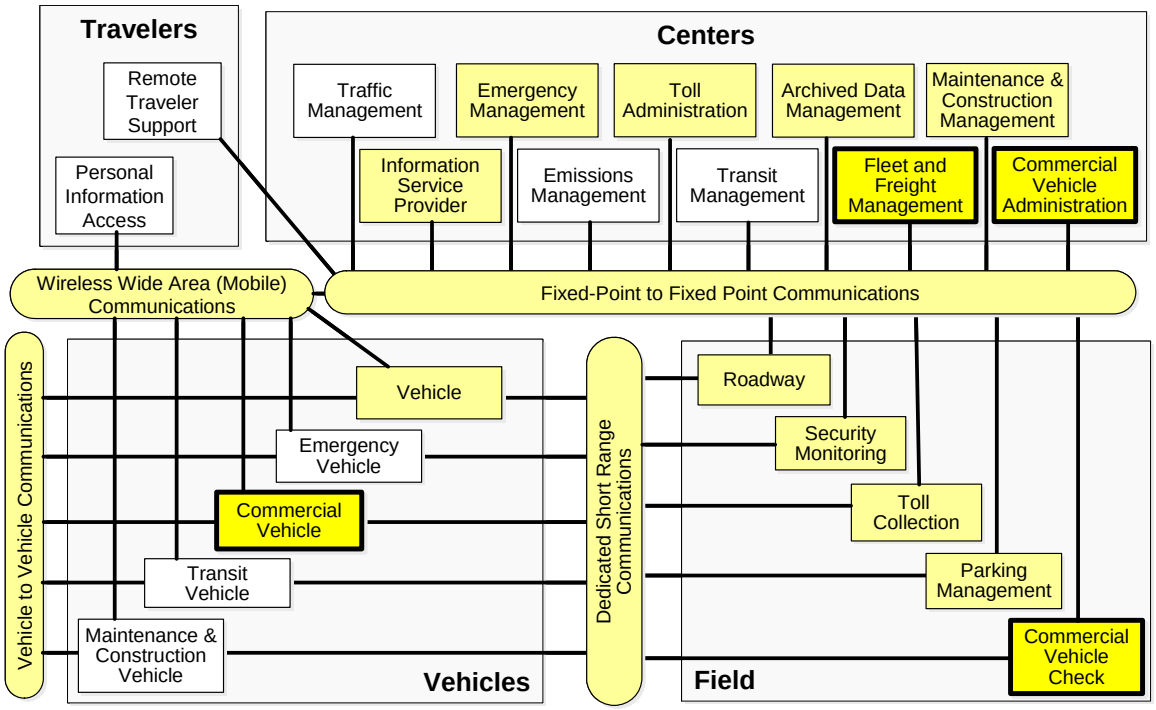

Figure 2-1. CVO Subsystems in the National ITS Architecture

The ITS subsystems communicate with each other using the communication elements and architecture interconnect channels shown in the National ITS Architecture Interconnect Diagram. The subsystems are shown as boxes, the communications channels are shown as lines, and the communication elements are shown as "sausages." In this version of the drawing, elements

unique to commercial vehicle operations are shown with thick borders and those that interface with the CVO-unique elements are shaded.

The subsystems shown as single entities are representative of multiple instances of the specific subsystems. For example, several Commercial Vehicle Administration subsystems in a region, each with their own jurisdiction, may communicate with each other.

2.1. Architecture Conventions

The CVISN Architecture follows these conventions for naming, styles, etc.:

1. The National ITS Architecture naming conventions are used by CVISN for aligned architecture flows: flow names are lower case except for acronyms. Some acronyms (e.g., cv for Commercial Vehicle) used in architecture flow names are also in lower case.
2. The National ITS Architecture definitions for aligned subsystems, equipment packages, terminators, and architecture flows are used by CVISN.
3. For the alignment process, basic vehicle (Vehicle Subsystem) functions were incorporated into the CV realm. The CVISN Architecture aggregates the National ITS Architecture's Commercial Vehicle and Vehicle Subsystems into a single subsystem named CVSAg. In this document we indicate which data are related to the Vehicle Subsystem by labeling the aggregated subsystem as CVSAg (VS). If a flow is related to the Commercial Vehicle Subsystem, the aggregated subsystem is labeled CVSAg (CVS).
4. The three line types used on the flow diagram to reflect "architecture interconnects" are as follows:
    a. Fixed Point Communications or Wireless Wide Area (Mobile Communications) – shown as a solid line
    b. Dedicated Short Range Communication (DSRC) – shown as a long dashed line
    c. Other Transactions – shown as a dotted line

    The DSRC architecture flow types used by CVISN match those defined by the National ITS Architecture. CVISN makes no distinction between fixed point and wireless wide area communications.
5. Some architecture flows between humans and subsystems remain in the National ITS Architecture but are not shown in the CVISN Architecture; the human operator is considered to be part of the subsystem in CVISN. The one exception is the Commercial Vehicle Driver.

2.2. Architecture Flow Diagram

Figure 2–2 is the CVISN Architecture Flow Diagram. The CVISN Architecture Flow Diagram depicts the CVO data flow among subsystems and between CVO subsystems and external entities. The subsystems and equipment packages shown relate to the processes defined in the National ITS Architecture's Physical Architecture. The shaded equipment packages are not part

of Core CVISN. In this version of this document, Table 2 was added to show which equipment packages exchange architecture flows.

Entities external to the ITS information systems are shown in ovals. In National Architecture terminology, these are “terminators.”

Connections and data exchanges shown on the figures are marked with different line types to differentiate the means of communication used. The definitions provided below are from the National ITS Architecture [Reference 5].

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

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

  Note: For CVISN the distinction between Fixed Point and Wireless Wide Area communications is unimportant. In this version of this document, no distinction is made.

- DSRC: A wireless communications channel used for close-proximity communications between vehicles and the immediate infrastructure. It supports location-specific communications for ITS capabilities such as toll collection, transit vehicle management, driver information, and automated commercial vehicle operations.

- Other Transactions: Any of the following National ITS Architecture’s architecture interconnects – Physical Interface, Human, Internal Vehicle Interface, Contact or Proximity Interface, or Position Location Interface.

Symbols for the Emergency Management Subsystem, the Freight Equipment terminator, the Intermodal Freight Shipper terminator, and the Alerting and Advisory Systems terminator contain the text string “(2)”, indicating that each symbol appears twice on the diagram. This was done to maintain a semblance of readability and has nothing to do with functionality.

2.3. Tables

In the discussion of the tables, a “flow” is comprised of the source, destination and architecture flow name. “Flow name” is a label for a set of data elements. A list of the acronyms and abbreviations used in the tables is given just prior to Table 1.

The tables provided are:

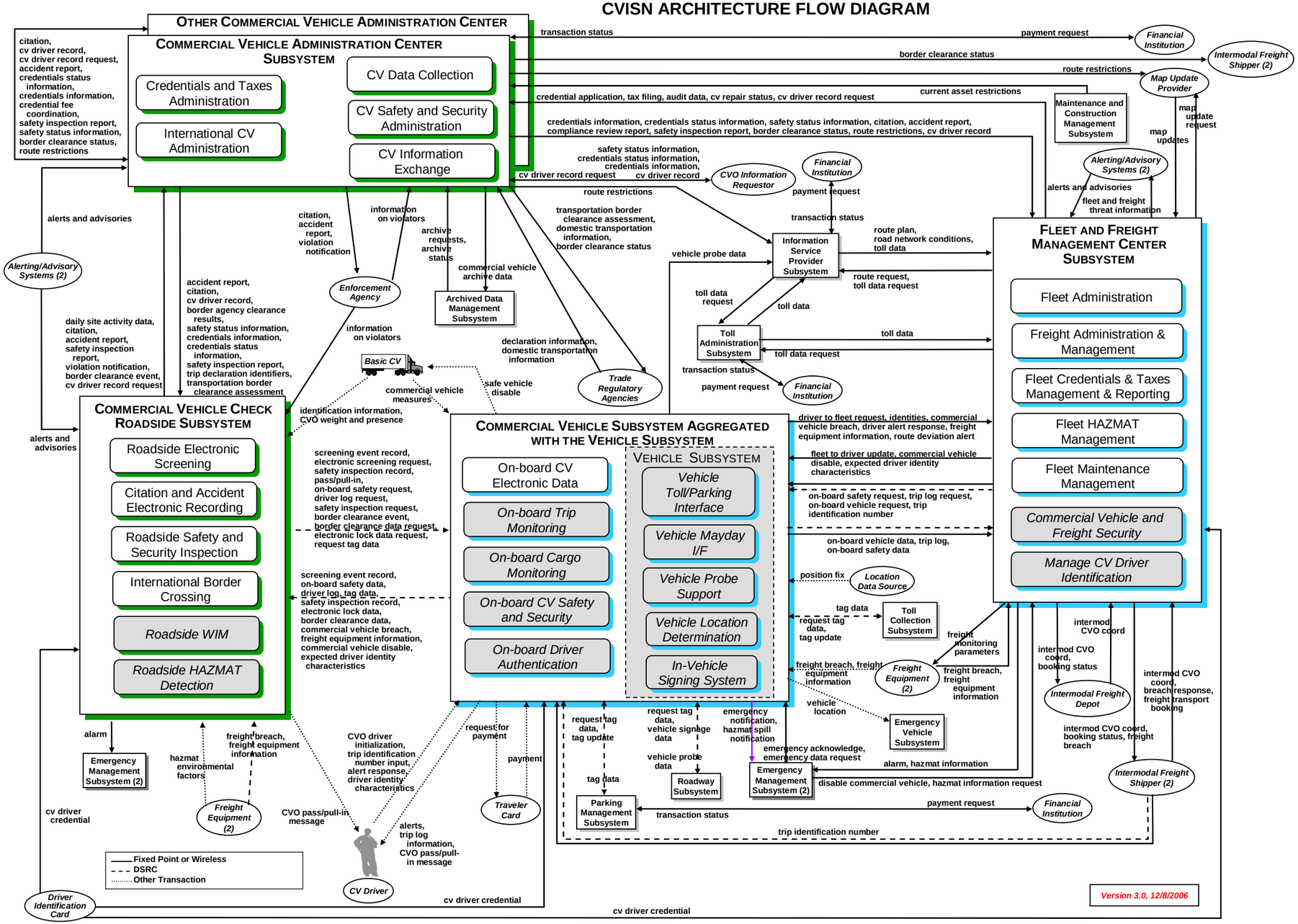

Figure 2–2. CVISN Architecture Flow Diagram

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ACRONYMS AND ABBREVIATIONS:

AAS:	Alerting and Advisory Systems
ADMS:	Archived Data Management Subsystem
BCV:	Basic Commercial Vehicle
CV:	Commercial Vehicle
CVAS:	Commercial Vehicle Administration Subsystem
CVCS:	Commercial Vehicle Check Subsystem
CV Driver:	Commercial Vehicle Driver
CVOIR:	Commercial Vehicle Operations Information Requestor
CVS:	Commercial Vehicle Subsystem
CVSAg:	Commercial Vehicle Subsystem Aggregated with the Vehicle Subsystem (this term is used only by CVISN)
CVSAg (CVS):	Associated with the CVS part of CVSAg
CVSAg (VS):	Associated with the VS part of CVSAg
DIDC:	Driver Identification Card (this term is used only by CVISN)
EA:	(Law) Enforcement Agency
EM:	Emergency Management Subsystem
EP:	Equipment Package
EVS:	Emergency Vehicle Subsystem
ExC:	Expanded CVISN
FE:	Freight Equipment
FI:	Financial Institution
FMS:	Fleet and Freight Management Subsystem
IFD:	Intermodal Freight Depot
IFS:	Intermodal Freight Shipper
ISP:	Information Service Provider Subsystem
LDS:	Location Data Source
MCMS:	Maintenance and Construction Management Subsystem
MUP:	Map Update Provider
PMS:	Parking Management Subsystem
RS:	Roadway Subsystem
TAS:	Toll Administration Subsystem
TC:	Traveler Card
TCS:	Toll Collection Subsystem
TRA:	Trade Regulatory Agencies
VS:	Vehicle Subsystem

Table 1 presents a detailed look at each architecture flow contained in the CVISN Architecture Flow Diagram [Figure 2–1]. This table is ordered alphabetically by source and destination subsystem/terminator. An "X" in the Std. column indicates that there are standards that apply to the architecture flow; refer to Version 5.1 of the National ITS Architecture for the applicable standards [Reference 5]. In the National ITS Architecture, many architecture flows are identified as candidates for future standardization; those are marked as "future" in the Std. column. The CR # column indicates applicable Change Requests for the flow.

It should be noted that although standards may apply to a particular architecture flow, in some cases the standard is no longer widely used (e.g., EDI standard 286 for architecture flow "credentials information"). For details about the 915 MHz Dedicated Short Range Communications (DSRC) standards used in CVO, please see the COACH Part 1 [Reference 15]. The 915 MHz DSRC guidelines referenced in the COACH Part 1 remain the de facto standard in the CVO community until 5 GHz standards and products are ready.

Table 1. CVISN Architecture Flows (Subsystems and Terminators)

CVISN Architecture Flows				
Source	**Destination**	**Flow Name**	**Std.**	**CR #**
AAS	CVAS	alerts and advisories	future	CR4778
AAS	CVCS	alerts and advisories	future	CR4778
AAS	FMS	alerts and advisories	future	
ADMS	CVAS	archive requests	future	
ADMS	CVAS	archive status	future	
BCV	CVCS	CVO weight and presence		
BCV	CVCS	identification information		
BCV	CVSAg (CVS)	commercial vehicle measures	future	
CVAS	ADMS	commercial vehicle archive data	X	
CVAS	CVCS	accident report	future	CR4778
CVAS	CVCS	border agency clearance results	future	
CVAS	CVCS	citation	future	CR4778
CVAS	CVCS	credentials information	X	
CVAS	CVCS	credentials status information	X	
CVAS	CVCS	cv driver record	future	CR4778

CVISN Architecture Flows				
Source	**Destination**	**Flow Name**	**Std.**	**CR #**
CVAS	CVCS	transportation border clearance assessment	future	
CVAS	CVCS	trip declaration identifiers	future	
CVAS	CVCS	safety inspection report	X	
CVAS	CVCS	safety status information	X	
CVAS	CVOIR	credentials information	X	
CVAS	CVOIR	credentials status information	X	
CVAS	CVOIR	cv driver record	future	CR4778
CVAS	CVOIR	safety status information	X	
CVAS	EA	accident report	future	
CVAS	EA	citation	future	
CVAS	EA	violation notification	future	
CVAS	FI	payment request		
CVAS	FMS	accident report	future	
CVAS	FMS	border clearance status	future	
CVAS	FMS	citation	future	
CVAS	FMS	compliance review report	future	
CVAS	FMS	credentials information	X	
CVAS	FMS	credentials status information	X	
CVAS	FMS	cv driver record	future	CR4778
CVAS	FMS	route restrictions	future	
CVAS	FMS	safety inspection report	X	
CVAS	FMS	safety status information	X	
CVAS	IFS	border clearance status	future	
CVAS	ISP	route restrictions	future	
CVAS	MUP	route restrictions	future	
CVAS	Other CVAS	accident report	future	CR4778
CVAS	Other CVAS	border clearance status	future	

CVISN Architecture Flows				
Source	**Destination**	**Flow Name**	**Std.**	**CR #**
CVAS	Other CVAS	citation	future	CR4778
CVAS	Other CVAS	credential fee coordination	future	
CVAS	Other CVAS	credentials information	X	
CVAS	Other CVAS	credentials status information	X	
CVAS	Other CVAS	cv driver record	future	CR4778
CVAS	Other CVAS	cv driver record request	future	CR4778
CVAS	Other CVAS	route restrictions	future	
CVAS	Other CVAS	safety inspection report	X	
CVAS	Other CVAS	safety status information	X	
CVAS	TRA	border clearance status	future	
CVAS	TRA	domestic transportation information	future	
CVAS	TRA	transportation border clearance assessment	future	
CVCS	CVAS	accident report	future	
CVCS	CVAS	citation	future	
CVCS	CVAS	cv driver record request	future	CR4778
CVCS	CVAS	daily site activity data	future	
CVCS	CVAS	border clearance event	future	
CVCS	CVAS	safety inspection report	X	
CVCS	CVAS	violation notification	future	
CVCS	CV Driver	CVO pass/pull-in message		
CVCS	CVSAg (CVS)	border clearance data request	X	
CVCS	CVSAg (CVS)	border clearance event	X	
CVCS	CVSAg (CVS)	driver log request	future	
CVCS	CVSAg (CVS)	electronic lock data request	X	
CVCS	CVSAg (CVS)	electronic screening request	X	
CVCS	CVSAg (CVS)	on-board safety request	X	
CVCS	CVSAg (CVS)	pass/pull-in	X	

CVISN Architecture Flows				
Source	**Destination**	**Flow Name**	**Std.**	**CR #**
CVCS	CVSAg (CVS)	request tag data	future	
CVCS	CVSAg (CVS)	safety inspection record	future	
CVCS	CVSAg (CVS)	safety inspection request	future	
CVCS	CVSAg (CVS)	screening event record	X	
CVCS	EM	alarm	future	
CV Driver	CVSAg (CVS)	alert response		
CV Driver	CVSAg (CVS)	CVO driver initialization		
CV Driver	CVSAg (CVS)	driver identity characteristics		
CV Driver	CVSAg (CVS)	trip identification number input		CR4760
CVOIR	CVAS	cv driver record request	future	CR4778
CVSAg (CVS)	BCV	safe vehicle disable	future	
CVSAg (CVS)	CVCS	border clearance data	X	
CVSAg (CVS)	CVCS	commercial vehicle breach	future	
CVSAg (CVS)	CVCS	commercial vehicle disable	future	CR4778
CVSAg (CVS)	CVCS	driver log	future	
CVSAg (CVS)	CVCS	electronic lock data	X	
CVSAg (CVS)	CVCS	expected driver identity characteristics	future	CR4778
CVSAg (CVS)	CVCS	freight equipment information	future	CR4778
CVSAg (CVS)	CVCS	on-board safety data	X	
CVSAg (CVS)	CVCS	safety inspection record	future	
CVSAg (CVS)	CVCS	screening event record	X	
CVSAg (CVS)	CVCS	tag data	future	
CVSAg (CVS)	CV Driver	alerts		
CVSAg (CVS)	CV Driver	CVO pass/pull-in message		
CVSAg (CVS)	CV Driver	trip log information		
CVSAg (CVS)	EM	hazmat spill notification	future	
CVSAg (CVS)	FMS	commercial vehicle breach	future	

CVISN Architecture Flows				
Source	**Destination**	**Flow Name**	**Std.**	**CR #**
CVSAg (CVS)	FMS	driver alert response	future	
CVSAg (CVS)	FMS	driver to fleet request	future	
CVSAg (CVS)	FMS	freight equipment information	future	
CVSAg (CVS)	FMS	identities	future	
CVSAg (CVS)	FMS	on-board safety data	X	
CVSAg (CVS)	FMS	on-board vehicle data	future	
CVSAg (CVS)	FMS	route deviation alert	future	
CVSAg (CVS)	FMS	trip log	future	
CVSAg (VS)	EM	emergency notification	X	
CVSAg (VS)	EVS	vehicle location		
CVSAg (VS)	ISP	vehicle probe data	future	
CVSAg (VS)	PMS	tag data	X	
CVSAg (VS)	RS	vehicle probe data	X	
CVSAg (VS)	TC	request for payment		
CVSAg (VS)	TCS	tag data	X	
DIDC	CVCS	cv driver credential	future	CR4778
DIDC	CVSAg (CVS)	cv driver credential	future	CR4778
DIDC	FMS	cv driver credential	future	CR4778
EA	CVAS	information on violators	future	
EA	CVCS	information on violators	future	
EM	CVSAg (VS)	emergency acknowledge	X	
EM	CVSAg (VS)	emergency data request	X	
EM	FMS	disable commercial vehicle	future	
EM	FMS	hazmat information request	X	
FE	CVCS	freight breach	future	
FE	CVCS	freight equipment information	future	
FE	CVCS	hazmat environmental factors		

CVISN Architecture Flows				
Source	**Destination**	**Flow Name**	**Std.**	**CR #**
FE	CVSAg (CVS)	freight breach	future	
FE	CVSAg (CVS)	freight equipment information	future	
FE	FMS	freight breach	future	
FE	FMS	freight equipment information	future	
FI	CVAS	transaction status		
FI	ISP	transaction status		
FI	PMS	transaction status		
FI	TAS	transaction status		
FMS	AAS	fleet and freight threat information	future	
FMS	CVAS	audit data	future	
FMS	CVAS	credential application	X	
FMS	CVAS	cv driver record request	future	CR4778
FMS	CVAS	cv repair status	future	CR4778
FMS	CVAS	tax filing	X	
FMS	CVSAg (CVS)	commercial vehicle disable	future	
FMS	CVSAg (CVS)	expected driver identity characteristics	future	
FMS	CVSAg (CVS)	fleet to driver update	future	
FMS	CVSAg (CVS)	on-board safety request	X	
FMS	CVSAg (CVS)	on-board vehicle request	future	
FMS	CVSAg (CVS)	trip identification number	future	
FMS	CVSAg (CVS)	trip log request	future	
FMS	EM	alarm	future	
FMS	EM	hazmat information	X	
FMS	FE	freight monitoring parameters	future	
FMS	IFD	booking status	future	
FMS	IFD	intermod CVO coord	future	
FMS	IFS	booking status	future	

CVISN Architecture Flows				
Source	**Destination**	**Flow Name**	**Std.**	**CR #**
FMS	IFS	freight breach	future	
FMS	IFS	intermod CVO coord	future	
FMS	ISP	route request	X	
FMS	ISP	toll data request	future	
FMS	MUP	map update request		
FMS	TAS	toll data request	future	
IFD	FMS	intermod CVO coord	future	
IFS	CVSAg (CVS)	trip identification number	future	
IFS	FMS	breach response	future	
IFS	FMS	freight transport booking	future	
IFS	FMS	intermod CVO coord	future	
ISP	FI	payment request		
ISP	FMS	road network conditions	X	
ISP	FMS	route plan	X	
ISP	FMS	toll data	future	
ISP	TAS	toll data request	future	
LDS	CVSAg (VS)	position fix		
MCMS	CVAS	current asset restrictions	future	
MUP	FMS	map updates		
Other CVAS	CVAS	accident report	future	CR4778
Other CVAS	CVAS	border clearance status	future	
Other CVAS	CVAS	citation	future	CR4778
Other CVAS	CVAS	credential fee coordination	future	
Other CVAS	CVAS	credentials information	X	
Other CVAS	CVAS	credentials status information	X	
Other CVAS	CVAS	cv driver record	future	CR4778
Other CVAS	CVAS	cv driver record request	future	CR4778

CVISN Architecture Flows				
Source	**Destination**	**Flow Name**	**Std.**	**CR #**
Other CVAS	CVAS	route restrictions	future	
Other CVAS	CVAS	safety inspection report	X	
Other CVAS	CVAS	safety status information	X	
PMS	CVSAg (VS)	request tag data	X	
PMS	CVSAg (VS)	tag update	X	
PMS	FI	payment request		
RS	CVSAg (VS)	request tag data	X	
RS	CVSAg (VS)	vehicle signage data	X	
TAS	FI	payment request		
TAS	FMS	toll data	future	
TAS	ISP	toll data	future	
TC	CVSAg (VS)	payment		
TCS	CVSAg (VS)	request tag data	X	
TCS	CVSAg (VS)	tag update	X	
TRA	CVAS	declaration information	future	
TRA	CVAS	domestic transportation information	future	

Table 2 shows the architecture flows and their source/destination equipment packages (EPs) and associated Expanded CVISN capabilities.
This table was inserted in response to CR 4763. Source or destination terminators are shown in ()'s. For EPs that are not shown on the CVISN Architecture Flow Diagram, the associated subsystem is retained following the name of the EP (e.g., "Emergency Commercial Vehicle Response – EM"). If a new EP-to-EP connection has been added to the architecture, the Expanded CVISN capability requiring that connection is shown in the last column. The Expanded CVISN capabilities are defined in Appendix B.

Table 2. CVISN Architecture Flows (Equipment Packages, Expanded CVISN Capabilities)

Flow Name	Source EP (or Terminator)	Destination EP (or Terminator)	ExC Cap.
accident report	CV Information Exchange	Roadside Safety and Security Inspection	R2
accident report	CV Safety and Security Administration	(EA)	
accident report	CV Information Exchange	Fleet Administration	
accident report	Citation and Accident Electronic Recording	CV Safety and Security Administration	
accident report	CV Information Exchange	(Other CVAS)	S7
accident report	(Other CVAS)	CV Information Exchange	S7
alarm	Roadside HAZMAT Detection	Emergency Commercial Vehicle Response – EM	
alarm	Commercial Vehicle and Freight Security, Fleet Administration, Manage CV Driver Identification	Emergency Commercial Vehicle Response – EM	
alert response	(CV Driver)	On-board CV Safety and Security, On-board Trip Monitoring	
alerts	On-board CV Safety and Security, On-board Trip Monitoring	(CV Driver)	
alerts and advisories	(AAS)	CV Safety and Security Administration	D6, R11
alerts and advisories	(AAS)	Roadside Safety and Security Inspection	R2, R11

Flow Name	Source EP (or Terminator)	Destination EP (or Terminator)	ExC Cap.
alerts and advisories	(AAS)	Roadside Electronic Screening	R2, R11
alerts and advisories	(AAS)	Commercial Vehicle and Freight Security, Fleet Administration	
archive requests	ITS Data Repository – ADMS	CV Data Collection	
archive status	ITS Data Repository – ADMS	CV Data Collection	
audit data	Fleet Credentials & Taxes Management & Reporting	Credentials and Taxes Administration	
booking status	Freight Administration and Management	(IFD)	
booking status	Freight Administration and Management	(IFS)	
border agency clearance results	International CV Administration	International Border Crossing	
border clearance data	On-board CV Electronic Data	International Border Crossing	
border clearance data request	International Border Crossing	On-board CV Electronic Data	
border clearance event	International Border Crossing	International CV Administration	
border clearance event	International Border Crossing	On-board CV Electronic Data	
border clearance status	CV Information Exchange, International CV Administration	Freight Administration and Management	
border clearance status	CV Information Exchange, International CV Administration	(IFS)	
border clearance status	CV Information Exchange, International CV Administration	(Other CVAS)	
border clearance status	CV Information Exchange, International CV Administration	(TRA)	
border clearance status	(Other CVAS)	CV Information Exchange, International CV Administration	
breach response	(IFS)	Commercial Vehicle and Freight Security	

Flow Name	Source EP (or Terminator)	Destination EP (or Terminator)	ExC Cap.
citation	CV Information Exchange	Roadside Safety and Security Inspection	R2
citation	CV Safety and Security Administration	(EA)	
citation	CV Safety and Security Administration	Fleet Administration	
citation	CV Information Exchange	(Other CVAS)	D11, S7
citation	Citation and Accident Electronic Recording	CV Safety and Security Administration	
citation	(Other CVAS)	CV Information Exchange	D11, S7
commercial vehicle archive data	CV Data Collection	ITS Data Repository – ADMS	
commercial vehicle breach	On-board CV Safety and Security	Roadside Safety and Security Inspection	
commercial vehicle breach	On-board CV Safety and Security	Commercial Vehicle and Freight Security	
commercial vehicle disable	On-board Driver Authentication	Roadside Safety and Security Inspection	R1
commercial vehicle disable	Manage CV Driver Identification	On-board Driver Authentication	
commercial vehicle measures	(BCV)	On-board Cargo Monitoring, On-board Trip Monitoring	
compliance review report	Credentials and Taxes Administration	Fleet Credentials & Taxes Management & Reporting	
credential application	Fleet Credentials & Taxes Management & Reporting	Credentials and Taxes Administration	
credential fee coordination	Credentials and Taxes Administration	(Other CVAS)	
credential fee coordination	(Other CVAS)	Credentials and Taxes Administration	
credentials information	CV Information Exchange	Roadside Electronic Screening, Roadside HAZMAT Detection	
credentials information	Credentials and Taxes Administration, CV Information Exchange	(CVOIR)	
credentials information	Credentials and Taxes Administration, CV Information Exchange	Fleet Credentials & Taxes Management & Reporting	

Flow Name	Source EP (or Terminator)	Destination EP (or Terminator)	ExC Cap.
credentials information	Credentials and Taxes Administration, CV Information Exchange	(Other CVAS)	
credentials information	Credentials and Taxes Administration, CV Information Exchange	Roadside Safety and Security Inspection	R2
credentials information	(Other CVAS)	CV Information Exchange	
credentials status information	CV Information Exchange, CV Safety and Security Administration	Roadside Electronic Screening	
credentials status information	CV Information Exchange	Roadside Safety and Security Inspection	D1, D2, R2
credentials status information	CV Information Exchange	Fleet Administration	D1, D2
credentials status information	CV Information Exchange	(CVOIR)	
credentials status information	CV Information Exchange	Fleet Credentials & Taxes Management & Reporting	
credentials status information	CV Information Exchange, CV Safety and Security Administration	(Other CVAS)	
credentials status information	(Other CVAS)	CV Information Exchange	
current asset restrictions	MCM Work Activity Coordination – MCMS	Credentials and Taxes Administration	
cv driver credential	(DIDC)	Roadside Safety and Security Inspection, Citation and Accident Electronic Reporting	D10
cv driver credential	(DIDC)	On-board Driver Authentication	D10
cv driver credential	(DIDC)	Manage CV Driver Identification	D2, D10
cv driver record	CV Information Exchange	Citation and Accident Electronic Recording	D1, D2, R2
cv driver record	CV Information Exchange	Roadside Safety and Security Inspection	D1, D2, R2

Flow Name	Source EP (or Terminator)	Destination EP (or Terminator)	ExC Cap.
cv driver record	CV Information Exchange	Fleet Administration	D1, D2, D7
cv driver record	CV Information Exchange	(CVOIR)	D9
cv driver record	CV Information Exchange	(Other CVAS)	D1, D2, C7
cv driver record	(Other CVAS)	CV Information Exchange	D1, D2, C7
cv driver record request	Citation and Accident Electronic Recording	CV Information Exchange	D1, D2, R2
cv driver record request	Roadside Safety and Security Inspection	CV Information Exchange	D1, D2, R2
cv driver record request	Fleet Administration	CV Information Exchange	D1, D2, D7
cv driver record request	(CVOIR)	CV Information Exchange	D9
cv driver record request	(Other CVAS)	CV Information Exchange	D1, D2, C7
cv driver record request	CV Information Exchange	(Other CVAS)	D1, D2, C7
cv repair status	Fleet Maintenance Management	CV Safety and Security Administration	S5
CVO driver initialization	(CV Driver)	On-board CV Electronic Data, On-board Trip Monitoring	
CVO pass/pull-in message	Roadside Electronic Screening, Roadside HAZMAT Detection, Roadside Safety and Security Inspection, Roadside WIM	(CV Driver)	
CVO pass/pull-in message	On-board CV Electronic Data, On-board CV Safety and Security	(CV Driver)	

Flow Name	Source EP (or Terminator)	Destination EP (or Terminator)	ExC Cap.
CVO weight and presence	(BCV)	Roadside Electronic Screening, Roadside HAZMAT Detection, Roadside WIM	
daily site activity data	Citation and Accident Electronic Recording, Roadside Electronic Screening	CV Safety and Security Administration	
declaration information	(TRA)	International CV Administration	
disable commercial vehicle	Emergency Commercial Vehicle Response – EM	Manage CV Driver Identification	
domestic transportation information	International CV Administration	(TRA)	
domestic transportation information	(TRA)	International CV Administration	
driver alert response	On-board CV Safety and Security	Commercial Vehicle and Freight Security	
driver alert response	On-board Trip Monitoring	Fleet Administration	
driver identity characteristics	(CV Driver)	On-board Driver Authentication	
driver log	On-board CV Safety and Security	Roadside Safety and Security Inspection	
driver log request	Roadside Safety and Security Inspection	On-board CV Safety and Security	
driver to fleet request	On-board Trip Monitoring	Fleet Administration	
electronic lock data	On-board CV Electronic Data	International Border Crossing	
electronic lock data	On-board CV Electronic Data	Roadside Safety and Security Inspection	R1
electronic lock data request	Roadside Safety and Security Inspection	On-board CV Electronic Data	R1
electronic lock data request	International Border Crossing	On-board CV Electronic Data	
electronic screening request	Roadside Electronic Screening, Roadside WIM	On-board CV Electronic Data	
emergency acknowledge	Mayday Support – EM	Vehicle Mayday I/F	
emergency data request	Mayday Support – EM	Vehicle Mayday I/F	

Flow Name	Source EP (or Terminator)	Destination EP (or Terminator)	ExC Cap.
emergency notification	Vehicle Mayday I/F	Mayday Support – EM	
expected driver identity characteristics	On-board Driver Authentication	Roadside Safety and Security Inspection	R1
expected driver identity characteristics	Manage CV Driver Identification	On-board Driver Authentication	
fleet and freight threat information	Commercial Vehicle and Freight Security, Fleet Administration	(AAS)	
fleet to driver update	Fleet Administration	On-board Trip Monitoring	
freight breach	(FE)	Roadside Safety and Security Inspection	
freight breach	(FE)	On-board CV Safety and Security	
freight breach	(FE)	Commercial Vehicle and Freight Security	
freight breach	Commercial Vehicle and Freight Security	(IFS)	
freight equipment information	On-board Cargo Monitoring	Citation and Accident Electronic Recording	R1
freight equipment information	On-board Cargo Monitoring	Commercial Vehicle and Freight Security, Freight Administration and Management	
freight equipment information	(FE)	Roadside Safety and Security Inspection	
freight equipment information	(FE)	Roadside Electronic Screening,	R11
freight equipment information	(FE)	On-board Cargo Monitoring, On-board CV Electronic Data	

Flow Name	Source EP (or Terminator)	Destination EP (or Terminator)	ExC Cap.
freight equipment information	(FE)	Commercial Vehicle and Freight Security, Freight Administration and Management	
freight monitoring parameters	Commercial Vehicle and Freight Security	(FE)	
freight transport booking	(IFS)	Freight Administration and Management	
hazmat environmental factors	(FE)	Roadside HAZMAT Detection	
hazmat information	Fleet HAZMAT Management	Emergency Commercial Vehicle Response – EM	
hazmat information request	Emergency Commercial Vehicle Response – EM	Fleet HAZMAT Management	
hazmat spill notification	On-board Cargo Monitoring	Emergency Commercial Vehicle Response – EM	
identification information	(BCV)	Roadside Electronic Screening, Roadside HAZMAT Detection, Roadside WIM	
identities	On-board Driver Authentication	Commercial Vehicle and Freight Security, Manage CV Driver Identification	
information on violators	(EA)	Credentials and Taxes Administration	
information on violators	(EA)	Roadside Electronic Screening	
intermod CVO coord	Freight Administration and Management	(IFD)	
intermod CVO coord	Freight Administration and Management	(IFS)	
intermod CVO coord	(IFD)	Freight Administration and Management	

Flow Name	Source EP (or Terminator)	Destination EP (or Terminator)	ExC Cap.
intermod CVO coord	(IFS)	Freight Administration and Management	
map update request	Fleet Administration	(MUP)	
map updates	(MUP)	Fleet Administration	
on-board safety data	On-board CV Safety and Security	Roadside Safety and Security Inspection	
on-board safety data	On-board CV Safety and Security	Roadside Electronic Screening	R1
on-board safety data	On-board CV Safety and Security, On-board Trip Monitoring	Fleet Maintenance Management	
on-board safety data	On-board CV Safety and Security	Citation and Accident Electronic Recording	R1
on-board safety request	Roadside Safety and Security Inspection	On-board CV Safety and Security	
on-board safety request	Roadside Electronic Screening	On-board CV Safety and Security	R1
on-board safety request	Fleet Maintenance Management	On-board CV Safety and Security, On-board Trip Monitoring	
on-board safety request	Citation and Accident Electronic Recording	On-board CV Safety and Security	R1
on-board vehicle data	On-board Trip Monitoring	Fleet Administration, Fleet Maintenance Management, Freight Administration and Management	
on-board vehicle request	Fleet Administration, Fleet Maintenance Management, Freight Administration and Management	On-board Trip Monitoring	

Flow Name	Source EP (or Terminator)	Destination EP (or Terminator)	ExC Cap.
pass/pull-in	Roadside Electronic Screening, Roadside HAZMAT Detection, Roadside Safety and Security Inspection, Roadside WIM	On-board CV Electronic Data	
pass/pull-in	Roadside Safety and Security Inspection	On-board CV Safety and Security	
payment	(TC)	Vehicle Toll/Parking Interface	
payment request	Credentials and Taxes Administration	(FI)	
payment request	Interactive Infrastructure Information – ISP	(FI)	
payment request	Parking Electronic Payment – PMS	(FI)	
payment request	Toll Administration – TAS	(FI)	
position fix	(LDS)	Vehicle Location Determination	
request for payment	Vehicle Toll/Parking Interface	(TC)	
request tag data	Roadside Safety and Security Inspection	On-board CV Electronic Data	R1
request tag data	Roadside Electronic Screening	On-board CV Electronic Data	R1
request tag data	International Border Crossing, Roadside WIM	On-board CV Electronic Data	
request tag data	Parking Electronic Payment – PMS	Vehicle Toll/Parking Interface	
request tag data	Roadway Probe Beacons – RS	Vehicle Probe Support	
request tag data	Toll Plaza Toll Collection – TCS	Vehicle Toll/Parking Interface	
road network conditions	ISP Traveler Data Collection – ISP	Fleet Administration	
route deviation alert	On-board Trip Monitoring	Fleet Administration	
route plan	Infrastructure Provided Trip Planning – ISP	Fleet Administration	
route request	Fleet Administration	Infrastructure Provided Trip Planning – ISP	

Flow Name	Source EP (or Terminator)	Destination EP (or Terminator)	ExC Cap.
route restrictions	Credentials and Taxes Administration	Fleet Administration	
route restrictions	Credentials and Taxes Administration	ISP Traveler Data Collection – ISP	
route restrictions	Credentials and Taxes Administration	(MUP)	
route restrictions	Credentials and Taxes Administration	(Other CVAS)	
route restrictions	(Other CVAS)	Credentials and Taxes Administration	
safe vehicle disable	On-board Driver Authentication	(BCV)	
safety inspection record	Roadside Safety and Security Inspection	On-board CV Electronic Data, On-board CV Safety and Security	
safety inspection record	On-board CV Electronic Data, On-board CV Safety and Security	Roadside Safety and Security Inspection	
safety inspection report	CV Information Exchange, CV Safety and Security Administration	Roadside Safety and Security Inspection	
safety inspection report	CV Information Exchange, CV Safety and Security Administration	Fleet Administration	
safety inspection report	CV Information Exchange, CV Safety and Security Administration	(Other CVAS)	
safety inspection report	Roadside Safety and Security Inspection	CV Safety and Security Administration	
safety inspection report	(Other CVAS)	CV Information Exchange, CV Safety and Security Administration	
safety inspection request	Roadside Safety and Security Inspection	On-board CV Electronic Data, On-board CV Safety and Security	
safety status information	CV Information Exchange, CV Safety and Security Administration	Roadside Electronic Screening	
safety status information	CV Information Exchange, CV Safety and Security Administration	Roadside Safety and Security Inspection	
safety status information	CV Information Exchange	(CVOIR)	
safety status information	CV Information Exchange	Fleet Administration	
safety status information	CV Information Exchange, CV Safety and Security Administration	(Other CVAS)	

Flow Name	Source EP (or Terminator)	Destination EP (or Terminator)	ExC Cap.
safety status information	(Other CVAS)	CV Information Exchange, CV Safety and Security Administration	
screening event record	Roadside Electronic Screening, Roadside WIM	On-board CV Electronic Data	
screening event record	On-board CV Electronic Data	Roadside Electronic Screening, Roadside WIM	
tag data	On-board CV Electronic Data	International Border Crossing, Roadside WIM	
tag data	On-board CV Electronic Data	Roadside Electronic Screening	R1
tag data	On-board CV Electronic Data	Roadside Safety and Security Inspection	R1
tag data	Vehicle Toll/Parking Interface	Parking Electronic Payment – PMS	
tag data	Vehicle Toll/Parking Interface	Toll Plaza Toll Collection – TCS	
tag update	Parking Electronic Payment – PMS	Vehicle Toll/Parking Interface	
tag update	Toll Plaza Toll Collection – TCS	Vehicle Toll/Parking Interface	
tax filing	Fleet Credentials & Taxes Management & Reporting	Credentials and Taxes Administration	
toll data	Infrastructure Provided Trip Planning – ISP	Fleet Administration	
toll data	Toll Administration – TAS	Fleet Administration	
toll data	Toll Administration – TAS	Infrastructure Provided Trip Planning – ISP, ISP Traveler Data Collection – ISP	
toll data request	Fleet Administration	Infrastructure Provided Trip Planning – ISP	
toll data request	Fleet Administration	Toll Administration – TAS	
toll data request	Infrastructure Provided Trip Planning – ISP, ISP Traveler Data Collection – ISP	Toll Administration – TAS	
transaction status	(FI)	Credentials and Taxes Administration	

Flow Name	Source EP (or Terminator)	Destination EP (or Terminator)	ExC Cap.
transaction status	(FI)	Interactive Infrastructure Information – ISP	
transaction status	(FI)	Parking Electronic Payment – PMS	
transaction status	(FI)	Toll Administration – TAS	
transportation border clearance assessment	International CV Administration	International Border Crossing	
transportation border clearance assessment	International CV Administration	(TRA)	
trip declaration identifiers	International CV Administration	International Border Crossing	
trip identification number	Freight Administration and Management	On-board CV Electronic Data	
trip identification number	(IFS)	On-board CV Electronic Data	
trip identification number input	(CV Driver)	On-board CV Electronic Data	
trip log	On-board Trip Monitoring	Fleet Administration	
trip log information	On-board Trip Monitoring	(CV Driver)	
trip log request	Fleet Administration	On-board Trip Monitoring	
vehicle location	Vehicle Location Determination	On-board EV En Route Support – EVS	
vehicle probe data	Vehicle Probe Support	ISP Probe Information Collection – ISP	
vehicle probe data	Vehicle Probe Support	Roadway Probe Beacons – RS	
vehicle signage data	Automated Road Signing – RS, Roadway In-Vehicle Signing – RS, Roadway Work Zone Safety – RS	In-Vehicle Signing System	
violation notification	CV Safety and Security Administration	(EA)	
violation notification	Citation and Accident Electronic Recording	CV Safety and Security Administration	

Table 3 defines the architecture flow names. Unless otherwise indicated, all flow definitions are from the National ITS Architecture Version 5.1 [Reference 5].

Table 3. CVISN Architecture Flow Names and Descriptions

CVISN Architecture Flow Names and Descriptions		
Flow Name	**Flow Description**	**CR #**
accident report	Report of commercial vehicle safety accident. The information may be provided as a response to a real-time query or proactively by the source. The query flow is not explicitly shown.	
alarm	Information about a Commercial Vehicle or Freight Equipment breach, non-permitted security sensitive hazmat detected at the roadside, route deviation, or Commercial Vehicle Driver / Commercial Vehicle / Freight Equipment assignment mismatches which includes the location of the Commercial Vehicle and appropriate identities.	
alert response	This flow represents the tactile or auditory interface with ITS equipment containing the response by a Commercial Vehicle Driver or Fleet-Freight Manager that confirms or cancels an alert.	
alerts	This flow represents the visual or auditory interface with ITS equipment containing specific alerts and messages related to commercial vehicles (e.g. trucks not advised, trucks over 10 tons not allowed on bridge, route details). This also includes detected route deviations and warning indications detected by on-board sensors (e.g., safety) and freight equipment sensors (e.g., breach, cargo).	
alerts and advisories	Assessments (general incident and vulnerability awareness information), advisories (identification of threats or recommendations to increase preparedness levels), and alerts (information on imminent or in-progress emergencies). This flow also provides supporting descriptive detail on incidents, threats, and vulnerabilities to increase preparedness and support effective response to threats against the surface transportation system.	

CVISN Architecture Flow Names and Descriptions		
Flow Name	**Flow Description**	**CR #**
archive requests	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.	
archive status	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.	
audit data	Information to support a tax audit.	
booking status	Status of the freight transport booking that includes the identities of the Commercial Vehicle and driver who will pick-up the freight or a request for more information from the originator.	
border agency clearance results	Notification regarding the granting of permission for commercial freight shipment to enter the U.S.	
border clearance data	Trip specific data regarding the movement of goods across international borders. Includes trip identification number. May also include results from recent border crossing screening events.	
border clearance data request	Request for trip specific data regarding the movement of goods across international borders. Includes trip identification number. May also include results from recent border crossing screening events.	
border clearance event	Reports clearance event data regarding action taken at border, including acceptance or override of system decision, and date/time stamp.	
border clearance status	Notification regarding the crossing status of commercial freight shipment scheduled to enter the U.S. Includes portions of border agency and transportation agency clearance results, as they become available. Recipients may include trade regulatory agencies that do not receive status information directly from U.S. Customs (e.g., other transportation agencies with trade related responsibilities, such as NHTSA, MARAD, etc.).	

CVISN Architecture Flow Names and Descriptions		
Flow Name	**Flow Description**	**CR #**
breach response	This is an Intermodal Freight Shipper's response to a breach or tamper event of their freight equipment. There may be instructions for handling of the shipment, possible re-routing or pickup.	
citation	Report of commercial vehicle citation. The citation includes references to the statute(s) that was (were) violated. It includes information on the violator and the officer issuing the citation. A citation differs from a violation because it is adjudicated by the courts. The information may be provided as a response to a real-time query or proactively by the source. The query flow is not explicitly shown.	
commercial vehicle archive data	Information describing commercial vehicle travel and commodity flow characteristics. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.	
commercial vehicle breach	Information about a breach or tamper event on a Commercial Vehicle or its attached freight equipment which includes identity, type of breach, location, and time.	
commercial vehicle disable	This flow safely disables a specific commercial vehicle.	
commercial vehicle measures	Commercial vehicle and driver status measured by on-board ITS equipment.	
compliance review report	Report containing results of carrier compliance review, including concomitant out-of-service notifications, carrier warnings/notifications. The information may be provided as a response to a real-time query or proactively by the source. The query flow is not explicitly shown.	
credential application	Application for commercial vehicle credentials. Authorization for payment is included.	
credential fee coordination	Jurisdiction's rates for various credentials (IRP, IFTA, etc.) that are exchanged between agencies.	
credentials information	Response containing full vehicle fuel tax and registration credentials information. "Response" may be provided in reaction to a real-time query or a standing request for updated information. The query flow is not explicitly shown.	CR4778

CVISN Architecture Flow Names and Descriptions		
Flow Name	**Flow Description**	**CR #**
credentials status information	Credentials information such as registration, licensing, insurance, check flags, and electronic screening enrollment data. A unique identifier is included. Corresponds to the credentials portion of CVISN "snapshots." The status information may be provided as a response to a real-time query or as a result of a standing request for updated information (subscription). This may also include information about non-U.S. fleets for use by U.S. authorities, and information regarding U.S. fleets made available to Mexican and Canadian authorities. The query flow is not explicitly shown.	
current asset restrictions	Restrictions levied on transportation asset usage based on infrastructure design, surveys, tests, or analyses. This includes standard facility design height, width, and weight restrictions, special restrictions such as spring weight restrictions, and temporary facility restrictions that are imposed during maintenance and construction.	
cv driver credential	Driver information (e.g., identity, biometrics, address, date of birth, endorsements, restrictions) stored on a driver's license or other official identification card used to identify a driver of commercial vehicles.	CR4778
cv driver record	Information typically maintained by a state driver licensing agency about a driver of a commercial vehicle including driver identification data, license data, permit data, and driving history details.	CR4778
cv driver record request	A request for information about a commercial vehicle driver.	CR4778
CVO driver initialization	This flow represents the tactile or auditory interface with ITS equipment containing the commercial vehicle driver and vehicle information. This flow contains inquiries to the commercial vehicle managing system.	
CVO pass/pull-in message	This flow represents the visual or auditory interface with ITS equipment containing a message sent to commercial vehicle driver indicating whether to bypass or requesting pull in to inspection/verification stop along with inspection results (e.g., LED indicator on transponder or variable message sign).	
CVO weight and presence	Physical attribute of commercial vehicle that can be measured (for example, weight, number of axles, axle spacing, etc.).	
cv repair status	Information about the completion of a repair to a commercial vehicle.	CR4778

CVISN Architecture Flow Names and Descriptions		
Flow Name	**Flow Description**	**CR #**
daily site activity data	Record of daily activities at commercial vehicle check stations including summaries of screening events and inspections.	
declaration information	Notification containing information regarding pending commercial freight shipment into the U.S.	
disable commercial vehicle	A request that a specific commercial vehicle should be safely disabled.	
domestic transportation information	Real-time or near real-time data regarding trade transportation activity. Potentially categorized by shipper classification, carrier, commodity, etc. Intended for use as a transportation decision tool.	
driver alert response	Commercial Vehicle Driver response to a breach alert for a Freight Equipment breach or tamper event.	
driver identity characteristics	The physical or visible characteristics of a commercial vehicle driver that can be measured to uniquely identify a driver. Could be an Identification Card with a Personal Identification Number, biometrics, or visual verification by an operator.	
driver log	A daily log showing hours in service for the current driver.	
driver log request	Request for driver log data.	
driver to fleet request	Requests from the driver and vehicle for routing, payment, and enrollment information.	
electronic lock data	Notification to roadside (via transponder) of the presence and status of electronic cargo locks.	
electronic lock data request	Request from roadside for data regarding presence and status of electronic cargo locks.	
electronic screening request	Request for identification data to support electronic screening.	
emergency acknowledge	Acknowledge request for emergency assistance and provide additional details regarding actions and verification requirements.	
emergency data request	A request for additional information or a control command issued by the emergency response agency in response to an emergency request for assistance from a traveler.	
emergency notification	An emergency request for assistance originated by a traveler using an in-vehicle, public access, or personal device or originated by a transit vehicle operator using an on-board device.	

CVISN Architecture Flow Names and Descriptions		
Flow Name	**Flow Description**	**CR #**
expected driver identity characteristics	Driver identification information, e.g., encrypted PIN codes issued to drivers, encrypted driver biometric parameters.	
fleet and freight threat information	Information about threats detected by commercial vehicle fleet and freight operators. The threats include incidents involving commercial vehicles (i.e., hijacking), unusual activities observed by commercial vehicle operators (i.e., truck parked under a bridge), and incidents involving freight equipment (i.e., freight equipment tampering).	
fleet to driver update	Updated instructions to the driver including dispatch, routing, and special instructions.	
freight breach	Information about a breach or tamper event on Freight Equipment which includes identity, type of breach, location, and time.	
freight equipment information	Container, trailer, or chassis information regarding identity, type, location, brake wear data, mileage, seal #, seal type, door open/close status, chassis bare/covered status, tethered / untethered status, Bill of Lading, and sensor status.	
freight monitoring parameters	Parameters to configure the Freight Equipment for event reporting and keep alive functions.	
freight transport booking	Booking information for the transport of freight that includes company, contact information, point of origin, pick-up location, drop-off location, and freight equipment identifier.	
hazmat environmental factors	Sensed characteristics of a vehicle that are analyzed to indicate if the vehicle is carrying a security sensitive substance, e.g., detection of radiation or ammonia compounds.	
hazmat information	Information about a particular hazmat load including nature of the load and unloading instructions. May also include hazmat vehicle route and route update information.	
hazmat information request	Request for information about a particular hazmat load.	
hazmat spill notification	This data flow is used by the on-board cargo monitoring equipment package to contact emergency response organizations when the cargo sensors detect a release of hazardous material. This information will include the vehicle location discussed above as well as identifying the carrier. The information may be provided as a response to a real-time query or proactively by the source. The query flow is not explicitly shown.	

CVISN Architecture Flow Names and Descriptions		
Flow Name	**Flow Description**	**CR #**
identification information	The physical characteristics of a commercial vehicle that can be used to determine a vehicle's identity, such as a license plate number, USDOT number, ICC number, bar code, etc.	
identities	Identification information for the Commercial Vehicle (e.g., license plate number or USDOT number), Freight Equipment (e.g., container, chassis, or trailer identification), and Driver.	
information on violators	Information on violators provided by a law enforcement agency. May include information about commercial vehicle violations or other kinds of violations associated with the particular entity. The information may be provided as a response to a real-time query or proactively by the source. The query flow is not explicitly shown.	
intermod CVO coord	Cargo movement logs, routing information, and cargo ID's.	
map update request	Request for a map update which could include a new underlying map or map layer updates.	
map updates	Map update which could include a new underlying static or real-time map or map layer(s) update.	
on-board safety data	Safety data measured by on-board sensors. Includes information about the vehicle, vehicle components, cargo, and driver.	
on-board safety request	Request for on-board vehicle safety data by the roadside equipment.	
on-board vehicle data	Information about the commercial vehicle stored on-board (for maintenance purposes, gate access, cargo status, lock status, etc.).	
on-board vehicle request	Request for on-board vehicle data.	
pass/pull-in	Command to commercial vehicle to pull into or bypass inspection station.	
payment	Payment of some kind (e.g., toll, parking, fare) by traveler, which, in most cases, can be related to a credit account.	
payment request	Request for payment from financial institution.	
position fix	Information, which provides a traveler's or vehicles geographical position.	
request for payment	Request to deduct cost of service from user's payment account.	
request tag data	Request for tag information including credit identity, stored value card cash, etc.	

CVISN Architecture Flow Names and Descriptions		
Flow Name	**Flow Description**	**CR #**
road network conditions	Current and forecasted traffic information, road and weather conditions, traffic incident information, and other road network status. Either raw data, processed data, or some combination of both may be provided by this architecture flow. Information on diversions and alternate routes, closures, and special traffic restrictions (lane/shoulder use, weight restrictions, width restrictions, HOV requirements) in effect is also included.	
route deviation alert	An alert that indicates a deviation from a planned route has been detected. The alert will contain the current Commercial Vehicle location and identity.	
route plan	Tailored route provided by ISP in response to a specific request.	
route request	Request for a tailored route based on given constraints.	
route restrictions	Information about routes, road segments, and areas that do not allow the transport of security sensitive hazmat cargoes or include other restrictions (such as height or weight limits).	
safe vehicle disable	Control signal disabling or enabling commercial vehicle.	
safety inspection record	Record containing results of commercial vehicle safety inspection.	
safety inspection report	Report containing results of commercial vehicle safety inspection. The information may be provided as a response to a real-time query or proactively by the source. The query flow is not explicitly shown.	
safety inspection request	Request for safety inspection record.	
safety status information	Safety information such as safety ratings, security ratings or flags, inspection summaries, and violation summaries. A unique identifier is included. Corresponds to the safety and security portion of CVISN "snapshots." The status information may be provided as a response to a real-time query or as a result of a standing request for updated information (subscription). This may also include information about non-U.S. fleets for use by U.S. authorities, and information regarding U.S. fleets made available to Mexican and Canadian authorities. The query flow is not explicitly shown.	CR4778
screening event record	Results of CVO electronic screening activity.	
tag data	Unique tag ID and related vehicle information.	

CVISN Architecture Flow Names and Descriptions		
Flow Name	**Flow Description**	**CR #**
tag update	Update data held in tag which can be read by another roadside device (Commercial Vehicle Check Subsystem, Toll Collection Subsystem, etc.).	
tax filing	Commercial vehicle tax filing data. Authorization for payment is included.	
toll data	Current toll schedules for different types of vehicles as well as advanced toll payment information.	
toll data request	Request made to obtain toll schedule information or pay a toll in advance. The request can be a subscription that initiates as-needed information updates as well as a one-time request for information.	
transaction status	Response to transaction request. Normally dealing with a request for payment.	
transportation border clearance assessment	Notification regarding the granting of permission for commercial freight shipment to enter the U.S. Includes directions for commercial driver to proceed to nearest vehicle weigh and inspection station for further review if required.	
trip declaration identifiers	Specific identifiers extracted from notification containing information regarding pending commercial freight shipment into the U.S. Includes carrier, vehicle, and driver identification data.	
trip identification number	The unique trip load number for a specific cross-border shipment.	
trip log	Driver's daily log, vehicle location, mileage, and trip activity (includes screening, inspection and border clearance event data as well as fare payments).	
trip log information	This flow represents the tactile or auditory interface with ITS equipment containing the information entered into the trip log, or request for update.	
trip log request	Request for trip log.	
vehicle location	Location of a vehicle calculated on-board the vehicle.	
vehicle probe data	Vehicle probe data indicating identity, route segment identity, link time and location.	
vehicle signage data	In-vehicle signage data generated by the roadway infrastructure indicating either road conditions, street names, or special information.	

CVISN Architecture Flow Names and Descriptions		
Flow Name	**Flow Description**	**CR #**
violation notification	Notification to enforcement agency of a violation. The violation notification flow describes the statute or regulation that was violated and how it was violated (e.g., overweight on specific axle by xxx pounds or which brake was out of adjustment and how far out of adjustment it was). A violation differs from a citation because it is not adjudicated by the courts.	

Table 4 presents the definitions for subsystems and terminators. Unless otherwise indicated, all definitions are from National ITS Architecture Version 5.1 [Reference 5].

Table 4. Subsystem and Terminator Descriptions.

Subsystem and Terminator Descriptions		
Subsystem/Terminator	**Updated Description**	**CR #**
Alerting and Advisory Systems	This terminator represents the federal, state, and local alerting and advisory systems that provide alerts, advisories, and other potential threat information that is relevant to surface transportation systems. This includes systems such as the Information Sharing and Analysis Centers (ISACS), the National Infrastructure Protection Center (NIPC), the Homeland Security Advisory System (HSAS), and other systems that provide intelligence about potential, imminent, or actual attacks on the transportation infrastructure or its supporting information systems. This terminator also represents the early warning and emergency alert systems operated by federal, state, county, and local agencies that provide advisories and alerts regarding all types of emergencies including natural hazards (floods, hurricanes, tornados, earthquakes), accidents (chemical spills, nuclear power plant emergencies) and other civil emergencies such as child abduction alerts that impact transportation system operation and/or require immediate public notification. Note that weather related watches and warnings, such as those issued by the National Hurricane Center, are provided by both this terminator and the Weather Service terminator since many alerting and advisory systems and the National Weather Service both provide severe weather and related hazards information. The alerts and advisories that are provided by the systems represented by this terminator are based on analysis of potential threat information that is collected from a variety of sources, including information collected by ITS systems. The bidirectional interface with this terminator allows potential threat information that is collected by ITS systems to be	CR4760

Subsystem and Terminator Descriptions		
Subsystem/Terminator	**Updated Description**	**CR #**
	provided to the alerting and advisory systems to improve their ability to identify threats and provide useful and timely information. The types of information provided by this terminator include general assessments and incident awareness information, advisories that identify potential threats or recommendations to increase preparedness levels, alerts regarding imminent or in-progress emergencies, and specific threat information such as visual imagery used for biometric image processing.	
Archived Data Management (ADMS)	The Archived Data Management Subsystem collects, archives, manages, and distributes data generated from ITS sources for use in transportation administration, policy evaluation, safety, planning, performance monitoring, program assessment, operations, and research applications. The data received is formatted and tagged with attributes that define the data source, conditions under which it was collected, data transformations, and other information (i.e., meta data) necessary to interpret the data. The subsystem can fuse ITS generated data with data from non-ITS sources and other archives to generate information products utilizing data from multiple functional areas, modes, and jurisdictions. The subsystem prepares data products that can serve as inputs to federal, state, and local data reporting systems. This subsystem may be implemented in many different ways. It may reside within an operational center and provide focused access to a particular agency's data archives. Alternatively, it may operate as a distinct center that collects data from multiple agencies and sources and provides a general data warehouse service for a region.	
Basic Commercial Vehicle	This terminator represents the motorized commercial vehicle platform that interfaces with and hosts ITS electronics. This terminator represents a vehicle that is used to transport goods which are operated by professional drivers, typically administered as part of a larger fleet, and regulated by a Fleet-Freight Manager. This classification applies to all such vehicles ranging from small panel vans used in local pick-up and delivery services to large, multi-axle tractor-trailer rigs operating on long haul routes.	

Subsystem and Terminator Descriptions		
Subsystem/Terminator	**Updated Description**	**CR #**
Commercial Vehicle Administration (CVAS)	The Commercial Vehicle Administration Subsystem will operate at one or more fixed locations within a region. This subsystem performs administrative functions supporting credentials, tax, and safety regulations. It issues credentials, collects fees and taxes, and supports enforcement of credential requirements. This subsystem communicates with the Fleet Management Subsystems associated with the motor carriers to process credentials applications and collect fuel taxes, weight/distance taxes, and other taxes and fees associated with commercial vehicle operations. The subsystem also receives applications for, and issues special Oversize/Overweight and HAZMAT permits in coordination with other cognizant authorities. The subsystem coordinates with other Commercial Vehicle Administration Subsystems (in other states/regions) to support nationwide access to credentials and safety information for administration and enforcement functions. This subsystem supports communications with Commercial Vehicle Check Subsystems operating at the roadside to enable credential checking and safety information collection. The collected safety information is processed, stored, and made available to qualified stakeholders to identify carriers and drivers that operate unsafely.	
Commercial Vehicle Check (CVCS)	The Commercial Vehicle Check Subsystem supports automated vehicle identification at mainline speeds for credential checking, roadside safety inspections, and weigh-in-motion using two-way data exchange. These capabilities include providing warnings to the commercial vehicle drivers, their fleet managers, and proper authorities of any safety problems that have been identified, accessing and examining historical safety data, and automatically deciding whether to allow the vehicle to pass or require it to stop with operator manual override. The Commercial Vehicle Check Subsystem also provides supplemental inspection services to current capabilities by supporting expedited brake inspections, the use of operator hand-held devices, mobile screening sites, on-board safety database access, and the enrollment of vehicles and carriers in the electronic clearance program.	CR4778

Subsystem and Terminator Descriptions		
Subsystem/Terminator	**Updated Description**	**CR #**
Commercial Vehicle Driver	This terminator represents the human entity that operates vehicles transporting goods including both long haul trucks and local pick up and delivery vans. This terminator is complementary to the Driver terminator in that it represents those interactions which are unique to Commercial Vehicle Operations. Data flowing from the Commercial Vehicle Driver terminator will include those system inputs specific to Commercial Vehicle Operations, such as information back to the Fleet-Freight Manager. Data flowing to the Commercial Vehicle Driver may include system outputs such as commands to pull into a roadside safety inspection facility. Showing the Driver as a terminator includes the user interface devices within the ITS architecture boundary. The Commercial Vehicle Driver will be expected to interact with the ITS interface devices designed to provide support for their usage.	
Commercial Vehicle Subsystem Aggregate (CVSAg) *[The Commercial Vehicle Subsystem Aggregate combines the National ITS Architecture Commercial Vehicle and Vehicle Subsystems; it is not a standalone subsystem within the National ITS Architecture.]*	The **Commercial Vehicle Subsystem** part resides in a commercial vehicle and provides the sensory, processing, storage, and communications functions necessary to support safe and efficient commercial vehicle operations. The Commercial Vehicle Subsystem provides two-way communications between the commercial vehicle drivers, their fleet managers, attached freight equipment, and roadside officials, and provides HAZMAT response teams with timely and accurate cargo contents information after a vehicle incident. This subsystem provides the capability to collect and process vehicle, cargo information from the attached freight equipment, and driver safety data and status and alert the driver whenever there is a potential safety or security problem. Basic identification, security and safety status data are supplied to inspection facilities at mainline speeds. In addition, the subsystem will automatically collect and record mileage, fuel usage, and border crossings. The **Vehicle Subsystem** part provides the sensory, processing, storage, and communications functions necessary to support efficient, safe, and convenient travel. These functions reside in general vehicles including personal automobiles, commercial vehicles, emergency vehicles, transit vehicles, or other vehicle types. Information	

Subsystem and Terminator Descriptions		
Subsystem/Terminator	**Updated Description**	**CR #**
	services provide the driver with current travel conditions and the availability of services along the route and at the destination. Both one-way and two-way communications options support a spectrum of information services from low-cost broadcast services to advanced, pay for use personalized information services. Route guidance capabilities assist in formulation of an optimal route and step-by-step guidance along the travel route. Advanced sensors, processors, enhanced driver interfaces, and actuators complement the driver information services so that, in addition to making informed mode and route selections, the driver travels these routes in a safer and more consistent manner. Initial collision avoidance functions provide "vigilant co-pilot" driver-warning capabilities. More advanced functions assume limited control of the vehicle to maintain safe headway. Ultimately, this subsystem supports completely automated vehicle operation through advanced communications with other vehicles in the vicinity and in coordination with supporting infrastructure subsystems. Pre-crash safety systems are deployed and emergency notification messages are issued when unavoidable collisions do occur.	
CVO Information Requestor	This terminator represents any organization or individual requesting information from the CVO Information Exchange network. It typically represents insurance companies requesting safety information on carriers, a driver requesting his/her own driving record, etc.	CR4778
Driver Identification Card	This terminator represents the portable entity (e.g., a smart card) that enables the transfer of electronic identification information about a driver. This may include license information, biometrics, and other data to identify the driver. Typically, the card will be issued by a government agency (e.g., a state driver licensing agency).	CR4778
Emergency Management (EM)	The Emergency Management Subsystem represents public safety, emergency management, and other allied agency systems that support incident management, disaster response and evacuation, security monitoring, and other security and public safety-oriented ITS applications. The subsystem includes the functions associated with fixed and mobile public safety communications centers including public safety call taker and dispatch centers operated by police (including transit police), fire, and emergency	

Subsystem and Terminator Descriptions		
Subsystem/Terminator	**Updated Description**	**CR #**
	medical services. It includes the functions associated with Emergency Operations Centers that are activated at local, regional, state, and federal levels for emergencies and the portable and transportable systems that support Incident Command System operations at an incident. This subsystem also represents other allied systems including centers associated with towing and recovery, freeway service patrols, HAZMAT response teams, and mayday service providers. The subsystem manages sensor and surveillance equipment used to enhance transportation security of the roadway infrastructure (including bridges, tunnels, interchanges, and other key roadway segments) and the public transportation system (including transit vehicles, public areas such as transit stops and stations, facilities such as transit yards, and transit infrastructure such as rail, bridges, tunnels, or bus guideways). The subsystem provides security/surveillance services to improve traveler security in public areas not a part of the public transportation system. This subsystem monitors alerts, advisories, and other threat information and prepares for and responds to identified emergencies. It interfaces with other Emergency Management Subsystems to support coordinated emergency response involving multiple agencies. The subsystem stores, coordinates, and utilizes emergency response and evacuation plans to facilitate this coordinated response. As the response progresses, situation information including damage assessments, response status, evacuation information, and resource information are shared to keep all allied agencies appraised of the response. Interface with the Transit Management Subsystem allows coordinated use of transit vehicles to facilitate response to major emergencies and to support evacuation efforts. The Emergency Management Subsystem also provides a focal point for coordination of the emergency and evacuation information that is provided to the traveling public, including wide-area alerts when immediate public notification is warranted.	

Subsystem and Terminator Descriptions		
Subsystem/Terminator	**Updated Description**	**CR #**
	The subsystem tracks and manages emergency vehicle fleets using real-time road network status and routing information from the other center subsystems to aide in selecting the emergency vehicle(s) and routes that will provide the most timely response. Interface with the Traffic Management Subsystem allows strategic coordination in tailoring traffic control to support emergency vehicle ingress and egress, implementation of special traffic restrictions and closures, evacuation traffic control plans, and other special strategies that adapt the transportation system to better meet the unique demands of an emergency.	
Emergency Vehicle (EVS)	This subsystem resides in an emergency vehicle and provides the sensory, processing, storage, and communications functions necessary to support safe and efficient incident response. The subsystem represents a range of vehicles including those operated by police, fire, and emergency medical services. In addition, this subsystem represents other incident response vehicles including towing and recovery vehicles and freeway service patrols. The Emergency Vehicle Subsystem includes two-way communications to support coordinated response to emergencies in accordance with an associated Emergency Management Subsystem. Emergency vehicles are equipped with automated vehicle location capability for monitoring by vehicle tracking and fleet management functions in the Emergency Management Subsystem. Using these capabilities, the appropriate emergency vehicle to respond to each emergency is determined. Route guidance capabilities within the vehicle enable safe and efficient routing to the emergency. In addition, the emergency vehicle may be equipped to support signal preemption through communications with the Roadway Subsystem.	
Enforcement Agency	This terminator represents the systems that receive reports of violations detected by various ITS facilities including individual vehicle emissions, toll violations, CVO violations, excessive speed in work zones, etc.	

Subsystem and Terminator Descriptions		
Subsystem/Terminator	**Updated Description**	**CR #**
Financial Institution	This terminator represents the organization that handles all electronic fund transfer requests to enable the transfer of funds from the user of the service to the provider of the service. The functions and activities of financial clearinghouses are subsumed by this entity.	
Fleet and Freight Management (FMS)	The Fleet and Freight Management Subsystem provides the capability for commercial drivers and fleet or freight managers to receive real-time routing information and access databases containing vehicle and/or freight equipment locations as well as carrier, vehicle, freight equipment and driver information. In addition, the capability to purchase credentials electronically shall also be provided, with automated and efficient connections to financial institutions and regulatory agencies, along with post-trip automated mileage and fuel usage reporting. The Fleet and Freight Management Subsystem also provides the capability for fleet managers to monitor the safety and security of their commercial vehicle drivers and fleet. The subsystem also supports application for hazmat credentials and makes information about hazmat cargo available to agencies as required. Within this subsystem lies all the functionality associated with subsystems and components necessary to enroll and participate in international goods movement programs aimed at enhancing trade and transportation safety and security.	
Freight Equipment	This terminator represents a freight container, intermodal chassis or trailer and provides information to support safe, secure and efficient freight operations. This terminator provides equipment safety data and status and can alert the appropriate systems of an incident, breach, or tamper event. This terminator provides accurate position information to support in-transit visibility of freight equipment.	

Subsystem and Terminator Descriptions		
Subsystem/Terminator	**Updated Description**	**CR #**
Information Service Provider (ISP)	This subsystem collects, processes, stores, and disseminates transportation information to system operators and the traveling public. The subsystem can play several different roles in an integrated ITS. In one role, the ISP provides a general data warehousing function, collecting information from transportation system operators and redistributing this information to other system operators in the region and other ISPs. In this information redistribution role, the ISP provides a bridge between the various transportation systems that produce the information and the other ISPs and their subscribers that use the information. The second role of an ISP is focused on delivery of traveler information to subscribers and the public at large. Information provided includes basic advisories, traffic and road conditions, transit schedule information, yellow pages information, ridematching information, and parking information. The subsystem also provides the capability to provide specific directions to travelers by receiving origin and destination requests from travelers, generating route plans, and returning the calculated plans to the users. In addition to general route planning for travelers, the ISP also supports specialized route planning for vehicle fleets. In this third role, the ISP function may be dedicated to, or even embedded within, the dispatch system. Reservation services are also provided in advanced implementations. The information is provided to the traveler through the Personal Information Access Subsystem, Remote Traveler Support Subsystem, and various Vehicle Subsystems through available communications links. Both basic one-way (broadcast) and personalized two-way information provision is supported. The subsystem provides the capability for an informational infrastructure to connect providers and consumers, and gather that market information needed to assist in the planning of service improvements and in maintenance of operations.	

Subsystem and Terminator Descriptions		
Subsystem/Terminator	**Updated Description**	**CR #**
Intermodal Freight Depot	A depot operated either by a depot manager or an alternate mode freight shipper which represents the point of exchange where freight is moved from one mode to another. The depot has knowledge about activities that may impact travel on roadways such as large groups of trucks entering the highway after unloading a ship or freight train. The depot interfaces to the ITS to coordinate freight movement with Fleet-Freight Managers, gather information on traffic conditions affecting the depot, and to provide information on intermodal freight activities that is pertinent to traffic movement in the surrounding area.	
Intermodal Freight Shipper	This terminator represents organizations that engage in the shipment of freight by multiple means, in addition to road-going trucks. They enable ITS to move goods on routes that require the use of other modes of transportation such as heavy rail, air, sea, etc. This terminator includes third party logistics providers (i.e., brokers, freight forwarders, etc) that interface with Fleet-Freight Managers to transfer cargo from one mode to another. This definition includes those responsible for the movement of freight across international borders. These entities are responsible for filing required declarations, and have an acute interest in the status of international shipments.	
Location Data Source	This terminator provides accurate position information. Systems, which use GPS, terrestrial trilateration, or driver inputs, are all potential examples of Location Data Sources. This terminator contains sensors such as radio position receivers (e.g., GPS) and/or dead reckoning sensors (e.g., odometer, differential odometer, magnetic compass, gyro, etc.). This terminator implies that some additional functionality associated with developing an absolute position is outside the system and will not be directly modeled by the logical or physical architecture representations of the system.	

Subsystem and Terminator Descriptions		
Subsystem/Terminator	**Updated Description**	**CR #**
Maintenance and Construction Management	The Maintenance and Construction Management Subsystem monitors and manages roadway infrastructure construction and maintenance activities. Representing both public agencies and private contractors that provide these functions, this subsystem manages fleets of maintenance, construction, or special service vehicles (e.g., snow and ice control equipment). The subsystem receives a wide range of status information from these vehicles and performs vehicle dispatch, routing, and resource management for the vehicle fleets and associated equipment. The subsystem participates in incident response by deploying maintenance and construction resources to an incident scene, in coordination with other center subsystems. The subsystem manages equipment at the roadside, including environmental sensors and automated systems that monitor and mitigate adverse road and surface weather conditions. The subsystem manages the repair and maintenance of both non-ITS and ITS equipment including the traffic controllers, detectors, dynamic message signs, signals, and other equipment associated with the roadway infrastructure. Additional interfaces to weather information providers (the weather service and surface transportation weather service providers) provide current and forecast weather information that can be fused with other data sources and used to support advanced decision support systems that increase the efficiency and effectiveness of maintenance and construction operations. The subsystem remotely monitors and manages ITS capabilities in work zones, gathering, storing, and disseminating work zone information to other systems. It manages traffic in the vicinity of the work zone and advises drivers of work zone status (either directly at the roadside or through an interface with the Information Service Provider or Traffic Management subsystems.) It schedules and manages the location and usage of maintenance assets (such as portable dynamic message signs). Construction and maintenance activities are tracked and coordinated with other systems, improving the quality and accuracy of information available regarding closures and other roadway construction and maintenance activities.	

Subsystem and Terminator Descriptions		
Subsystem/Terminator	**Updated Description**	**CR #**
Map Update Provider	This terminator represents a third-party developer and provider of digitized map databases used to support ITS services. It supports the provision of the databases that are required exclusively for route guidance (navigable maps) as well as those that are used exclusively for display by operators, e.g., Fleet-Freight Managers (restricted routes) and at traveler information points, e.g., kiosks (display maps).	
Other CVAS	This terminator is intended to provide a source and destination for ITS data flows between peer (e.g., inter-regional) commercial vehicle administration functions. It enables commercial vehicle administration activities to be coordinated across different jurisdictional areas. In the Physical Architecture, this terminator is a reciprocal Commercial Vehicle Administration Subsystem (CVAS). This terminator encompasses all functions associated with commercial vehicle safety, registration, and operating authority for non-U.S. based commercial motor vehicle carriers. The agencies represented herein may include Federal, state, provincial, and local regulatory entities outside the U.S.	
Parking Management (PMS)	The Parking Management Subsystem provides electronic monitoring and management of parking facilities. It supports a dedicated short-range communications (DSRC) communications link to the Vehicle Subsystem that allows electronic collection of parking fees. It also includes the instrumentation, signs, and other infrastructure that monitors parking lot usage and provides local information about parking availability and other general parking information. This portion of the subsystem functionality must be located in the parking facility where it can monitor, classify, and share information with customers and their vehicles. The subsystem also interfaces with the financial infrastructure and broadly disseminates parking information to other operational centers in the region. Note that the latter functionality may be located in a back office, remote from the parking facility.	

Subsystem and Terminator Descriptions		
Subsystem/Terminator	**Updated Description**	**CR #**
Roadway (RS)	This subsystem includes the equipment distributed on and along the roadway that monitors and controls traffic and monitors and manages the roadway itself. Equipment includes traffic detectors, environmental sensors, traffic signals, highway advisory radios, dynamic message signs, CCTV cameras and video image processing systems, grade crossing warning systems, and freeway ramp metering systems. HOV lane management, reversible lane management functions, and barrier systems that control access to transportation infrastructure such as roadways, bridges and tunnels are also supported. This subsystem also provides the capability for environmental monitoring including sensors that measure road conditions, surface weather, and vehicle emissions. In adverse conditions, automated systems can be used to apply anti-icing materials, disperse fog, etc. Work zone systems including work zone surveillance, traffic control, driver warning, and work crew safety systems are also included. To enhance security, safeguard systems such as blast shields, exhaust systems and other automated and remotely controlled systems to protect transportation infrastructure is also provided. In advanced implementations, this subsystem supports automated vehicle safety systems by safely controlling access to and egress from an Automated Highway System through monitoring of, and communications with, AHS vehicles. Intersection collision avoidance functions are provided by determining the probability of a collision in the intersection and sending appropriate warnings and/or control actions to the approaching vehicles.	

Subsystem and Terminator Descriptions		
Subsystem/Terminator	**Updated Description**	**CR #**
Toll Administration (TAS)	The Toll Administration Subsystem provides general payment administration capabilities and supports the electronic transfer of authenticated funds from the customer to the transportation system operator. This subsystem supports traveler enrollment and collection of both pre-payment and post-payment transportation fees in coordination with the existing, and evolving financial infrastructure supporting electronic payment transactions. The system may establish and administer escrow accounts depending on the clearinghouse scheme and the type of payments involved. This subsystem posts a transaction to the customer account and generates a bill (for post-payment accounts), debits an escrow account, or interfaces to the financial infrastructure to debit a customer designated account. It supports communications with the Toll Collection Subsystem to support fee collection operations. The subsystem also sets and administers the pricing structures and includes the capability to implement road-pricing policies in coordination with the Traffic Management Subsystem. The electronic financial transactions in which this subsystem is an intermediary between the customer and the financial infrastructure shall be cryptographically protected and authenticated to preserve privacy and ensure authenticity and auditability.	
Toll Collection (TCS)	The Toll Collection Subsystem provides the capability for vehicle operators to pay tolls without stopping their vehicles using locally determined pricing structures and includes the capability to implement various variable road pricing policies. Each transaction is accompanied by feedback to the customer indicating the general status of the customer account. A record of the transactions is provided to the Toll Administration Subsystem for reconciliation and so that the customer can periodically receive a detailed record of the transactions.	

Subsystem and Terminator Descriptions		
Subsystem/Terminator	**Updated Description**	**CR #**
Trade Regulatory Agencies	These agencies include U.S. domestic and foreign governmental agencies responsible for the regulation of trade, and the enforcement of customs and immigration laws. These agencies include U.S. Customs, the U.S. Immigration and Naturalization Service (INS), and their counterparts in Canada and Mexico. They may also include secondary trade agencies (e.g., U.S. Food and Drug Administration, U.S. Department of Agriculture, other USDOT departments, etc.), and agencies from other trading nations.	
Traveler Card	This terminator represents the entity that enables the actual transfer of electronic information from the user of a service (i.e., a traveler) to the provider of the service. This may include the transfer of funds through means of an electronic payment instrument. The device, like a smart card, may also hold and update the traveler's information such as personal profiles or trip histories.	

Table 5 presents the definitions for equipment packages. Unless otherwise indicated, all definitions are from National ITS Architecture Version 5.1 [Reference 5]. Italics indicate that the equipment package currently falls outside the scope of Core CVISN but is part of systems that support commercial vehicle operations; if an italicized equipment package name is also underlined, it supports Expanded CVISN capabilities.

Table 5. Equipment Package Descriptions.

Equipment Package Descriptions		
SUBSYSTEM Equipment Package	**Updated Description**	**CR #**
CVAS		
Credentials and Taxes Administration	This equipment package issues credentials, collects fees and taxes, and supports enforcement of credential requirements. It manages driver licensing. It communicates with the Fleet and Freight Management Subsystems associated with the motor carriers to process credentials applications and collect fuel taxes, weight/distance taxes, and other taxes and fees associated with commercial vehicle operations. The subsystem also receives applications for, and issues special Oversize/Overweight and HAZMAT permits in coordination with other cognizant authorities. This equipment package communicates with similar packages in other jurisdictions to exchange credentials database information. This equipment package also exchanges hazmat route restrictions information, and provides a clearinghouse for this information that can be shared with Map Update Providers, Fleet and Freight Management subsystems and Information Service Providers.	CR4760 CR4778
CV Data Collection	This equipment package collects and stores commercial vehicle information that is collected in the course of Commercial Vehicle Administration Subsystem operations. This data can be used directly by operations personnel or it can be made available to other data users and archives in the region.	
CV Information Exchange	This equipment package supports the exchange of safety and credentials data among jurisdiction. The package also supports the exchange of safety and credentials data between systems (for example, an administrative center and the roadside check facilities) within a single jurisdiction. Data are collected from multiple authoritative sources and	CR4760 CR4778

Equipment Package Descriptions		
SUBSYSTEM Equipment Package	**Updated Description**	**CR #**
	packaged into snapshots (top-level summary and critical status information) and profiles (detailed and historical data). Data is made available to fleet operators, and other information requestors.	
CV Safety and Security Administration	This equipment package provides commercial vehicle safety and security criteria to roadside check facilities; collects and reviews safety and security data from the field; and distributes safety and security information to other centers, carriers, and enforcement agencies. It supports the collection and review of carrier and driver safety and security data and supports determination of the carrier and driver safety and security ratings. It clears the out-of-service status when the responsible carrier or driver reports that deficiencies flagged during inspections have been corrected.	CR4760 CR4778
International CV Administration	This equipment package generates and processes the entry documentation necessary to obtain release of vehicle, cargo, and driver across an international border, report the results of the crossing event, and handle duty fee processing. It includes the systems used by customs and immigration, carriers, and service providers (e.g., brokers) to generate, process, and store entry documentation.	CR4760
CVCS		
Citation and Accident Electronic Recording	The equipment package documents accidents, citations, and violations identified during roadside safety inspections and forwards the information to the Commercial Vehicle Administration Subsystem for processing. It collects data from the vehicle to help characterize the circumstances surrounding the accident.	CR4760 CR4778
International Border Crossing	This equipment package checks compliance with import/export and immigration regulations to manage release of commercial vehicle, cargo, and driver across an international border. It includes the equipment at international border crossings operated by government agencies such as customs and immigration.	CR4760
Roadside Electronic Screening	This equipment package provides two-way communication with approaching properly equipped commercial vehicles at mainline speeds, reading tags for automated vehicle identification and credential checking. This equipment package processes the data from	CR4760

Equipment Package Descriptions		
SUBSYSTEM Equipment Package	**Updated Description**	**CR #**
	the commercial vehicles along with accessed database information to determine whether a pull-in message is needed or to generate random pull-in messages with provisions for facility operators and enforcement officials to have manual override capabilities.	
Roadside HAZMAT Detection	This equipment package detects and identifies commercial vehicles carrying security sensitive hazardous materials. It assess the likelihood of the presence of security sensitive HAZMAT materials based on remote sensed data as well as other physical information acquired about the commercial vehicle. It then determines if any detected HAZMAT is authorized. If unauthorized HAZMAT material is detected, a pull-in message is generated. The equipment package may also issue a message to the Emergency Management (Police Dispatch) function that includes: location of the incident, current location of the commercial vehicle, timestamp, Vehicle ID, Carrier ID, Driver ID, CV Credentials information, HAZMAT material or category detected, and cargo manifest (if known).	CR4760
Roadside Safety and Security Inspection	This equipment package supports the roadside safety inspection process. It reads on-board safety data at mainline speeds to rapidly ~~screen~~ check the vehicle and driver and accesses historical safety data after identifying vehicles at mainline speeds or while stopped at the roadside. The capabilities to process safety data and issue pull-in messages or provide warnings to the driver, carrier, and enforcement agencies are also provided. It includes hand held or automatic devices to rapidly inspect the vehicle and driver. Results of screening and summary safety inspection data are stored and maintained. Since a vehicle may cross jurisdictional boundaries during a trip, this equipment package supports the concept of a last clearance event record carried on the vehicle tag. The last clearance event record reflects the results of the roadside verification action. For example, if the vehicle is pulled over in State A and undergoes credential, weight, and safety checks, the results of the clearance process are written to the vehicle s tag. If the vehicle continues the trip and passes a roadside station in State B, the State B station has access to the results of the previous pull-in because it can read the last clearance event record written by the State A roadside station. This equipment package associates high-	CR4760 CR4778

Equipment Package Descriptions		
SUBSYSTEM Equipment Package	**Updated Description**	**CR #**
	risk cargo with the container/chassis, manifest, carrier, vehicle and driver transporting it.	
Roadside WIM	This equipment package measures commercial vehicle weight at high speeds. It includes both portable and permanent installations and can be used to augment electronic credentials checking or it can be a stand alone package with display.	CR4760
CVSAg (CVS)		
On-board Cargo Monitoring	This on-board equipment package monitors the location and status of the commercial vehicle and its cargo. It sends the collected data to appropriate centers and roadside facilities, including emergency management in the case of HAZMAT incidents. Depending on the nature of the cargo, this equipment package may include sensors that measure temperature, pressure, load leveling, acceleration, and other attributes of the cargo.	CR4760
On-board CV Electronic Data	This on-board equipment package exchanges information with roadside facilities, providing information such as driver, vehicle, and carrier identification to roadside facilities that can be used to support electronic screening. Pass/pull-in messages are received and presented to the commercial vehicle driver and screening events are recorded. Additional information, including trip records (e.g., border clearance information), safety inspection records, cargo information, and driver status information may also be collected, stored, and made available to the roadside facility by this equipment package.	CR4760
On-board CV Safety and Security	This on-board equipment package collects and processes vehicle and driver safety and security information and provides safety and security information to the Fleet and Freight Management Subsystem. This equipment package also supplies this information to the roadside facilities both at mainline speeds and while stopped for inspections. The capability to alert the commercial vehicle driver whenever there is a critical safety or security problem or potential emergency is also provided. The package also supports on-board driver safety log maintenance and checking.	CR4760
On-board Driver Authentication	This on-board equipment package monitors the identity of the commercial vehicle driver	CR4760

Equipment Package Descriptions		
SUBSYSTEM Equipment Package	**Updated Description**	**CR #**
	and compares it with the planned drivers for the commercial vehicle. Any change in driver is sent to the Fleet and Freight Management Subsystem. Notification of any unexpected drivers will also be sent to the Fleet and Freight Management Subsystem which, in turn, may send a disable vehicle command back to this equipment package to cause the vehicle to stop. On receipt of a disable vehicle message from the Fleet and Freight Management Subsystem or on detection of an unauthorized driver, the equipment package will safety disable the CV.	
On-board Trip Monitoring	This equipment package provides the capabilities to support fleet management with automatic vehicle location and automated mileage and fuel reporting and auditing. In addition, this equipment is used to monitor the planned route and notify the Fleet and Freight Management Subsystem of any deviations.	CR4760
CVSAg (VS)		
In-Vehicle Signing System	This equipment package presents information to the driver using in-vehicle equipment that augments information provided by roadside signs (both static and dynamic) and traffic control devices. Any information that might be displayed by a roadside device can be provided via short range communications to the vehicle and presented to the driver using this equipment package. Information presented may include fixed sign information, traffic control device states (e.g., traffic signal states), advisory and detour information, and warnings of adverse road and weather conditions.	CR4778
Vehicle Location Determination	This equipment package determines current location of the vehicle using GPS or similar location referencing capability and provides this information to other equipment packages that use the location information to provide various ITS services.	CR4760
Vehicle Mayday I/F	This equipment package provides the capability for drivers or collision detection sensors to report an emergency and summon assistance. This equipment package includes the on-board collision detection sensors, a mechanism for the driver to summon assistance, and two-way communications with a service provider.	CR4760
Vehicle Probe Support	This equipment package includes capabilities for the probe vehicle to identify its	CR4760

Equipment Package Descriptions		
SUBSYSTEM Equipment Package	**Updated Description**	**CR #**
	location, measure traffic conditions such as link travel time and speed, and transmit these data to a center or roadside beacons.	
Vehicle Toll/Parking Interface	This equipment package includes the on-board systems that pay for tolls and parking electronically. It includes in-vehicle equipment that communicates with the toll/parking plaza (e.g., a tag) and an optional interface to a traveler card to allow use of a common payment medium for all transportation services.	CR4760
FMS		
Commercial Vehicle and Freight Security	This equipment package provides for the security of the commercial vehicle and the freight that it carries by detecting breaches such as seals or locks being broken into by unauthorized personnel and/or any other unauthorized tampering. In addition, this equipment package monitors the commercial vehicle driver and compares it with the planned driver for the vehicle. In a similar manner, the driver and vehicle that have been assigned to move freight are monitored and compared with the planned assignment for that freight. In all cases, any deviations to the planned assignments and any breach or tamper events are reported to the Emergency Management Subsystem.	
Fleet Administration	This equipment package provides vehicle tracking, dispatch, and reporting capabilities to fleet management center personnel. It gathers current road conditions and traffic information, prepares vehicle routes, and provides a fleet interface for toll collection. It also provides route plan information for network performance evaluation. As part of the tracking function, this equipment package monitors commercial vehicle location, compares it against the known route and notifies the Emergency Management Subsystem and Fleet-Freight Manager of any deviations, including HAZMAT route restriction violations. This equipment package supports pre-hiring checks for potential drivers and monitors the performance of each driver who is hired. It also supports ongoing monitoring of the company's safety performance.	CR4778
Fleet Credentials and Taxes Management and Reporting	This equipment package provides the capability to purchase credentials, file taxes and trip reports electronically, and perform electronic enrollment in expedited border	CR4760

Equipment Package Descriptions		
SUBSYSTEM Equipment Package	**Updated Description**	**CR #**
	crossing programs. It tracks and manages credentials and provides electronic interfaces to appropriate state and federal commercial vehicle administration centers.	
Fleet HAZMAT Management	This equipment package manages hazardous materials shipments. In the event of an incident, it notifies the Emergency Management Subsystem, providing information on the nature of the cargo and the vehicle equipment.	CR4760
Fleet Maintenance Management	This equipment package tracks and monitors diagnostic results, vehicle mileage, inspection records, and repair and service records collected from a commercial vehicle fleet equipped with on-board monitoring equipment. The data is used to develop preventative maintenance and repair schedules and repair and service records are maintained.	CR4760
Freight Administration and Management	This equipment package manages the movement of freight from source to destination via links to the freight equipment, intermodal freight shippers, and depots. It interfaces to intermodal freight shippers to setup and schedule transportation and coordinates with intermodal freight depots to coordinate the shipment. The equipment package monitors the status of the freight and freight equipment (container, trailer, or chassis) and monitors freight location and compares it against the planned route.	CR4760

Equipment Package Descriptions		
SUBSYSTEM Equipment Package	**Updated Description**	**CR #**
Manage CV Driver Identification	This equipment package collects and stores driver identification records including driver issued PINS and/or individual driver biometric measurements. The equipment package can also manage the storage of driver PINs, data from a Driver Identification Card, and/or biometric measurements for authorized drivers on individual commercial vehicles. Based on information reported by the commercial vehicle, the equipment package will determine if the driver is authorized, and notify the Commercial Vehicle Manager when an unauthorized driver is detected. The Commercial Vehicle Manager may override the disable vehicle action. When an unauthorized driver is detected and the system is not overridden, then the equipment package will issue a message to the commercial vehicle to safely disable the vehicle. If an unauthorized driver is detected, then the equipment package will send to the Emergency Management Subsystem an alert that includes: incident location, current location of the CV, Vehicle ID, Carrier ID, Driver ID, CV Credentials information, and cargo manifest (if known).	CR4760 CR4778

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3. CHANGE REQUESTS

3.1. Change Requests Incorporated

This section summarizes the changes incorporated into the CVISN Architecture since it was aligned with the National ITS and IBC Architectures as documented in References 1, 2, 3 and 4 prior to the release of Versions 5.1 and 5.1.1 of the National ITS Architecture [Reference 5].

- **CR 4758** – Bring the CVO Subsystems Interconnect ("sausage") diagram into alignment with the corresponding National ITS Architecture diagram.

  The following changes need to be made to the CVO diagram to bring it into alignment with changes made to Version 5.0 of the National ITS Architecture:

  1. Add Security Monitoring subsystem
  2. Change Wireline Wide Area Communications to Fixed-Point to Fixed-Point Communications
  3. Add "(Mobile)" to Wide Area Wireless Communications label
  4. Change Personal Information Access to Wide Area Wireless (Mobile) Communications
  5. Change Roadside label to Field The attached file shows the proposed changes.

- **CR 4760** – Update CVISN Architecture to keep pace with changes to the National ITS Architecture (Versions 5.1 and 5.1.1).

  The CVISN Architecture document should be updated to align with changes made in Version 5.1.0 and 5.1.1 of the National ITS Architecture. The changes include:

  1. Architecture flow trip identification number was replaced by trip identification number input from CV Driver to CVSAg(CVS). (Version 5.1)
  2. Version 5.1 of the National ITS Architecture organized the functional requirements by Equipment Package (EP) and added them to the physical architecture database and hypertext. In connection with those changes, the descriptions for these Equipment Packages were revised: Credentials and Taxes Administration, CV Information Exchange, CV Safety Administration, International CV Administration, Citation and Accident Electronic Recording, International Border Crossing, Roadside Electronic Screening, Roadside HAZMAT Detection, Roadside Safety and Security Inspection, Roadside WIM, On-board Cargo Monitoring, On-board CV Electronic Data, On-board CV Safety and Security, On-board Driver Authentication, On-board Trip Monitoring, Vehicle Location Determination, Vehicle Mayday I/F (name modification as well), Vehicle Probe Support, Vehicle Toll/Parking Interface, Fleet Credentials and Taxes Management and Reporting, Fleet HAZMAT Management, Fleet Maintenance Management, Freight Administration and Management, and Manage CV Driver Identification. The revised EP descriptions clarify the functions assigned to each package.
  3. Updated terminator description: Alerting and Advisory Systems

4. Updated ITS Standards Information (5.1.1) "The ITS standards area was updated to make it consistent with the new ITS Standards Program website. Many minor changes were made to the ITS standards information so that the two sites are completely consistent in the standards information that is presented. Changes were made to standards document numbers and standards titles and several standards were added/removed to match current ITS standards activities. The DSRC 915 MHz standards group description was updated to reflect feedback from the CVO community." Further analysis required to determine if these changes impact the CVISN architecture.

   Fix: Update the CVISN Architecture document to match the new flow name, equipment package descriptions, and terminator description.

- **CR 4762 –** Slightly expand scope of CVISN Architecture document.

  The CVISN System Design Description document is no longer maintained. It contained several high-level diagrams and descriptions should be updated and made accessible to all states in a current document.

  Fix: The only document that is being maintained is the CVISN Architecture. Expand the scope of the CVISN Architecture document to include selected high-level diagrams and descriptions. In particular:

  - Move the brief description of Core CVISN capabilities into the CVISN Architecture document.
  - Annotate the latest version of the sausage diagram (see CR 4758) to highlight CVO aspects and move it into the CVISN Architecture document.
  - Add the table of standard identifiers to the CVISN Architecture document.
  - Add the brief descriptions of the 41 Expanded CVISN Capabilities to the CVISN Architecture document. These were documented in APL document SSD-PL-05-0202, Expanded Commercial Vehicle Information Systems and Networks (CVISN) Summary Report, June 2005.

- **CR 4763 –** Add source and destination equipment packages for CVISN architecture flows.

  The National ITS Architecture shows source and destination equipment packages for each architecture flow that is exchanged between EPs in different subsystems. The CVISN Architecture document does not.

  Fix: Add a table to show source and destination equipment packages for each flow.

- **CR 4764 –** Eliminate distinction between wireline and wireless lines on CVISN Architecture Flow Diagram.

  Different line types are used on the CVISN Architecture Flow Diagram to indicate Wireline (Fixed Point Communications), DSRC, Wide Area Wireless, and Other Transactions. The distinction between wireline and wireless communications is no longer of value for CVO applications.

  Fix: Use a single line type for both wireless and wireline communications.

- **CR 4778 –** Update CVISN Architecture to better address Expanded CVISN capabilities.

As part of the CVISN program, the Federal Motor Carrier Safety Administration (FMCSA) defined an initial set of capabilities that could be deployed incrementally by a state and its motor carriers. Those “Core CVISN” capabilities focus on electronically exchanging safety and credentialing information, electronically processing interstate registration and fuel tax credentials and filings, and implementing transponder-based roadside electronic screening at one fixed or mobile site. The Expanded CVISN initiative builds on Core CVISN to continue to enhance the safety, security and productivity of commercial vehicle operations and to improve access to and quality of information about commercial vehicle operations for authorized public and private sector users. Through extensive outreach in 2004, FMCSA engaged stakeholders to identify the capabilities necessary to achieve the goals of Expanded CVISN. This CR proposes changes to the CVISN Architecture and the National ITS Architecture to better support Expanded CVISN capabilities.

- New Terminators:
  - Driver Identification Card - This terminator represents the portable entity (e.g., a smart card) that enables the transfer of electronic identification information about a driver. This may include license information, biometrics, and other data to identify the driver.
- New Architecture Flows:
  - cv driver credential – Driver information (e.g., identity, biometrics, address, date of birth, endorsements, restrictions) stored on a driver’s license or other official identification card used to identify a driver of commercial vehicles.
  - cv repair status – Information about the completion of a repair to a commercial vehicle.
  - cv driver record – Information typically maintained by a state driver licensing agency about a driver of a commercial vehicle including driver identification data, license data, permit data, and driving history details.
  - cv driver record request – A request for information about a commercial vehicle driver.
- Modified Subsystem description: Commercial Vehicle Check System (CVCS)
- Modified EP Name: CV Safety *and Security* Administration
- Modified EP descriptions: CV Information Exchange, CV Safety and Security Administration, Credentials and Taxes Administration, Fleet Administration, Manage CV Driver Identification, Citation and Accident Electronic Recording, Roadside Safety and Security Inspection
- Added EP: In-Vehicle Signing System
- Modified architecture flow descriptions:
  - safety status information – Safety information such as safety ratings, security ratings or flags, inspection summaries, and violation summaries. A unique identifier is included. Corresponds to the safety and security portion of CVISN "snapshots." The

status information may be provided as a response to a real-time query or as a result of a standing request for updated information (subscription). This may also include information about non-U.S. fleets for use by U.S. authorities, and information regarding U.S. fleets made available to Mexican and Canadian authorities. The query flow is not explicitly shown.

- credentials information – Response containing full vehicle fuel tax and registration credentials information. "Response" may be provided in reaction to a real-time query or a standing request for updated information. The query flow is not explicitly shown.

- Flows added to the CVISN Architecture Flow Diagram:
  accident report: CVAS to CVCS
  accident report: CVAS to Other CVAS
  accident report: Other CVAS to CVAS
  alerts and advisories: Alerting and Advisory Systems to CVAS
  alerts and advisories: Alerting and Advisory Systems to CVCS
  citation: CVAS to CVCS
  citation: CVAS to Other CVAS
  citation: Other CVAS to CVAS
  commercial vehicle disable: CVSAg(CVS) to CVCS
  cv driver record: CVAS to CVCS
  cv driver record: CVAS to CVOIR
  cv driver record: CVAS to FMS
  cv driver record: CVAS to Other CVAS
  cv driver record: Other CVAS to CVAS
  cv driver record request: CVCS to CVAS
  cv driver record request: CVOIR to CVAS
  cv driver record request: FMS to CVAS
  cv driver record request: CVAS to Other CVAS
  cv driver record request: Other CVAS to CVAS
  cv driver credential: Driver ID Card to CVCS
  cv driver credential: Driver ID Card to CVSAg(CVS)
  cv driver credential: Driver ID Card to FMS
  cv repair status: FMS to CVAS
  expected driver identity characteristics: CVSAg(CVS) to CVCS
  freight equipment information: CVSAg(CVS) to CVCS

These changes will be reflected in the CVISN Architecture document. In that document, the architecture flows will also be mapped between specific equipment packages (new Table 2).

3.2. Change Requests Pending

All the change requests listed above have been implemented in this version of the CVISN Architecture. All have been agreed to by the CVISN ACCB. They have been or will be submitted to the FMCSA Enterprise Configuration Control Board for final approval.

CR 4778 has been coordinated with the National ITS Architecture team as ID 629 *Architecture Changes to Support Expanded CVISN* in their change management process.

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APPENDIX A – DEFINITION OF CORE CVISN DEPLOYMENT

- **An organizational framework for cooperative system development has been established among state agencies and motor carriers.**

- **A state CVISN System Design has been established that conforms to the CVISN Architecture and can evolve to include new technology and capabilities.**

- **All the elements of three capability areas (below) have been implemented using applicable architectural guidelines, operational concepts, and standards:**

  - **Safety Information Exchange**
    - Inspection reporting using ASPEN (or equivalent) at all major inspection sites. ASPEN data sent to SAFER (Safety and Fitness Electronic Records) directly or indirectly.
    - Connection to the SAFER system to provide exchange of interstate carrier and vehicle data snapshots among states.
    - Implementation of CVIEW (or CVIEW equivalent) system for exchange of intrastate and interstate data within state and connection to SAFER for exchange of interstate data through snapshots.

      – OR –

    - Utilization of SAFER option for exchange of inter- and intrastate data through snapshots.

  - **Credentials Administration**
    - Automated electronic processing via Web-based or computer-to-computer solutions from carrier to state (processing includes carrier application, state application processing, credential issuance, and tax filing) of at least IRP (International Registration Plan) and IFTA (International Fuel Tax Agreement) credentials; ready to extend to other credentials [intrastate, titling, OS/OW (Oversize/Overweight), carrier registration, HazMat]. Note: Processing does not necessarily include e-payment.
    - Update SAFER with credential information for interstate credential information as actions are taken.
    - Connection to IRP and IFTA Clearinghouses.
    - At least 10% of the transaction volume handled electronically; ready to bring on more carriers as carriers sign up; ready to extend to branch offices where applicable.

  - **Electronic Screening**
    - Use snapshots to support screening decisions.
    - Implemented at a minimum of one fixed or mobile inspection site.
    - Ready to replicate at other sites.

APPENDIX B – EXPANDED CVISN CAPABILITIES

The list of Expanded CVISN Capabilities includes these items. Those that are in gray text (instead of black) are not at a level that would affect the National ITS Architecture.

Driver Information Sharing

D1. Establish, maintain and provide controlled access to driver snapshots/Use and maintain driver snapshots for all processes.

D2. Improve access to driver information for enforcement and carrier personnel to target driver safety risk.

D3. Provide roadside tools to evaluate compliance with hours-of-service regulations.

D4. Improve identity checks in all driver-licensing processes.

D5. Link driver performance data to related carrier ID to identify high-risk carriers.

D6. Determine security rating for drivers.

D7. Provide on-line tools to help carriers assess potential drivers and monitor current drivers' performance.

D8. Ensure that systems control access to driver records.

D9. Allow the driver to review, challenge and correct information in their driving record.

D10. Expand the use of standards for commercial drivers' licenses (CDLs) and information systems that store driver data; include standards for identification security.

D11. Improve the standardization of citation data collection and information sharing among enforcement agencies.

Enhanced Safety Information Sharing

S1. Establish data timeliness, data accuracy and integrity measures.

S2. Regularly check data used in CVISN processes for timeliness, accuracy and integrity; purge stale data and repair errors.

S3. Expand core safety systems to include standard information storage and exchange for intrastate and foreign carriers, in addition to interstate carriers.

S4. Establish or expand "data stores" for cargo, carrier, vehicle and driver credential, safety and enforcement data.

S5. Provide on-line tools to enable appropriate users to provide timely information about corrections of deficiencies detected during inspections.

S6. Improve the carrier's ability to review safety data associated with its record. Consider proactively delivering safety data to carrier.

S7. Provide on-line tools for law enforcement to submit crash and citation reports.

S8. Enable jurisdictions to maintain up-to-the-minute inspection history data.

Smart Roadside

R1. Expand access to data collected by on-board systems to improve roadside operations.

R2. Provide integrated and improved access for roadside personnel to data stored in core infrastructure systems [e.g., Safety and Fitness Electronic Records (SAFER), Motor Carrier Management Information System (MCMIS), CDL data systems].

R3. Provide carriers with streamlined and timely access to citation, crash, and inspection information so they are better informed about safety problems.

R4. Associate high-risk cargo with the container, manifest, chassis, vehicle/transponder, carrier(s), vehicle and driver transporting it.

R5. Expand the use of standard electronic security devices (ESDs) to improve container and trailer security and reduce theft.

R6. Monitor status of the ESDs throughout the trip by collecting "event data" at toll booths, ports of entry, inspection/weigh stations and freight yard entries/exits.

R7. Expand the use of technologies and processes to verify authorized drivers and personnel are able to access the vehicle, trailer and container.

R8. Provide access to the event data and related information to authorized private and public sector users – based on legitimate needs for information to improve productivity, streamline operations and improve security.

R9. Expand the use of mobile data entry devices [e.g., laptop, personal data assistant (PDA), cell phone] and applications to improve data quality and streamline data collection.

R10. Expand the use and capabilities of virtual/remote sites to increase the effectiveness of enforcement.

R11. Expand the use of technology to generate real-time safety and security alerts.

Expanded Electronic Credentialing

C1. Reduce complexity and redundancy for users by offering access to multiple credentials from a single source.

C2. Increase the number of e-credentials that are available [e.g., oversize/overweight (OS/OW) permitting, Hazardous Materials (HazMat)].

C3. Offer a variety of standard e-payment options.

C4. Improve the process for enrolling in multi-jurisdiction programs (e.g., e-screening programs, e-toll) through provision of links.

C5. Provide for automated queries to cross-check supporting requirements across agencies, states and federal systems through use of unique carrier, vehicle, driver and load identifiers.

C6. Legacy credentialing systems update Commercial Vehicle Information Exchange Window (CVIEW) with changes in credentials data for real-time access.

C7. Enhance interfaces and systems for information sharing to provide improved access to more current and accurate credentials information for authorized stakeholders.

C8. Designate one authoritative source for each credential-related data element and provide date/time stamp; manage changes; auditable.

C9. Use secure electronic identification, notification, documentation and screening for vehicles, carriers, drivers and cargo.

C10. Expand the set of standard data elements for information exchange related to credentials.

APPENDIX C – RECOMMENDED PRIMARY IDENTIFIERS

Entity	Identifier Name	Identifier Segments	Number of Characters
Motor Carrier	Primary Carrier ID for ***interstate*** carrier: e.g., 12345 A001 (note that '12345' must be the carrier's USDOT # ; the terminal ID 'A001' is optional)	Carrier-Specific Identifier (alphanumeric); must be USDOT number + Carrier Terminal ID designated by carrier (alphanumeric) (optional) + CVO Company Type	12 (max) 4 (max) TBD
	Primary Carrier ID for ***intrastate*** carrier: e.g., US CA 123A45689 1234 (note that the terminal ID '1234' is optional)	Country Code (alpha); allowable codes from ISO 3166-1, country codes (English) + Jurisdiction (state or province) Code (alphanumeric); the allowable codes are defined in the SAFER Interface Control Document [Reference 22] + Carrier-Specific Identifier; if carrier is intrastate and has a USDOT number, must be USDOT number; for state-specific IDs, the Carrier-Specific Identifier may include a prefix to clarify the agency/source of the identifier) + Carrier Terminal ID designated by carrier (alphanumeric) (optional) CVO Company Type	2 2 12 (max) 4 (max) TBD
	For all carriers: Federal Taxpayer Identification Number e.g., E 123456789 Note: Open issue regarding Mexican and Canadian carriers	Type (alphanumeric); S for Social Security Number, E for Employer Identification Number + Tax ID Number (alphanumeric)	1 9

Entity	Identifier Name	Identifier Segments	Number of Characters
Driver	Driver Unique ID e.g., US MD B99999999999A	Country code (alpha); allowable codes from ISO 3166-1, country codes (English) + Jurisdiction (state or province) code (alphanumeric); the allowable codes are defined in the SAFER Interface Control Document [Reference 22] + Driver specific identifier (driver license number) assigned by jurisdiction (alphanumeric)	2 2 16 (max)
Vehicle	Vehicle Identification Number e.g., 1FDKE30F8SHB33184 **and**	VIN assigned by manufacturer (alphanumeric)	30 (max)
	Vehicle Plate ID e.g., US CA 12345664820M	Country code (alpha); allowable codes from ISO 3166-1, country codes (English) + Jurisdiction (state or province) code (alphanumeric); the allowable codes are defined in the SAFER Interface Control Document [Reference 22] + License plate ID (alphanumeric)	2 2 12 (max)
Container	Container Unique ID e.g., SUDU3070079	Suggested as a candidate: Container marked on side (in accordance with ISO 6346) (alphanumeric)	11 (suggested)
Shipment	Shipment Unique ID e.g., 123456789776655443322	Shipper ID. DUNS number suggested as a candidate (alphanumeric) + Bill of Lading number assigned by the shipper identified above (numeric)	9 (suggested) 12 (max)
Transponder	Transponder ID e.g., 0 123456789	Transponder ID Definition Flag (0=current; 1=IEEE 1455-1999) + *If Transponder ID Definition Flag = current*, then the other segment is: Transponder Serial Number assigned by manufacturer	1 (1 bit) 8 (32-bit hexadecimal

Entity	Identifier Name	Identifier Segments	Number of Characters
			value)
	or 1 9999 232323	*If Transponder ID Definition Flag = IEEE 1455-1999*, then the other segments are:	4
		Manufacturer Identifier +	(16 bits hexadecimal value)
		Transponder Serial Number assigned by manufacturer	5 (20 bits hexadecimal value)

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