INTERFACE CONTROL DOCUMENT

Version 1.0.10

for the

DSRC Mobile Communications Unit (DMCU) / Vehicle Gateway Interface

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REVISION NOTICE

Version Identifier	Date of Issue	Summary of Changes
1.0.0	9/9/2009	Initial version for discussion purposes
1.0.1	10/7/2009	Removed unnecessary portions and added content for CVII Task 2.
1.0.2	10/12/2009	Modified based on initial feedback. • Revised to match CVII nomenclature (Mercury → DMCU) • Added Position Vector Update Message • Added Probe Messages • Added messages to activate, deactivate, and remove traveler advisory messages • Added sequence diagrams for message interactions
1.0.3	10/13/2009	• Added Priority to Traveler Advisory message • Modified overview text to match figure regarding serial interface • Removed Brake Applied pressure and Throttle position from Probe Snapshot as they will not be used in CVII • Modified Vehicle Dynamic Event section to include variable length messages based on the event type
1.0.4	5/25/2010	• Added Request Travel Advisory Messages Cache • Added Driver Credentials Verification Request / Response • Added Inspection Data Request / Response
1.0.5	5/27/2010	Modified based on feedback. • Added advisory type field to Traveler Advisory message • Added field to Driver Credential Verification Response to indicate if there is a communications issue between the OBE and RSE • Updated Wireless Roadside Inspection figure • Added drivers name to Driver Information • Added axle group weight to inspection message
1.0.6	6/28/2010	• Updated Street Address field in driver's license information to include 2 lines for 'street' • Added SeatBeltStatus for inspection data

1.0.7	7/28/2010	• Corrected typo in Weight Information table
		• Added CDL fields:
		  ○ License issuing country
		  ○ Driver address country
		  ○ Driver date of birth

1.0.8	8/17/2010	• Added field for number of axle groups
1.0.9	10/25/2010	• Initial addition of EVA • Added 'Update Travel Advisory Message'
1.0.10	4/7/2011	• Added 'Applicable Heading' field to the ActivateEVA message.

1. SCOPE

1.1 Project Identification

This document serves as the Interface Control Document for the DSRC Mobile Communications Unit (DMCU) Application Interface.

1.2 System Overview

The DMCU serves as an interface to communicate with Dedicated Short Range Communication (DSRC) equipped systems such as Road-Side Equipment (RSE) and On-board Equipment (OBE) in other vehicles. It interfaces with the Global Positioning System (GPS) and other vehicle systems on the OBU. This document describes the Ethernet interface between Mercury and other On-Board applications. This Ethernet interface supports User Diagram Protocol/Internet Protocol (UDP/IP) for IPv4. These interfaces are shown in Figure 1.

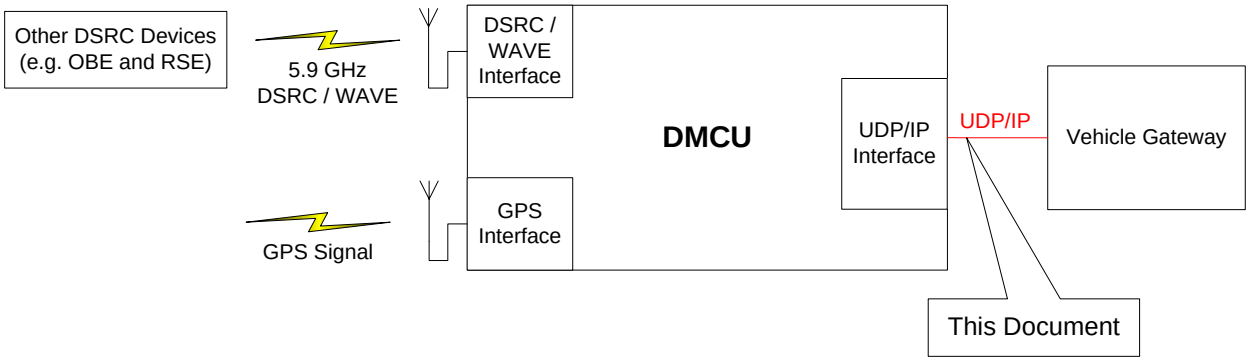

Figure 1. Overview of DMCU Interfaces

1.3 Goals and Objectives

The DMCU has the following goals and objectives:

- Interface with various GPS provider applications for positional data
- Interface with the Wireless Access in Vehicular Environment (WAVE) Software Development Kit to communicate with other DSRC devices
- Interface with other On-Board vehicle systems via UDP/IP
- Provide Probe Data Collection and dissemination capabilities
- Provide Traveler Advisory Message capabilities
- Provide encoding and decoding capabilities for Society of Automotive Engineers (SAE) J2735 based messages
- Provide Driver Credentials Verification capabilities
- Provide Wireless Roadside Inspection capabilities
- Provide Emergency Vehicle Alert (EVA) generation and processing capabilities

1.4 Document Overview

The details of the UDP/IP based interface for the DMCU is described in Section 2. Acronyms are included in Appendix A.

1.5 Related Documents

The following documents are related to or are referenced within this document.

- *VII PROOF-OF-CONCEPT DSRC MESSAGE SETS,* SAE
- *NYS CVII DSRC Message Set (Based on SAE J2735 Rev. 36)*
- *DMCU Software User's Manual*, Southwest Research Institute
- *DMCU Application Software Design Document*, Southwest Research Institute
- *WAVE Software Development Kit Programmer's Guide,* Kapsch TrafficCom

2. INTERFACE

The DMCU supports a configurable UDP/IP interface that is defined in the following sections.

2.1 UDP/IP Interface

The DMCU supports a UDP/IP interface for data exchange with the Vehicle Gateway. The types of messages that the DMCU will send via UDP/IP include the following:

- Probe Snapshot Request
- Add Traveler Advisory Message
- Activate Traveler Advisory Message
- Deactivate Traveler Advisory Message
- Remove Traveler Advisory Message
- Update Traveler Advisory Message
- Driver Credentials Verification Response
- Inspection Data Request

The types of messages that the DMCU will receive via UDP/IP include the following:

- Position Vector Updates
- Probe Snapshot Responses
- Vehicle Dynamic Events
- Request Traveler Advisory Message Cache
- Driver Credentials Verification Request
- Inspection Data Response
- Emergency Vehicle Alert Activation/Deactivation

The DMCU can be configured to support each message on a separate port or combine multiple messages on a single port. It can also be configured to broadcast or unicast messages. The format of the messages and detailed data descriptions for each message are included in Section 2.1.1.

2.1.1 UDP Message Format

Each message will consist of a 6 byte header followed by the message specific data as shown in Table 1.

Table 1. DMCU UDP/IP Message Format

Byte	0	1	2	3	4	5	6	7	8	…
	Sync		Type		Size		data …			

A description of the header format is presented in Table 2.

Table 2. UDP Message Header

Field Name	Description
Sync	2 byte synchronization frame (big endian) that is always 0xFF7E. The intent of the UDP messaging is that each message will be small enough to be contained in one UDP packet. If the first 2 bytes of the received message are not equal to 0xFF7E, the message should be considered incomplete and discarded.
Type	2 byte value (big endian) representing the message type. Refer to Section 2.1.2 for the message types.
Size	2 byte value (big endian) representing the size of the entire message including the 6 byte header. This should always match the size that is in the UDP packet header and is present for convenience and message troubleshooting purposes.

As an example, a UDP message that contains 3 bytes of data (86 3D A1) with a data type of 8 would be sent as shown in Table 3. All values are shown in hex.

Table 3. UDP Message example

Byte	0	1	2	3	4	5	6	7	8
	FF	7E	00	08	00	09	86	3D	A1

2.1.2 Message Types and Default Ports

The values for the message types along with the default ports are shown in Table 4. Refer to the DMCU configuration file for the actual port values that were configured during the installation.

Table 4. Message Types and Default Ports

Message Description	Message Type	Default Port
Position Vector Update Message (2.1.3.1)	1	40011
Probe Snapshot Request (2.1.3.2)	2	40012
Probe Snapshot Response (2.1.3.3)	3	40012
Vehicle Dynamic Event (2.1.3.4)	4	40012

Message Description	Message Type	Default Port
Add Traveler Advisory Message (2.1.3.5)	5	40013
Activate Travel Advisory Message (2.1.3.6)	6	40013
Deactivate Travel Advisory Message (2.1.3.7)	7	40013
Remove Travel Advisory Message (2.1.3.8)	8	40013
Request Travel Advisory Messages Cache (2.1.3.10)	9	40013
Driver Credentials Verification Request (2.1.3.11)	10	40014
Driver Credentials Verification Response (2.1.3.12)	11	40014
Inspection Data Request (2.1.3.13)	12	40015
Inspection Data Response (2.1.3.14)	13	40015
Activate Emergency Vehicle Alert (2.1.3.15)	14	40016
Deactivate Emergency Vehicle Alert (0)	15	40016
Update Traveler Advisory Message (2.1.3.9)	16	40013

2.1.3 Message Content

The detailed contents for each message type are described in Sections 2.1.3.3 through 2.1.3.14. When possible and appropriate, the values from the SAE J2735 Standard were reused. Integer values larger than 1 byte are in Big Endian (network byte order) format.

2.1.3.1 Position Vector Update Message

The Position Vector Update Message is provided by the Vehicle Gateway to the DMCU once per second. This message is used as an alternate source for positional data when the DMCU's internal GPS is not available due to equipment provisioning in the vehicle. This interaction is illustrated in Figure 2.

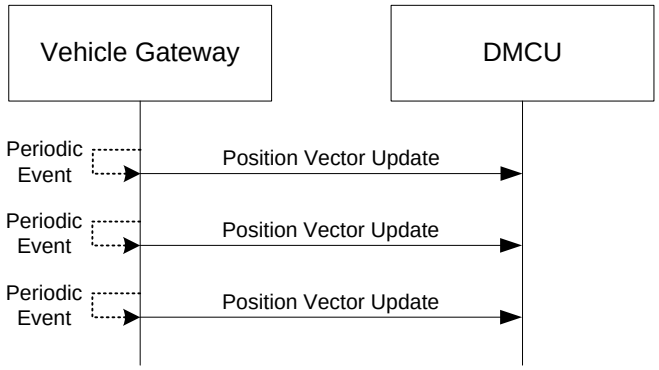

Figure 2. Position Vector Update Sequence

Table 5 provides the details of the Position Vector Update Message.

Table 5. Position Vector Update Message

Field	Data Type and Size	Example
DateTime→Year	unsigned 16-bit integer	2009 (0x07D9)
DateTime→Month	unsigned 8-bit integer	10 (0x0A) (October)
DateTime→Day	unsigned 8-bit integer	31 (0x1F)
DateTime→Hour	unsigned 8-bit integer	14 (0x0E) (2 pm)
DateTime→Minute	unsigned 8-bit integer	46 (0x2E)
DateTime→Milliseconds	unsigned 16-bit integer	45329 (0xB111)
Longitude LSB = 1/8 micro degree	signed 32-bit integer	-788915472 (0xD0FA1AF0) (= -98.614434 decimal degrees)
Latitude Least Significant Bit (LSB) = 1/8 micro degree	signed 32-bit integer	235539264 (0x0E0A0B40) (= 29.442408 decimal degrees)
Elevation LSB = 10 cm with a 1 km negative offset	unsigned 32-bit integer	17215 (0x0000433F) (= 721.5 m above sea level)

Field	Data Type and Size	Example
Heading LSB = 0.00549 degrees	unsigned 16-bit integer	58789 (0xE5A5) (= 322.75 degrees)
Speed LSB = 0.01 m/s	signed 16-bit integer	1654 (0x676) (= 16.54 m/s)
TimeConfidence (see bit map in VII POC doc)	unsigned 8-bit integer	12 (0x0C) (0.01 seconds)
PositionConfidence (see bit map in VII POC doc)	unsigned 8-bit integer	135 (0x87) (2 m position, 5 m elevation)
SpeedHeadingConfidence (see bit map in VII POC doc)	unsigned 8-bit integer	82 (0x52) (10 deg heading, 1 meter speed, 1 percent throttle)

2.1.3.2 Probe Snapshot Request Message

A Probe Snapshot Request Message will be sent by the DMCU when it has determined that a Probe Snapshot needs to be created. This request can be triggered based on a periodic event, start / stop event, or a monitored vehicle event. The DMCU expects to receive a Probe Snapshot Response Message in response this request. This interaction is illustrated in Figure 3.

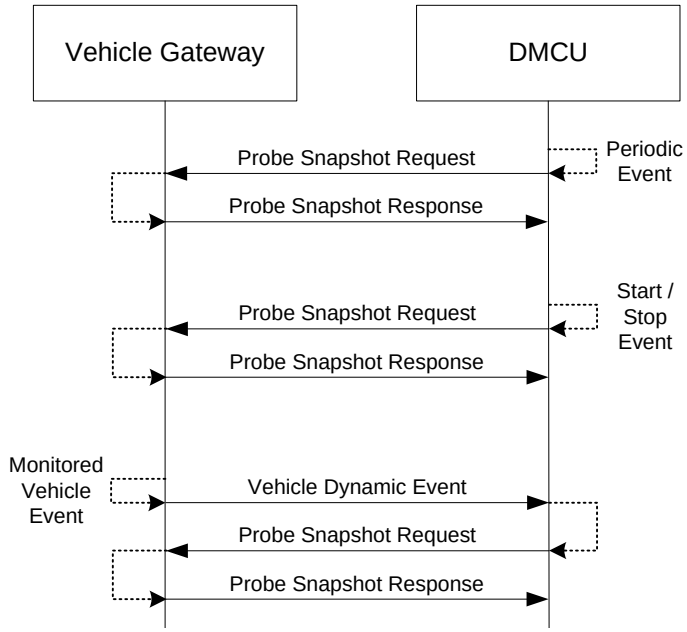

Figure 3. Probe Snapshot Request / Response Sequence

Table 6 provides the details of the Probe Snapshot Request Message.

Table 6 . Probe Snapshot Request Message

Field	Data Type and Size	Example
Request ID	unsigned 8-bit integer	7 (0x07)

2.1.3.3 Probe Snapshot Response Message

Table 7 provides the details of the Probe Snapshot Response Message. This message is sent in response to a Probe Snapshot Request Message and the Request ID should be set to match the Request ID of the Probe Snapshot Request Message.

Table 7. Probe Snapshot Response Message

Field	Data Type and Size	Example
Request ID	unsigned 8-bit integer	7 (0x07)
Vehicle Height LSB = 0.05 m	unsigned 8-bit integer	84 (0x54) (4.2 m)
Vehicle Mass LSB = 25 kg	unsigned 8-bit integer	246 (0xF6) (6,150 kg)

Field	Data Type and Size	Example
Vehicle Type	unsigned 8-bit integer	12 (0x0C) Six or more axles
Brakes - Upper 2 bits – reserved - 2 bits – Antilock Brake status - 4 bits – Reserved	unsigned 8-bit integer	47 (0x2F) - Antilock Brakes = on
Exterior Lights (see bitmap in VII POC doc)	unsigned 8-bit integer	5 (0x05) (low beam headlights and left turn signal on)
Ambient Air Temperature (- 40 deg C offset)	unsigned 8-bit integer	65 (0x41) (25 deg C)

2.1.3.4 Vehicle Dynamic Event Message

Table 8 provides the details of the Vehicle Dynamic Event Message. This message is sent by the Vehicle Gateway when a monitored vehicle event has been detected.

Table 8. Vehicle Dynamic Event Message

Field	Data Type and Size	Example
Vehicle Status Device Type (see enum in VII POC doc)	unsigned 8-bit integer	4 (0x04) Stability Control
Type Specific Data	variable	See supported types in tables below. • Traction Control (Table 9) • Stability Control (Table 10)

Table 9. Traction Control Status Data

Field	Data Type and Size	Example
Traction Control Status (see bitmap in VII POC doc)	unsigned 8-bit integer	3 (0x03) Engaged

Table 10. Stability Control Status Data

Field	Data Type and Size	Example
Stability Control Status (see bitmap in VII POC doc)	unsigned 8-bit integer	3 (0x03) Engaged

2.1.3.5 Add Traveler Advisory Message

An Add Traveler Advisory Message will be sent by the DMCU when it has received a new Traveler Advisory Message from the RSE. The DMCU will send additional messages to activate, deactivate, or remove the message based on the presentation region, valid times, and priority. This interaction is illustrated in Figure 4.

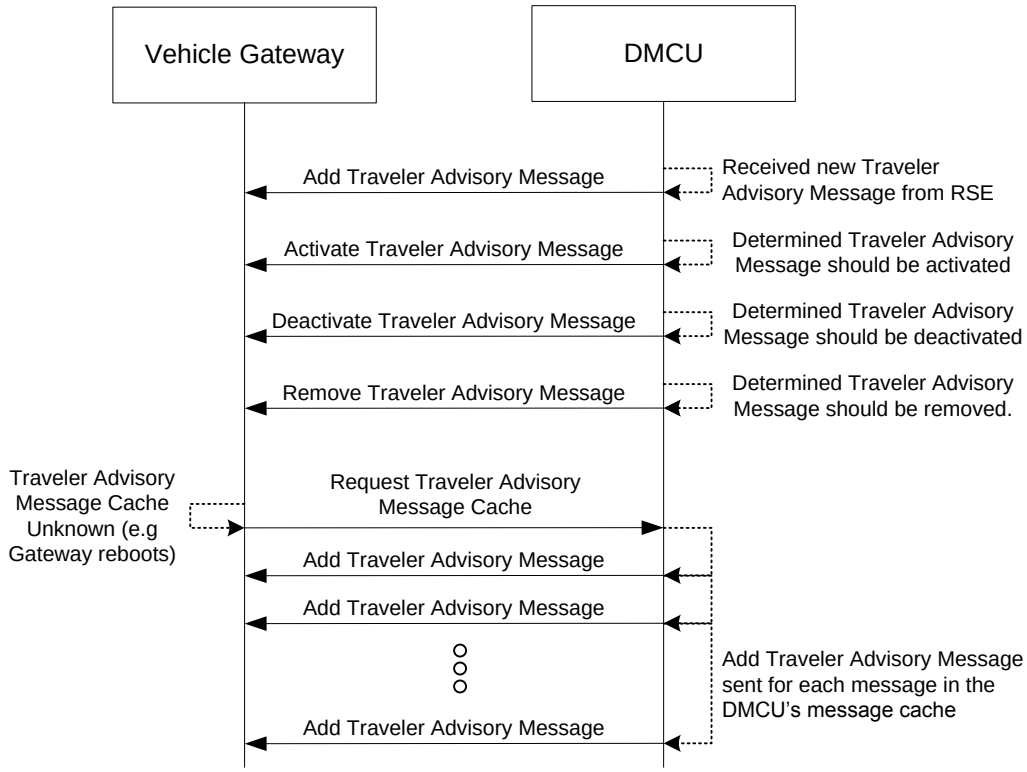

Figure 4. Traveler Advisory Message Sequence

Table 11 provides the details of the Add Traveler Advisory Message. This message is sent whenever the DMCU has received a Traveler Advisory Message.

Table 11. Add Traveler Advisory Message

Field	Data Type and Size	Example
Advisory Type	unsigned 8-bit integer	0 (0x00) J2735 Traveler Advisory (See Table 12

Field	Data Type and Size	Example
		for enumeration values)
ID Length	unsigned 8-bit integer	4 (0x04)
ID Text	ASCII Characters (variable)	"2-11" Represents a unique ID for a traveler advisory message. "advisoryNumber-agencyID".
Category	unsigned 16-bit integer	4212 (0x0174)
Priority	unsigned 8-bit integer	6 (0x06) Medium Priority Traveler Advisory
Title Length	unsigned 8-bit integer	18 (0x12)
Title Text	ASCII Characters (variable)	"Low Bridge Warning"
Num Text Lines	unsigned 8-bit integer	2 (0x02)
Text Lines	Repeated for each text line in the message. Refer to Table 13.	

Table 12. Advisory Type

Value	Advisory Type	Description
0	J2735 Traveler Advisory	A message containing a standard traveler information message.
1	Inspection Advisory	A message to be displayed containing the result of an inspection.
2	V2V Warning	A message containing information regarding another vehicles presence.

Table 13. Add Traveler Advisory Message - Text Lines

Field	Data Type and Size	Example
Text Line Length	unsigned 8-bit integer	24 (0x18)
Text Line	ASCII Characters	"Max Height: 14 ft. 6 in."

	(variable)	

2.1.3.6 Activate Traveler Advisory Message

Table 14 provides the details of the Activate Traveler Advisory Message.

Table 14. Activate Traveler Advisory Message

Field	Data Type and Size	Example
ID Length	unsigned 8-bit integer	4 (0x04)
ID Text	ASCII Characters (variable)	"2-11" Represents a unique ID for a traveler advisory message. "advisoryNumber-agencyID".

2.1.3.7 Deactivate Traveler Advisory Message

Table 15 provides the details of the Deactivate Traveler Advisory Message.

Table 15. Deactivate Traveler Advisory Message

Field	Data Type and Size	Example
ID Length	unsigned 8-bit integer	4 (0x04)
ID Text	ASCII Characters (variable)	"2-11" Represents a unique ID for a traveler advisory message. "advisoryNumber-agencyID".

2.1.3.8 Remove Travel Advisory Message

Table 16 provides the details of the Remove Traveler Advisory Message.

Table 16. Remove Traveler Advisory Message

Field	Data Type and Size	Example
ID Length	unsigned 8-bit integer	4 (0x04)

Field	Data Type and Size	Example
ID Text	ASCII Characters (variable)	"2-11" Represents a unique ID for a traveler advisory message. "advisoryNumber-agencyID".

2.1.3.9 Update Travel Advisory Message

Table 17 provides the details of the Update Traveler Advisory Message. This message is sent when an update (ie. Change to the text fields) needs to be made for an existing Travel Advisory.

Table 17. Update Traveler Advisory Message

Field	Data Type and Size	Example
Advisory Type	unsigned 8-bit integer	0 (0x00) J2735 Traveler Advisory (See Table 12 for enumeration values)
ID Length	unsigned 8-bit integer	4 (0x04)
ID Text	ASCII Characters (variable)	"2-11" Represents a unique ID for a traveler advisory message. "advisoryNumber-agencyID".
Category	unsigned 16-bit integer	4212 (0x0174)
Priority	unsigned 8-bit integer	6 (0x06) Medium Priority Traveler Advisory
Title Length	unsigned 8-bit integer	18 (0x12)
Title Text	ASCII Characters (variable)	"Low Bridge Warning"
Num Text Lines	unsigned 8-bit integer	2 (0x02)
Text Lines	Repeated for each text line in the message. Refer to Table 13.	

2.1.3.10 Request Traveler Advisory Message Cache

This request does not require supporting data and should have a length of 0.

2.1.3.11 Driver Credentials Verification Request

The Driver Credentials Verification Request is sent from the Vehicle Gateway to the DMCU when a driver has inserted their CDL card and provided the correct PIN Code. The DMCU will return a response upon verifying the provided credentials with the Government Back-office System. This interaction is illustrated in Figure 5.

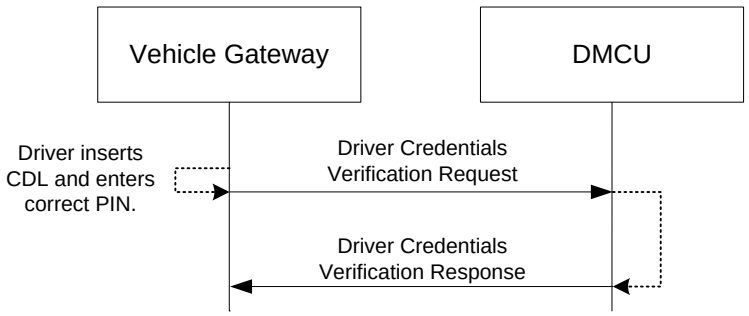

Figure 5. Driver Credentials Verification Sequence

Table 18 provides the details of the Driver Credentials Verification Request.

Table 18. Driver Credentials Verification Request

Field	Data Type and Size	Example
Request ID	unsigned 8-bit integer	7 (0x07)
Driver's License Information	See Table 19 below.	

Table 19. Driver's License Information

Field	Data Type and Size	Example
Name Length	unsigned 8-bit integer	17 (0x11)
Name	ASCII String (Variable)	"John Q Public III"
Date of Birth→Year	unsigned 16-bit integer	1960 (0x07A8)
Date of Birth →Month	unsigned 8-bit integer	7 (0x07) (July)
Date of Birth →Day	unsigned 8-bit integer	9 (0x09)
License # Length	unsigned 8-bit integer	9 (0x09)

Field	Data Type and Size	Example
License #	ASCII String (Variable)	"H12345678"
Issuing State	ASCII String (2 chars)	"HI"
Issuing Country	ASCII String (2 chars)	"US"
Issue Date→Year	unsigned 16-bit integer	2000 (0x07D0)
Issue Date→Month	unsigned 8-bit integer	10 (0x0A) (October)
Issue Date→Day	unsigned 8-bit integer	31 (0x1F)
Expiration Date→Year	unsigned 16-bit integer	2009 (0x07D9)
Expiration Date→Month	unsigned 8-bit integer	1 (0x01) (January)
Expiration Date→Day	unsigned 8-bit integer	31 (0x1F)
Class (see LicenseClass enumeration in CVII ASN.1 Specification)	unsigned 8-bit integer	0 (0x00) – A
Address→Street1 Length	unsigned 8-bit integer	15 (0x0F)
Address→Street1	ASCII String (Variable)	"2005 Kalia Road"
Address→Street2 Length	unsigned 8-bit integer	5 (0x05)
Address→Street2	ASCII String (Variable)	"Apt 1"
Address→City Length	unsigned 8-bit integer	8 (0x08)
Address→City	ASCII String (Variable)	"Honolulu"
Address→State	ASCII String (2 chars)	"HI"
Address→Zip Length	unsigned 8-bit integer	5 (0x05)
Address→Zip	ASCII String (Variable)	96815
Address→Country Code	ASCII String (2 chars)	"US"

2.1.3.12 Driver Credentials Verification Response

Table 20 provides the details of the Remove Traveler Advisory Message.

Table 20. Driver Credentials Verification Response

Field	Data Type and Size	Example
Request ID	unsigned 8-bit integer	7 (0x07)
Response Type (See Table 21 for enumeration values)	unsigned 8-bit integer	0 (0x00) Valid Response Received
Credentials Status (see CredentialStatus enumeration in CVII ASN.1 Specification)	unsigned 8-bit integer	2 (0x02) – License Expired

Table 21. Driver Credentials Response Type

Value	Advisory Type	Description
0	Valid Response	A valid response was received from an RSE
1	No RSE Available	The vehicle is not in range of an RSE
2	Timeout	The vehicle is in range of an RSE, but no response was received

2.1.3.13 Inspection Data Request

The Inspection Data Request is sent from the DMCU to the Vehicle Gateway when the vehicle enters an inspection region, as defined by a local RSE. The Vehicle Gateway replies with an Inspection Data Response that the DMCU uses to perform the Wireless Roadside Inspection (WRI). Once the Inspection Advisory is received from the RSE, the DMCU will send it to the Vehicle Gateway as a Traveler Advisory Message and will activate, deactivate, and remove it in a similar fashion. This interaction is illustrated in Figure 6.

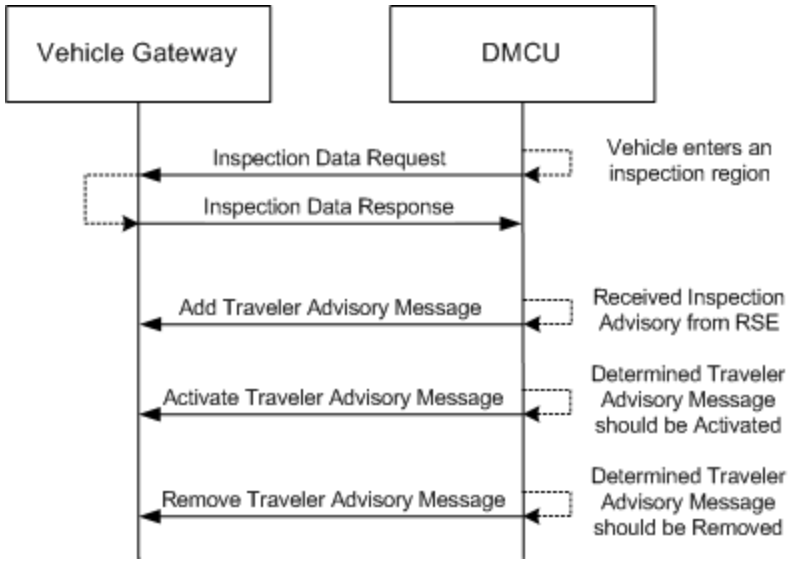

Figure 6. Wireless Roadside Inspection Sequence

Table 22 provides the details of the Inspection Data Request.

Table 22. Inspection Data Request

Field	Data Type and Size	Example
Request ID	unsigned 8-bit integer	7 (0x07)

2.1.3.14 Inspection Data Response

Table 23 provides the details of the Inspection Data Response.

Table 23. Inspection Data Response

Field	Data Type and Size	Example
Request ID	unsigned 8-bit integer	7 (0x07)
Tractor→VIN Length	unsigned 8-bit integer	17 (0x11)
Tractor→VIN	ASCII String (Variable)	1M8GDM9AXKP042788
Tractor→Num Tires	unsigned 8-bit integer	10 (0x0A)
Tractor→Tires	Repeated for each tractor tire. Refer to Table 24.	
Tractor→Num Axles	unsigned 8-bit integer	3 (0x03)
Tractor→Brakes	Repeated for each axle side (2x Num Axles). Refer to Table 25.	

Field	Data Type and Size	Example
Tractor→Seat Belt Status (see SeatBeltStatus enumeration in CVII ASN.1 Specification)	unsigned 8-bit integer	1 (0x01) OK – Seat belt is buckled
Tractor→Lights	unsigned 8-bit integer	1 (0x01) One or more lights failed
Tractor→Num Axle Groups	unsigned 8-bit integer	2 (0x02)
Tractor→Weights	Repeated for each axle group. Refer to Table 26.	
Num Trailers	unsigned 8-bit integer	2 (0x02)
Trailers	Refer to Table 27.	
CDL	Refer to Table 19.	

Table 24. Tire Pressure/Temp Information

Field	Data Type and Size	Example
Tire Location	unsigned 8-bit integer	35 (0x23) Axle 3, Tire 4
Pressure (see DE_J1939-71-Tire Pressure in J2735)	unsigned 16-bit integer	621 (0x026D) kPa (~ 90 psi)
Temperature (see DE_J1939-71-Tire Temp in J2735)	unsigned 16-bit integer	10336 (0x2860) 50 deg C

Table 25. Brake Information

Field	Data Type and Size	Example
Axle Location	unsigned 8-bit integer	33 (0x21) Axle 3, right side
Anti-lock Brake Status (see DE_AntiLockBrakeStatus in J2735)	unsigned 8-bit integer	3 (0x03) engaged
Brake Stroke (see DE_BrakeStroke in CVII	unsigned 8-bit integer	2 (0x02) non-functional

J2735)		
Brake Lining (see DE_BrakeLining in CVII J2735)	unsigned 8-bit integer	100 (0x64) 50%

Table 26. Weight Information

Field	Data Type and Size	Example
Axle Group ID (see DE_AxleGroupID in CVII J2735)	unsigned 8-bit integer	6 (0x06) Trailer A axle group
Axle Group Weight (see DE_AxleGroupWeight in CVII J2735)	unsigned 16-bit integer	7250 (0x1C52) 14,500 kg

Table 27. Trailer Information

Field	Data Type and Size	Example
Position (see DE_TrailerLocation in CVII J2735)	unsigned 8-bit integer	1 (0x01) second trailer
VIN Length	unsigned 8-bit integer	17 (0x11)
VIN	Variable	1M8GDM9AXKP042788
Num Tires	unsigned 8-bit integer	16 (0x10)
Tires	Repeated for each tire. Refer to Table 24.	
Num Axles	unsigned 8-bit integer	
Brakes	Repeated for each axle side (2x Num Axles). Refer to Table 25.	
Lights	unsigned 8-bit integer	1 (0x01) One or more lights failed
Num Axle Groups	unsigned 8-bit integer	1 (0x01)
Weights	Repeated for each axle group. Refer to Table 26.	

2.1.3.15 Activate Emergency Vehicle Alert

The Activate Emergency Vehicle Alert Message is sent from the Vehicle Gateway to the DMCU when a qualifying vehicle event occurs and the DMCU should begin broadcasting the EVA message.

Table 28 provides the details of the Activate Emergency Vehicle Alert.

Table 28. Activate Emergency Vehicle Alert

Field	Data Type and Size	Example
Alert ID	unsigned 8-bit integer	7 (0x07)
Event Type (J2540 ITIScodes)	unsigned 16-bit integer	10102 (0x2776) snowplow
Response Type (see ResponseType in CVII ASN.1 Specification)	unsigned 8-bit integer	2 (non-emergency)
Group Affected (see J2540 VehicleGroupAffected)	unsigned 16-bit integer	9217 (0x2401) all vehicles
Applicable Heading (see Table 29 for enumeration values)	unsigned 8-bit integer	0 (0x00) The current heading of the vehicle
Response Equipment (see J2540 IncidentResponseEquipment)	unsigned 16-bit integer	10102 (0x2776) snowplow
Vehicle Mass LSB = 25 kg	unsigned 8-bit integer	246 (0xF6) (6,150 kg)
Vehicle Type (see VehicleType in CVII ASN.1 Specification)	unsigned 8-bit integer	7 (0x07) axleCnt2 – Two axle, six tire single unit

Table 29. Applicable Headings

Value	Heading	Description
0	Forward Heading	The current heading of the vehicle
1	Forward and Reverse Heading	The current heading of the vehicle and the heading of oncoming vehicles
2	All Headings	Headings in all 360 degrees

2.1.3.16 Deactivate Emergency Vehicle Alert

The Deactivate Emergency Vehicle Alert Message is sent from the Vehicle Gateway to DMCU at the end of a qualifying vehicle event, indicating the EVA message should no longer be broadcast.

Table 30 provides the details of the Deactivate Emergency Vehicle Alert.

Table 30. Deactivate Emergency Vehicle Alert

Field	Data Type and Size	Example
Alert ID	unsigned 8-bit integer	7 (0x07)

APPENDIX A

Glossary, Terms, and Acronyms

APPENDIX A

Glossary, Terms, and Acronyms

Acronym	Definition
BER	Basic Encoding Rules
DMCU	DSRC Mobile Communications Unit
DSRC	Dedicated Short Range Communication
EVA	Emergency Vehicle Alert
GBE	Government Back-office System
GPS	Global Positioning System
IP	Internet Protocol
ITS	Intelligent Transportation Systems
LSB	Least Significant Bit
OBU	On-Board Unit
OBE	On-Board Equipment
POC	Proof Of Concept
PSID	Provider Service Identifier
RSE	Road-Side Equipment
SAE	Society of Automotive Engineers
SwRI	Southwest Research Institute
UDP	User Datagram Protocol
VII	Vehicle Infrastructure Integration
WAVE	Wireless Access in Vehicular Environment