



Volume II

PEMS XML Message Specification

Based on

**Traffic Management Data Dictionary and Message Sets for
External Traffic Management Center Communications
Dated 8-30-07**

(TMDD MS/ETMCC)

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Revision History

Filename	Version	Date	Author	Comment
PEMS Data Dictionary Vol 2.doc	1.0	10/17/07		Initial Draft
PEMS XML Message Specification Vol 2.doc	2.1	1/31/08	Craig A. Franklin	Updated XML Message Definition for Illinois Tollway
Tango Update	2.2	2/12/08	Matt Butler	Paired down all elements specific to Trichord Illinois Project
Tango Update	2.3	4/8/08	Matt Butler	Updated missing elements found in coding cycle
PEMS XML Message Specification Vol 2, V2.3.doc	2.3	4/23/08	Craig A. Franklin	Updated text and formatting
PEMS XML Message Specification Vol 2, V2.4.doc	2.4	4/24/08	Craig A. Franklin Scott Butler	Update of structure and add login dialog and message

1 Document Introduction

1.1 Purpose

The purpose of Volume II is to document the data concept definitions in terms of dialogs, messages, data frames, data elements, and object classes for the PEMS Systems.

This document serves as a design specification and contains.

External customer center to PEMS interface definitions. and
XML-specific external customer center reference model.

Volume I identifies and describe the needs and requirements for the PEMS Network Operations Center (NOC) to provide services to external PEMS Customer Centers (PCC) via a communications interface. This subject area is frequently called external traffic management center communications (ETMCC) in the Traffic Management Data Dictionary from which this is based.

The two volumes together make up the PEMS Data Dictionary and Message Sets for External PEMS Customer Center Communication. Figure 1 depicts the relationship between the volumes in the document.

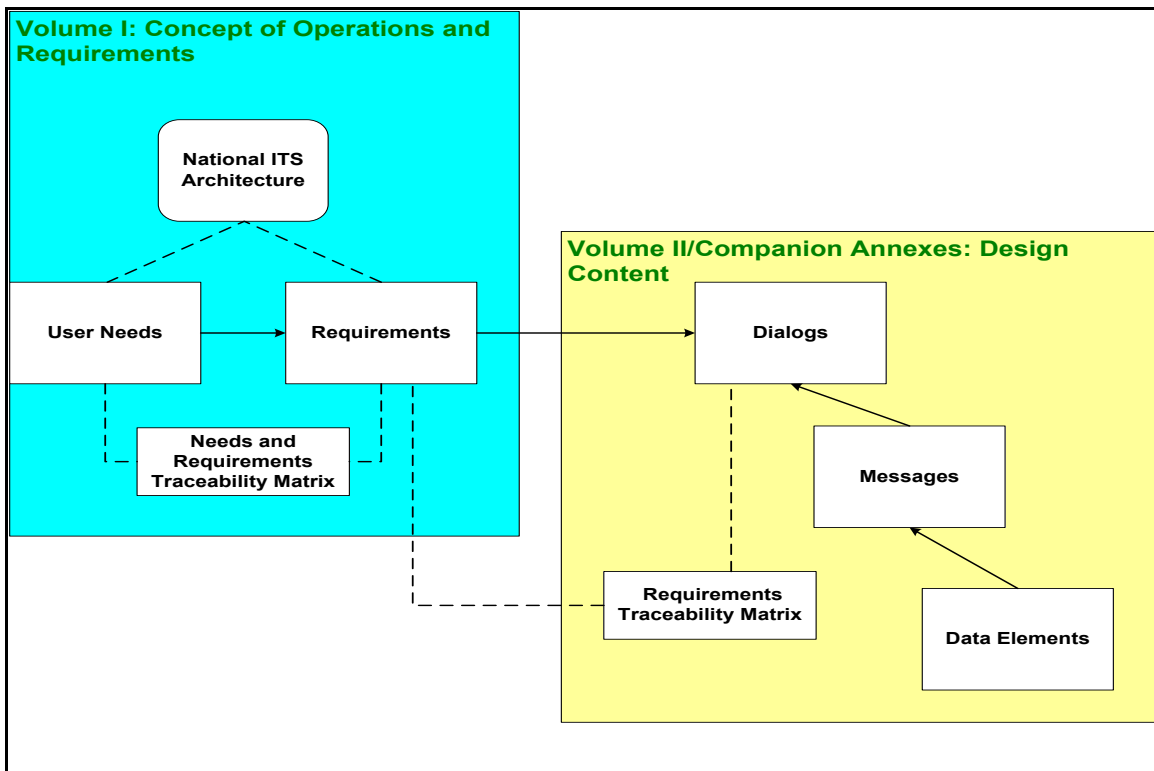


Figure 1. Relationship between Volume I and Volume II

1.2 Document Organization

- Section 2 of this document provides a discussion of interface dialogues and identifies and describes the sequence of message exchanges needed to and from PEMS.
- Section 3 of this document is based on TMDD 14817 and XML Definitions of Data Concepts and provides a highly structured definition of the data concepts including dialogs, messages, data frames, and data elements..

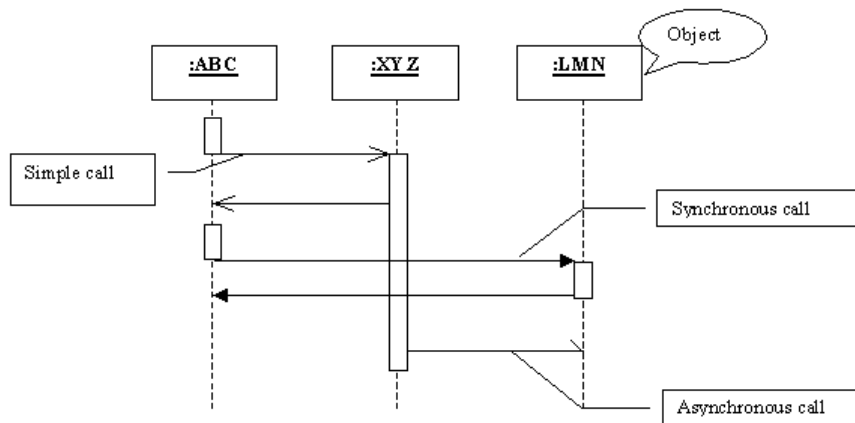
2 Interface Dialogues

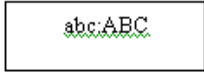
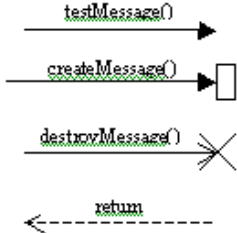
2.1 Tutorial – What is a Dialog?

A dialog describes a sequence of message exchanges. For example, a request-response dialog would include two messages being shared between an external center and PEMS NOC to accomplish information sharing. The first message would include the request for information, followed by a message containing the information (response). Some dialogs are simple and include one or two exchanges, while complex dialogs would include a larger number of steps and alterations of sequence steps based on some criteria, for example, special error handling.

Whether simple or complex dialogs can be described using the Unified Modeling Language (UML) Sequence Diagrams. This is consistent with the ISO 14817 standard, which is being used as the guide-spec for defining PEMS data concepts. A conceptual UML Sequence Diagram is shown below to illustrate relevant portions.

Figure 2. Parts of a UML Sequence Diagram



UML Sequence Diagram Element and Description	Symbol
<p>Object: The primary element sequence diagram is an Object—an instance of a class. A Sequence diagram consists of sequences of interaction among different objects over a period of time. An object is represented by a named rectangle. The name to the left of the ":" is the object name and to its right is the class name.</p>	
<p>Message: The interaction between different objects in a sequence diagram is represented as messages. A message is denoted by a directed arrow. Depending on the type of message, the notation differs. In a Sequence diagram, you can represent simple messages, special messages to create or destroy objects, and message responses.</p>	

2.2 Defining the Dialog Sequence

The purpose of this document is to introduce the message information or content of messages being exchanged between a PEMS server and an external Traffic Control System. A companion document, “PEMS Application Notes” goes into the details of connecting over a TCP/IP socket and exchanging the messages identified in this document. In general terms, the TCC will establish a TCP/IP socket connection to port 6000 of the PEMS server and exchange messages according to the protocols described here. The Application Notes document presents implementation details.

2.2.1 Message Patterns

Message patterns are the building blocks of dialogs. Three types of basic, or simple dialogs, can handle a wide variety of situations, or a project may define complex dialogs to meet their special project requirements. The three basic building blocks of dialogs, or message patterns, are shown below:

- One-way: A concept intended for bulk data transfer, this messaging pattern relies on request of an XML file being requested by name.
- Request-Response: This message pattern supports the sending of a message followed by a response. This pattern implements a synchronous pattern of message communications.
- Subscription-Publication: This message pattern supports a subscriber application performing an initial request-response to set up future asynchronous responses from an information publisher application.

2.3 Generic Dialogs

Based on the overview presented above, PEMS will include the following in describing interface-dialogues:

- Description
- Sequence Diagram
- NTCIP 2306 Dialog Worksheet

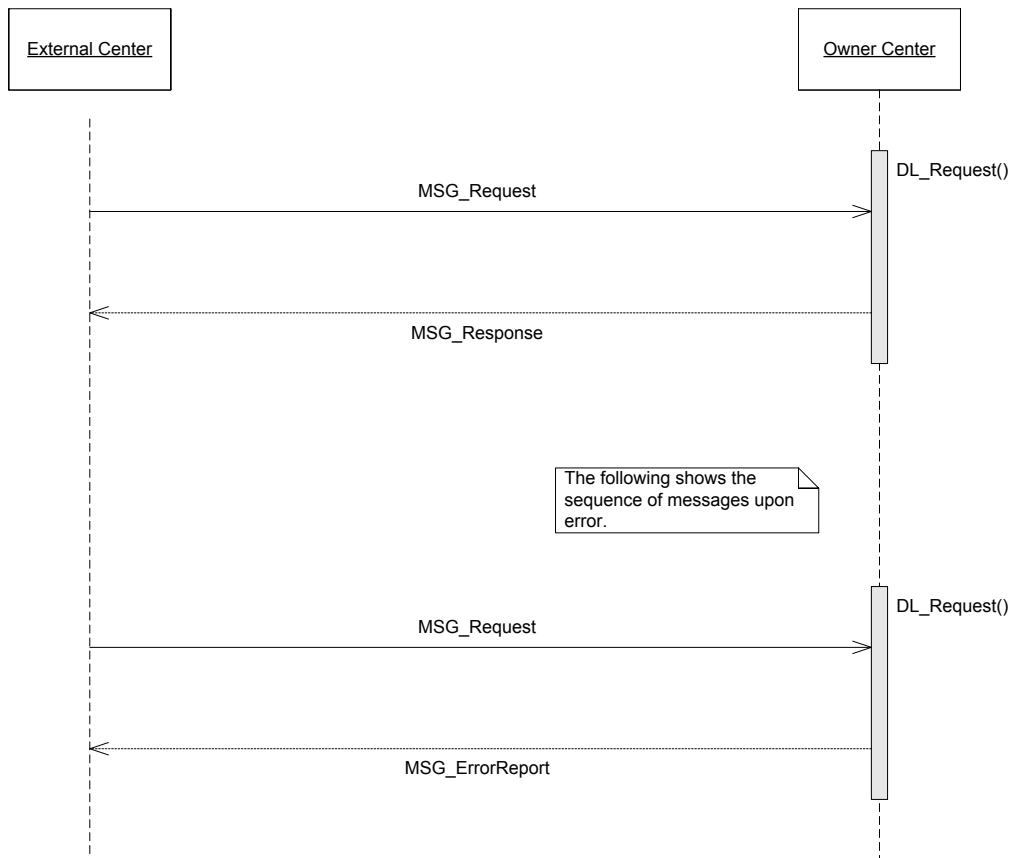
The PEMS dialogs may reference one of the generic dialogs presented below. Along with each of the generic dialogs presented below is a description, sequence diagram, and NTCIP 2306 dialog worksheet.

2.3.1 Request-Response Dialog Template

2.3.1.1 Description:

The request-response dialog supports the sending of an information or control message by a PCC followed by a response by the PEMS NOC upon request. Upon error, the PEMS NOC returns an error message.

2.3.1.2 Sequence Diagram:



2.3.1.3 Dialog Worksheet:

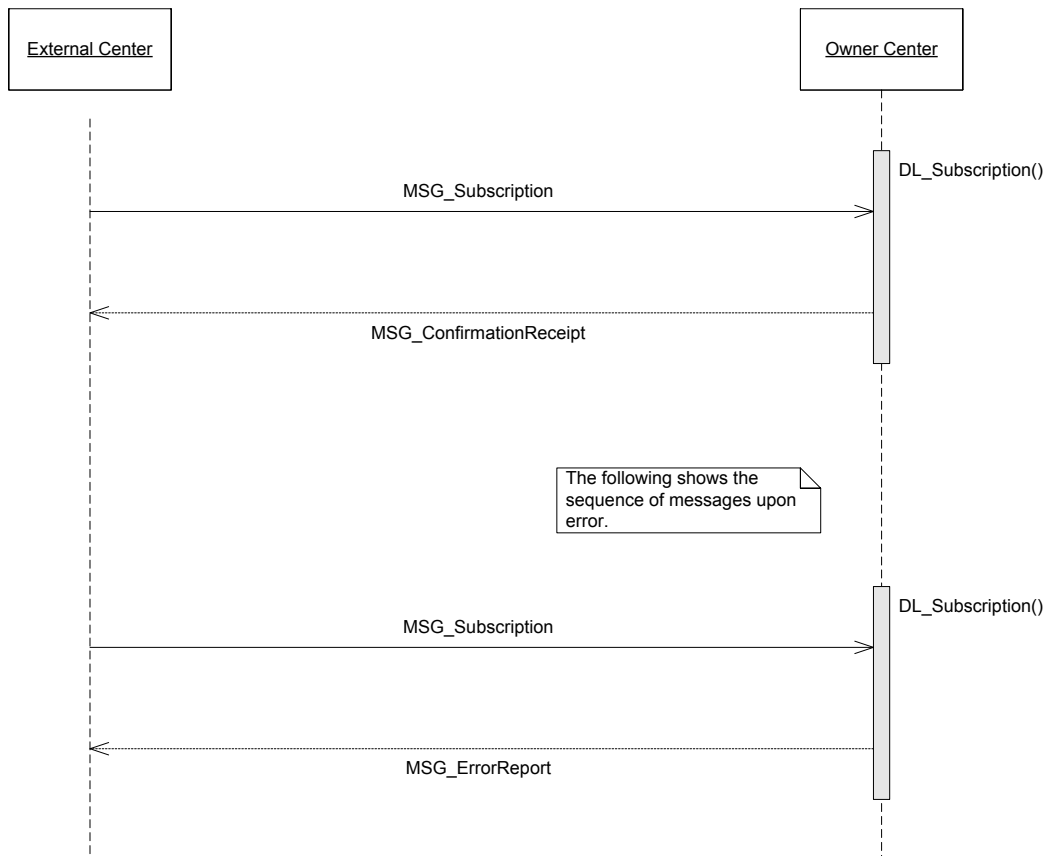
Item	Value
Dialog ASN1Name	DIGenericRequestResponse
Initiator Center	PCC
Target Center	PEMS NOC
Input Message	Request:message
Output Message	Response:message
Error Message	errorReport:message

2.3.2 Subscription Dialog Template

2.3.2.1 Description:

The subscription dialog supports the sending of an information subscription by a PCC followed by a confirmation receipt by the PEMS NOC upon request. Upon error, the PEMS NOC returns an error message.

2.3.2.2 Sequence Diagram:



2.3.2.3 Dialog Worksheet:

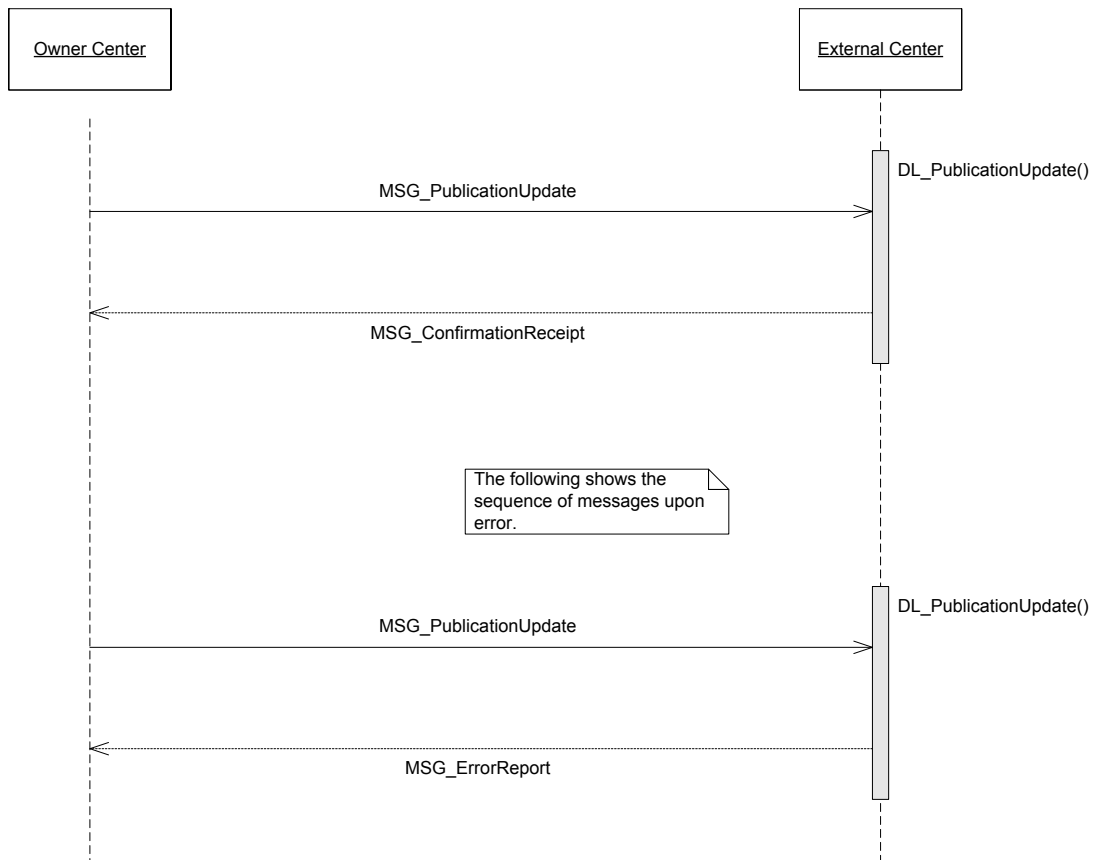
Item	Value
Dialog ASN1Name	DIGenericSubscription
Initiator Center	PCC
Target Center	PEMS NOC
Input Message	Subscription:message
Output Message	confirmationReceipt:message
Error Message	errorReport:message

2.3.3 Publication Update Dialog Template

2.3.3.1 Description:

The publication update dialog supports the sending of updated information by the PEMS NOC to a PCC upon information update. Upon error, the PCC returns an error message.

2.3.3.2 Sequence Diagram:



2.3.3.3 Dialog Worksheet:

Item	Value
Dialog ASN1Name	DIGenericPublicationUpdate
Initiator Center	PEMS NOC
Target Center	PCC
MsgInput	PublicationUpdate:message
MsgOutput	confirmationReceipt:message
MsgError	errorReport:message

3 TMDD ISO 14817 and XML Data Concept Definitions

This section contains the data concept definitions of TMDD that the PEMS data dictionary and message sets are built upon: this includes interface-dialogues, messages, data frames, data elements, and object classes. The following apply as needed:

- With the exception of object classes, each data concept defined includes the ISO 14817 and XML representation.
- The XML representation of interface dialogues is that of WSDL (as defined in the NTCIP 2306).
- The XML representation of messages, data frames, and data elements is that of the XML Schema (as defined in SAE J2630).

3.1 Interface Dialogues

3.1.1 DILogin

3.1.1.1 DEFINITION

A request-response dialog that allows a PCC to established a secured connection to the PEMS NOC.

3.1.1.2 PRE CONDITIONS

n/a

3.1.1.3 DIALOG REFERENCE

See Clause 2.3.1

3.1.1.4 ASN.1 REPRESENTATION

Not available

3.1.1.5 XML REPRESENTATION

```
<operation xmlns="http://schemas.xmlsoap.org/wsdl/" name="DILogin">
  <documentation>
    <objectClass>ConnectionManagement</objectClass>
    <msgPattern>Sub</msgPattern>
  </documentation>
  <input message="tns:MSG_LoginSet"/>
  <output message="tns:MSG_ConfirmationReceipt"/>
  <fault name="ErrorReport" message="tns:MSG_ErrorReport"/>
</operation>
```

3.1.2 DICancelSubscription

3.1.2.1 DEFINITION

A request-response dialog that allows a PCC to request that the PEMS NOC cancel a previously requested subscription.

3.1.2.2 PRE CONDITIONS

Previous subscription

3.1.2.3 DIALOG REFERENCE

See Clause 2.3.1

3.1.2.4 ASN.1 REPRESENTATION

```
DICancelSubscription ITS-INTERFACE-DIALOGUE ::= {
  DATA-CONCEPT-IDENTIFIER 1
  DATA-CONCEPT-VERSION 1
  DESCRIPTIVE-NAME "PCC<-DICancelSubscription->PEMS NOC"
  ASN-NAME "DICancelSubscription"
  ASN-OBJECT-IDENTIFIER { PEMS-interface-dialogue DICancelSubscription(1) }
  URL "MISSING MESSAGE PATTERN.gif"
  DEFINITION "A request-response dialog that allows a PCC to request that the PEMS NOC
    cancel a previously requested subscription."
  DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}
  ARCHITECTURE-REFERENCE {"nil"}
```

```

ARCHITECTURE-NAME {"U.S. National ITS Architecture"}
ARCHITECTURE-VERSION {"6.0"}
DATA-CONCEPT-TYPE interface-dialogue
STANDARD "PEMS DD"
REFERENCED-MESSAGES {
  { c2c-message c2cMessageSubscription(1) }, -- Input
  { c2c-message c2cMessageReceipt(1) }, -- Output
  { pems-message errorReportMsg(1) } -- Fault
}
REFERENCED-OBJECT-CLASSES {
  { PEMS-object-class-owner-center(1) },
  { PEMS-object-class external center(1) }
}
}
    
```

3.1.2.5 XML REPRESENTATION

```

<operation xmlns="http://schemas.xmlsoap.org/wsdl/" name="DlCancelSubscription">
  <documentation>
    <objectClass>ConnectionManagement</objectClass>
    <msgPattern>Sub</msgPattern>
  </documentation>
  <input message="tns:MSG_CancelSubscription"/>
  <output message="tns:MSG_ConfirmationReceipt"/>
  <fault name="ErrorReport" message="tns:MSG_ErrorReport"/>
</operation>
    
```

3.1.3 DICCTVInventoryRequest

3.1.3.1 DEFINITION

A request-response dialog that allows a PCC to request the PEMS NOC to provide an inventory of the PEMS NOC's CCTVs.

3.1.3.2 DIALOG REFERENCE

See Clause 2.3.1

3.1.3.3 ASN.1 REPRESENTATION

```

DlCCTVInventoryRequest ITS-INTERFACE-DIALOGUE ::= {
  DATA-CONCEPT-IDENTIFIER 12
  DATA-CONCEPT-VERSION 1
  DESCRIPTIVE-NAME
    "PCC<-DlCCTVInventoryRequest->PEMS NOC"
  ASN-NAME "DlCCTVInventoryRequest"
  ASN-OBJECT-IDENTIFIER { PEMS-interface-dialogue DlCCTVInventoryRequest(1) }
  URL "R-R.gif"
  DEFINITION
    "A request-response dialog that allows a PCC to request the PEMS NOC to
    provide an inventory of the PEMS NOC's CCTVs."
  DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}
  ARCHITECTURE-REFERENCE {
    "nil"
  }
  ARCHITECTURE-NAME {"U.S. National ITS Architecture"}
  ARCHITECTURE-VERSION {"6.0"}
  DATA-CONCEPT-TYPE interface-dialogue
  STANDARD "PEMS DD"
  REFERENCED-MESSAGES {
    { pems-message deviceInformationRequestMsg(1) }, -- Input
    { pems-message cCTVInventoryMsg(1) }, -- Output
    { pems-message errorReportMsg(1) } -- Fault
  }
  REFERENCED-OBJECT-CLASSES {
    { PEMS-object-class-owner-center(1) },
    
```



```
{ PEMS-object-class external center(1) }  
}  
}
```

3.1.3.4 XML REPRESENTATION

```
<operation xmlns="http://schemas.xmlsoap.org/wsdl/" name="DlCCTVInventoryRequest">  
  <documentation>  
    <objectClass>CCTV</objectClass>  
    <msgPattern>R-R</msgPattern>  
  </documentation>  
  <input message="tns:MSG_DeviceInformationRequest"/>  
  <output message="tns:MSG_CCTVInventory"/>  
  <fault name="ErrorReport" message="tns:MSG_ErrorReport"/>  
</operation>
```

3.1.4 DICCTVInventoryUpdate

3.1.4.1 DEFINITION

A publication dialog that allows the PEMS NOC to provide inventory updates to a PCC on the PEMS NOC's CCTVs.

3.1.4.2 PRE CONDITIONS

Previous DeviceInformationSubscription

3.1.4.3 DIALOG REFERENCE

See Clause 2.3.3

3.1.4.4 ASN.1 REPRESENTATION

```
DlCCTVInventoryUpdate ITS-INTERFACE-DIALOGUE ::= {
  DATA-CONCEPT-IDENTIFIER 76
  DATA-CONCEPT-VERSION 1
  DESCRIPTIVE-NAME
    "PEMS NOC<-DlCCTVInventoryUpdate->PCC"
  ASN-NAME "DlCCTVInventoryUpdate"
  ASN-OBJECT-IDENTIFIER { PEMS-interface-dialogue DlCCTVInventoryUpdate(1) }
  URL "Pub.gif"
  DEFINITION
    "A publication dialog that allows the PEMS NOC to provide inventory updates to
    a PCC on the PEMS NOC's CCTVs."
  DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}
  ARCHITECTURE-REFERENCE {
    "nil"
  }
  ARCHITECTURE-NAME {"U.S. National ITS Architecture"}
  ARCHITECTURE-VERSION {"6.0"}
  DATA-CONCEPT-TYPE interface-dialogue
  STANDARD "PEMS DD"
  REFERENCED-MESSAGES {
    { pems-message cCTVInventoryMsg(1) }, -- Input
    { c2c-message c2cMessageReceipt(1) }, -- Output
    { pems-message errorReportMsg(1) } -- Fault
  }
  REFERENCED-OBJECT-CLASSES {
    { PEMS-object-class-owner-center(1) },
    { PEMS-object-class external center(1) }
  }
}
```

3.1.4.5 XML REPRESENTATION

```
<operation xmlns="http://schemas.xmlsoap.org/wsdl/" name="DlCCTVInventoryUpdate">
  <documentation>
    <objectClass>CCTV</objectClass>
    <msgPattern>Pub</msgPattern>
  </documentation>
  <input message="tns:MSG_CCTVInventory"/>
  <output message="tns:MSG_ConfirmationReceipt"/>
  <fault name="ErrorReport" message="tns:MSG_ErrorReport"/>
</operation>
```

3.1.5 DIDetectorDataRequest

3.1.5.1 DEFINITION

A request-response dialog that allows a PCC to request the PEMS NOC to provide collected data for a given set of the PEMS NOC's Detector stations and sensors.

3.1.5.2 DIALOG REFERENCE

See Clause 2.3.1

3.1.5.3 ASN.1 REPRESENTATION

```
dlDetectorDataRequest ITS-INTERFACE-DIALOGUE ::= {
  DATA-CONCEPT-IDENTIFIER 20
  DATA-CONCEPT-VERSION 1
  DESCRIPTIVE-NAME
    "PCC<-dlDetectorDataRequest->PEMS NOC"
  ASN-NAME "dlDetectorDataRequest"
  ASN-OBJECT-IDENTIFIER { PEMS-interface-dialogue dlDetectorDataRequest(1) }
  URL "R-R.gif"
  DEFINITION "A request-response dialog that allows a PCC to request the PEMS NOC to
  provide collected data for a given set of the PEMS NOC's detector stations and sensors."
  DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}
  ARCHITECTURE-REFERENCE {
    "nil"
  }
  ARCHITECTURE-NAME {"U.S. National ITS Architecture"}
  ARCHITECTURE-VERSION {"6.0"}
  DATA-CONCEPT-TYPE interface-dialogue
  STANDARD "PEMS DD"
  REFERENCED-MESSAGES {
    { pems-message detectorDataRequestMsg(1) }, -- Input
    { pems-message detectorDataMsg(1) }, -- Output
    { pems-message errorReportMsg(1) } -- Fault
  }
  REFERENCED-OBJECT-CLASSES {
    { PEMS-object-class-owner-center(1) },
    { PEMS-object-class external center(1) }
  }
}
```

3.1.5.4 XML REPRESENTATION

```
<operation xmlns="http://schemas.xmlsoap.org/wsdl/" name="dlDetectorDataRequest ">
  <documentation>
    <objectClass>Detector</objectClass>
    <msgPattern>R-R</msgPattern>
  </documentation>
  <input message="tns:MSG_DetectorDataRequest"/>
  <output message="tns:MSG_DetectorData"/>
  <fault name="ErrorReport" message="tns:MSG_ErrorReport"/>
</operation>
```

3.1.6 DIDetectorDataSubscription

3.1.6.1 DEFINITION

A request-response dialog that allows a PCC to request the PEMS NOC set up a subscription for updates on the PEMS NOC Detector station and sensor collected data.

3.1.6.2 DIALOG REFERENCE

See Clause 2.3.2

3.1.6.3 ASN.1 REPRESENTATION

```
DlDetectorDataSubscription ITS-INTERFACE-DIALOGUE ::= {
```

```

DATA-CONCEPT-IDENTIFIER 21
DATA-CONCEPT-VERSION 1
DESCRIPTIVE-NAME
  "PCC<-DlDetectorDataSubscription->PEMS NOC"
ASN-NAME "DlDetectorDataSubscription"
ASN-OBJECT-IDENTIFIER { PEMS-interface-dialogue DlDetectorDataSubscription(1) }
URL "Sub.gif"
DEFINITION
  "A request-response dialog that allows a PCC to request the PEMS NOC set up a
  subscription for updates on the PEMS NOC Detector station and sensor collected data."
DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}
ARCHITECTURE-REFERENCE {
  "nil"
}
ARCHITECTURE-NAME {"U.S. National ITS Architecture"}
ARCHITECTURE-VERSION {"6.0"}
DATA-CONCEPT-TYPE interface-dialogue
STANDARD "PEMS DD"
REFERENCED-MESSAGES {
  { pems-message deviceInformationRequestMsg(1) }, -- Input
  { c2c-message c2cMessageReceipt(1) }, -- Output
  { pems-message errorReportMsg(1) } -- Fault
}
REFERENCED-OBJECT-CLASSES {
  { PEMS-object-class-owner-center(1) },
  { PEMS-object-class-external-center(1) }
}
}

```

3.1.6.4 XML REPRESENTATION

```

<operation xmlns="http://schemas.xmlsoap.org/wsdl/" name="DlDetectorDataSubscription">
  <documentation>
    <objectClass>Device</objectClass>
    <msgPattern>Sub</msgPattern>
  </documentation>
  <input message="tns:MSG_DeviceInformationSubscription"/>
  <output message="tns:MSG_ConfirmationReceipt"/>
  <fault name="ErrorReport" message="tns:MSG_ErrorReport"/>
</operation>

```

3.1.7 DlDetectorDataUpdate

3.1.7.1 DEFINITION

A publication dialog that allows the PEMS NOC to provide collected data updates to a PCC on the PEMS NOC's Detector stations and sensors.

3.1.7.2 PRE CONDITIONS

Previous DetectorDataSubscription

3.1.7.3 DIALOG REFERENCE

See Clause 2.3.3

3.1.7.4 ASN.1 REPRESENTATION

```

dlDetectorDataUpdate ITS-INTERFACE-DIALOGUE ::= {
DATA-CONCEPT-IDENTIFIER 82
DATA-CONCEPT-VERSION 1
DESCRIPTIVE-NAME
  "PEMS NOC<-DlDetectorDataUpdate->PCC"
ASN-NAME "DlDetectorDataUpdate"
ASN-OBJECT-IDENTIFIER { PEMS-interface-dialogue dlDetectorDataUpdate(1) }
URL "Pub.gif"
DEFINITION
  "A publication dialog that allows the PEMS NOC to provide collected data
  updates to a PCC on the PEMS NOC's detector stations and sensors."
DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}
}

```

```

ARCHITECTURE-REFERENCE {
    "nil"
}
ARCHITECTURE-NAME {"U.S. National ITS Architecture"}
ARCHITECTURE-VERSION {"6.0"}
DATA-CONCEPT-TYPE interface-dialogue
STANDARD "PEMS DD"
REFERENCED-MESSAGES {
    { pems-message detectorDataMsg(1) }, -- Input
    { c2c-message c2cMessageReceipt(1) }, -- Output
    { pems-message errorReportMsg(1) } -- Fault
}
REFERENCED-OBJECT-CLASSES {
    { PEMS-object-class-owner-center(1) },
    { PEMS-object-class external center(1) }
}
}
    
```

3.1.7.5 XML REPRESENTATION

```

<operation xmlns="http://schemas.xmlsoap.org/wsdl/" name="DlDetectorDataUpdate">
  <documentation>
    <objectClass>Detector</objectClass>
    <msgPattern>Pub</msgPattern>
  </documentation>
  <input message="tns:MSG_DetectorData"/>
  <output message="tns:MSG_ConfirmationReceipt"/>
  <fault name="ErrorReport" message="tns:MSG_ErrorReport"/>
</operation>
    
```

3.1.8 DlDetectorInventoryRequest

3.1.8.1 DEFINITION

A request-response dialog that allows a PCC to request the PEMS NOC to provide an inventory of the PEMS NOC's detector stations and sensors.

3.1.8.2 DIALOG REFERENCE

See Clause 2.3.1

3.1.8.3 ASN.1 REPRESENTATION

```

DlDetectorInventoryRequest ITS-INTERFACE-DIALOGUE ::= {
  DATA-CONCEPT-IDENTIFIER 18
  DATA-CONCEPT-VERSION 1
  DESCRIPTIVE-NAME
    "PCC<-DlDetectorInventoryRequest->PEMS NOC"
  ASN-NAME "DlDetectorInventoryRequest"
  ASN-OBJECT-IDENTIFIER { PEMS-interface-dialogue DlDetectorInventoryRequest(1) }
  URL "R-R.gif"
  DEFINITION
    "A request-response dialog that allows a PCC to request the PEMS NOC to
    provide an inventory of the PEMS NOC's detector stations and sensors."
  DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}
  ARCHITECTURE-REFERENCE {
    "nil"
  }
  ARCHITECTURE-NAME {"U.S. National ITS Architecture"}
  ARCHITECTURE-VERSION {"6.0"}
  DATA-CONCEPT-TYPE interface-dialogue
  STANDARD "PEMS DD"
  REFERENCED-MESSAGES {
    { pems-message deviceInformationRequestMsg(1) }, -- Input
    { pems-message detectorInventoryMsg(1) }, -- Output
    { pems-message errorReportMsg(1) } -- Fault
  }
  REFERENCED-OBJECT-CLASSES {
    
```

```
{ PEMS-object-class-owner-center(1) },  
{ PEMS-object-class external center(1) }  
}  
}
```

3.1.8.4 XML REPRESENTATION

```
<operation xmlns="http://schemas.xmlsoap.org/wsdl/" name="DlDetectorInventoryRequest">  
  <documentation>  
    <objectClass>Detector</objectClass>  
    <msgPattern>R-R</msgPattern>  
  </documentation>  
  <input message="tns:MSG_DeviceInformationRequest"/>  
  <output message="tns:MSG_DetectorInventory"/>  
  <fault name="ErrorReport" message="tns:MSG_ErrorReport"/>  
</operation>
```

3.1.9 DlDetectorInventoryUpdate

3.1.9.1 DEFINITION

A publication dialog that allows the PEMS NOC to provide inventory updates to a PCC on the PEMS NOC's detector stations and sensors.

3.1.9.2 PRE CONDITIONS

Previous DeviceInformationSubscription

3.1.9.3 DIALOG REFERENCE

See Clause 2.3.3

3.1.9.4 ASN.1 REPRESENTATION

```
dlDetectorInventoryUpdate ITS-INTERFACE-DIALOGUE ::= {  
  DATA-CONCEPT-IDENTIFIER 80  
  DATA-CONCEPT-VERSION 1  
  DESCRIPTIVE-NAME  
    "PEMS NOC<-DlDetectorInventoryUpdate->PCC"  
  ASN-NAME "DlDetectorInventoryUpdate"  
  ASN-OBJECT-IDENTIFIER { PEMS-interface-dialogue dlDetectorInventoryUpdate(1) }  
  URL "Pub.gif"  
  DEFINITION "A publication dialog that allows the PEMS NOC to provide inventory updates to  
  a PCC on the PEMS NOC's detector stations and sensors."  
  DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}  
  ARCHITECTURE-REFERENCE {  
    "nil"  
  }  
  ARCHITECTURE-NAME {"U.S. National ITS Architecture"}  
  ARCHITECTURE-VERSION {"6.0"}  
  DATA-CONCEPT-TYPE interface-dialogue  
  STANDARD "PEMS DD"  
  REFERENCED-MESSAGES {  
    { pems-message detectorInventoryMsg(1) }, -- Input  
    { c2c-message c2cMessageReceipt(1) }, -- Output  
    { pems-message errorReportMsg(1) } -- Fault  
  }  
  REFERENCED-OBJECT-CLASSES {  
    { PEMS-object-class-owner-center(1) },  
    { PEMS-object-class external center(1) }  
  }  
}
```

3.1.9.5 XML REPRESENTATION

```
<operation xmlns="http://schemas.xmlsoap.org/wsdl/" name="DlDetectorInventoryUpdate">
  <documentation>
    <objectClass>Detector</objectClass>
    <msgPattern>Pub</msgPattern>
  </documentation>
  <input message="tns:MSG_DetectorInventory"/>
  <output message="tns:MSG_ConfirmationReceipt"/>
  <fault name="ErrorReport" message="tns:MSG_ErrorReport"/>
</operation>
```

3.1.10 DIDeviceInformationSubscription

3.1.10.1 DEFINITION

A request-response dialog that allows a PCC to request the PEMS NOC set up a subscription for updates on the PEMS NOC device inventory, status, and control schedule.

3.1.10.2 DIALOG REFERENCE

See Clause 2.3.2

3.1.10.3 ASN.1 REPRESENTATION

```
DlDeviceInformationSubscription ITS-INTERFACE-DIALOGUE ::= {
  DATA-CONCEPT-IDENTIFIER 11
  DATA-CONCEPT-VERSION 1
  DESCRIPTIVE-NAME
    "PCC<-DlDeviceInformationSubscription->PEMS NOC"
  ASN-NAME "DlDeviceInformationSubscription"
  ASN-OBJECT-IDENTIFIER { PEMS-interface-dialogue DlDeviceInformationSubscription(1) }
  URL "Sub.gif"
  DEFINITION "A request-response dialog that allows a PCC to request the PEMS
  NOC set up a subscription for updates on the PEMS NOC device inventory, status, and
  control schedule."
  DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}
  ARCHITECTURE-REFERENCE {
    "nil"
  }
  ARCHITECTURE-NAME {"U.S. National ITS Architecture"}
  ARCHITECTURE-VERSION {"6.0"}
  DATA-CONCEPT-TYPE interface-dialogue
  STANDARD "PEMS DD"
  REFERENCED-MESSAGES {
    { pems-message deviceInformationRequestMsg(1) }, -- Input
    { c2c-message c2cMessageReceipt(1) }, -- Output
    { pems-message errorReportMsg(1) } -- Fault
  }
  REFERENCED-OBJECT-CLASSES {
    { PEMS-object-class-owner-center(1) },
    { PEMS-object-class external center(1) }
  }
}
```

3.1.10.4 XML REPRESENTATION

```
<operation xmlns="http://schemas.xmlsoap.org/wsdl/" name="DlDeviceInformationSubscription">
  <documentation>
    <objectClass>Device</objectClass>
    <msgPattern>Sub</msgPattern>
  </documentation>
  <input message="tns:MSG_DeviceInformationSubscription"/>
  <output message="tns:MSG_ConfirmationReceipt"/>
  <fault name="ErrorReport" message="tns:MSG_ErrorReport"/>
</operation>
```

</operation>

3.2 Messages

3.2.1 LoginSetMsg

3.2.1.1 Description

This message establishes login from an External Server to the PEMS server

3.2.1.2 ASN.1 Representation

Not available

3.2.1.3 XML Representation

```
<xs:element name="CancelSubscriptionMsg">
  <xs:annotation>
    <xs:documentation>
      <objectClass>ConnectionManagement</objectClass>
    </xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="organization-Owning" type="organizationInformation" minOccurs="1"
      maxOccurs="1" />
    <xs:element name="organization-Requesting" type="organizationInformation" minOccurs="1"
      maxOccurs="1" />
    <xs:element name="user-id" type="Security-User-Name" minOccurs="1" maxOccurs="1" />
    <xs:element name="password" type="Security-Password" minOccurs="1" maxOccurs="1" />
  </xs:sequence>
</xs:element>
```

3.2.2 CancelSubscriptionMsg

3.2.2.1 Description

This message cancels all subscriptions from the PEMS server to the External Server

3.2.2.2 ASN.1 Representation

Not available

3.2.2.3 XML Representation

```
<xs:element name="CancelSubscriptionMsg">
  <xs:annotation>
    <xs:documentation>
      <objectClass>ConnectionManagement</objectClass>
    </xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="organization-owning" type="organizationInformation">
      <xs:annotation>
        <xs:documentation>
          <requirement>REQ308</requirement>
          <requirement>REQ310</requirement>
        </xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="organization-requesting" type="organizationInformation">
      <xs:annotation>
        <xs:documentation>
          <requirement>REQ308</requirement>
          <requirement>REQ310</requirement>
        </xs:documentation>
      </xs:annotation>
    </xs:element>
  </xs:sequence>
</xs:element>
```

```

        </xs:annotation>
    </xs:element>
    <xs:element name="informationalText" type="InformationalText">
        <xs:annotation>
            <xs:documentation>
                <requirement>REQ308</requirement>
                <requirement>REQ310</requirement>
            </xs:documentation>
        </xs:annotation>
    </xs:element>
</xs:sequence>
</xs:element>

```

3.2.3 cCTVInventoryMsg

3.2.3.1 DEFINITION

The information content describing the PEMS NOC CCTV inventory.

3.2.3.2 ASN.1 REPRESENTATION

```

cCTVInventoryMsg ITS-MESSAGE ::= {
    DATA-CONCEPT-IDENTIFIER 14
    DATA-CONCEPT-VERSION 1
    DESCRIPTIVE-NAME "cCTVInventoryMsg:message"
    ASN-NAME "cCTVInventoryMsg"
    ASN-OBJECT-IDENTIFIER { pems-message cCTVInventoryMsg(1) }
    DEFINITION "The information content describing the PEMS NOC CCTV inventory."
    DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}
    ARCHITECTURE-REFERENCE {
        "nil"
    }
    ARCHITECTURE-NAME {"U.S. National ITS Architecture"}
    ARCHITECTURE-VERSION {"6.0"}
    DATA-CONCEPT-TYPE message
    STANDARD "PEMS DD"
    META-DATA-SOURCE direct
    PRIORITY "routine"
    FREQUENCY-OR-MESSAGE-MODE "on demand"
    REFERENCED-DATA-FRAMES {
        { pems-data-frame CCTVInventory(1) }
    }
    DATA-TYPE "
        CCTVInventoryMsg ::= SEQUENCE (SIZE(1..10240)) OF CCTVInventory
    "
    REGISTRATION-STATUSqualitative:draft
    DATE-REGISTERED "200202200000Z"
    LAST-CHANGE-DATE "200202200000Z"
    LAST-CHANGE-USER "ITE Editor"
    REGISTRAR-ORGANIZATION-NAME "NEMA"
    REGISTRAR-PHONE-NUMBER "+1 111-222-3333"-- NEMA Phone Number
    STEWARD-ORGANIZATION-NAME "ITE"
    STEWARD-PHONE-NUMBER "+1 444-555-6666"-- ITE Phone Number
    SUBMITTER-ORGANIZATION-NAME "ITE-AASHTO TMDD Steering Committee"
    SUBMITTER-PHONE-NUMBER "+1 444-555-6666"-- ITE Project Manager
    USER {""}
}

```

3.2.3.3 XML REPRESENTATION

```

<xs:element xmlns:xs="http://www.w3.org/2001/XMLSchema" name="cCTVInventoryMsg"
    type="cCTVInventoryMsg">
    <xs:annotation>
        <xs:documentation>
            <objectClass>CCTV</objectClass>
        </xs:documentation>
    </xs:annotation>
</xs:complexType>

```

```
<xs:sequence maxOccurs="10240">
  <xs:element name="cctv-inventory-item" type="CCTVInventory"/>
</xs:sequence>
</xs:complexType>
</xs:element>
```

3.2.4 confirmationReceiptMsg

3.2.4.1 Description

After a subscription or publication message is transmitted, the receiver shall respond with a receipt message.

3.2.4.2 ASN.1 Representation

Not available

3.2.4.3 XML Representation

```
<xs:element xmlns:xs="http://www.w3.org/2001/XMLSchema" name="confirmationReceiptMsg">
  <xs:annotation>
    <xs:documentation>
      <objectClass>ConnectionManagement</objectClass>
    </xs:documentation>
  </xs:annotation>
  <xs:element name="informationalText" type="InformationalText">
    <xs:annotation>
      <xs:documentation>
        <requirement>REQ308</requirement>
        <requirement>REQ310</requirement>
      </xs:documentation>
    </xs:annotation>
  </xs:element>
</xs:element>
```

3.2.5 detectorDataMsg

3.2.5.1 DEFINITION

The information content describing the PEMS NOC detector data for a given set of stations and/or sensors.

3.2.5.2 ASN.1 REPRESENTATION

```
detectorDataMsg ITS-MESSAGE ::= {
  DATA-CONCEPT-IDENTIFIER 20
  DATA-CONCEPT-VERSION 1
  DESCRIPTIVE-NAME "detectorDataMsg:message"
  ASN-NAME "detectorDataMsg"
  ASN-OBJECT-IDENTIFIER { pems-message detectorDataMsg(1) }
  DEFINITION "The information content describing the PEMS NOC detector data for a given set
of stations and/or sensors."
  DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}
  ARCHITECTURE-REFERENCE {
    "nil"
  }
  ARCHITECTURE-NAME {"U.S. National ITS Architecture"}
  ARCHITECTURE-VERSION {"6.0"}
  DATA-CONCEPT-TYPE message
  STANDARD "PEMS DD"
  META-DATA-SOURCE direct
  PRIORITY "routine"
  FREQUENCY-OR-MESSAGE-MODE "on demand"
  REFERENCED-DATA-FRAMES {
    { pems-data-frame detectorData(1) }
  }
}
```

```

}
DATA-TYPE "
    detectorDataMsg ::= SEQUENCE (SIZE(1..10240)) OF detectorData
"
REGISTRATION-STATUSqualitative:draft
DATE-REGISTERED "200202200000Z"
LAST-CHANGE-DATE "200202200000Z"
LAST-CHANGE-USER "ITE Editor"
REGISTRAR-ORGANIZATION-NAME "NEMA"
REGISTRAR-PHONE-NUMBER "+1 111-222-3333"-- NEMA Phone Number
STEWARD-ORGANIZATION-NAME "ITE"
STEWARD-PHONE-NUMBER "+1 444-555-6666"-- ITE Phone Number
SUBMITTER-ORGANIZATION-NAME "ITE-AASHTO TMDD Steering Committee"
SUBMITTER-PHONE-NUMBER "+1 444-555-6666"-- ITE Project Manager
USER {""}
}

```

3.2.5.3 XML REPRESENTATION

```

<xs:element xmlns:xs="http://www.w3.org/2001/XMLSchema" name="detectorDataMsg">
  <xs:annotation>
    <xs:documentation>
      <objectClass>Detector</objectClass>
    </xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence maxOccurs="10240">
      <xs:element name="detector-data-item" type="detectorData"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

```

3.2.6 detectorDataRequestMsg

3.2.6.1 DEFINITION

The information content necessary to request the PEMS NOC detector data for a given set of stations and/or sensors.

3.2.6.2 ASN.1 REPRESENTATION

```

detectorDataRequestMsg ITS-MESSAGE ::= {
  DATA-CONCEPT-IDENTIFIER 19
  DATA-CONCEPT-VERSION 1
  DESCRIPTIVE-NAME "detectorDataRequestMsg:message"
  ASN-NAME "detectorDataRequestMsg"
  ASN-OBJECT-IDENTIFIER { pems-message detectorDataRequestMsg(1) }
  DEFINITION "The information content necessary to request the PEMS NOC detector data for a
  given set of stations and/or sensors."
  DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}
  ARCHITECTURE-REFERENCE {
    "nil"
  }
}
ARCHITECTURE-NAME {"U.S. National ITS Architecture"}
ARCHITECTURE-VERSION {"6.0"}
DATA-CONCEPT-TYPE message
STANDARD "PEMS DD"
META-DATA-SOURCE direct
PRIORITY "routine"
FREQUENCY-OR-MESSAGE-MODE "on demand"
REFERENCED-DATA-FRAMES {
  { pems-data-frame detectorDataRequest(1) }
}
DATA-TYPE "
detectorDataRequestMsg ::= detectorDataRequest
"
REGISTRATION-STATUSqualitative:draft
DATE-REGISTERED "200202200000Z"
LAST-CHANGE-DATE "200202200000Z"

```


3.2.7.3 XML REPRESENTATION

```
<xs:element xmlns:xs="http://www.w3.org/2001/XMLSchema" name="detectorInventoryMsg"
    name="detectorInventoryMsg">
  <xs:annotation>
    <xs:documentation>
      <objectClass>Detector</objectClass>
    </xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence maxOccurs="10240">
      <xs:element name="detector-inventory-item" type="detectorInventory"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>
```

3.2.8 deviceInformationSubscriptionMsg

3.2.8.1 DEFINITION

The information content requesting periodic updates to device information.

3.2.8.2 ASN.1 REPRESENTATION

```
deviceInformationSubscriptionMsg ITS-MESSAGE ::= {
  DATA-CONCEPT-IDENTIFIER 3
  DATA-CONCEPT-VERSION 1
  DESCRIPTIVE-NAME "deviceInformationSubscriptionMsg:message"
  ASN-NAME "deviceInformationSubscriptionMsg"
  ASN-OBJECT-IDENTIFIER { pems-message deviceInformationSubscriptionMsg(1) }
  DEFINITION " The information content requesting periodic updates to device information."
  DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}
  ARCHITECTURE-REFERENCE {
    "nil"
  }
  ARCHITECTURE-NAME {"U.S. National ITS Architecture"}
  ARCHITECTURE-VERSION {"6.0"}
  DATA-CONCEPT-TYPE message
  STANDARD "PEMS DD"
  META-DATA-SOURCE direct
  PRIORITY "routine"
  FREQUENCY-OR-MESSAGE-MODE "on demand"
  REFERENCED-DATA-FRAMES {
    { pems-data-frame deviceInformationSubscription(1) }
  }
  DATA-TYPE "
  DeviceInformationSubscriptionMsg ::= DeviceInformationSubscription
  "
}
```

3.2.8.3 XML REPRESENTATION

```
<xs:element xmlns:xs="http://www.w3.org/2001/XMLSchema" name="deviceInformationSubscriptionMsg"
    type="DeviceInformationSubscription">
  <xs:annotation>
    <xs:documentation>
      <objectClass>ConnectionManagement</objectClass>
      <requirement>REQ1079</requirement>
      <definition/>
    </xs:documentation>
  </xs:annotation>
</xs:element>
```

3.2.9 deviceInformationRequestMsg

3.2.9.1 DEFINITION

The information content necessary to request the PEMS NOC to provide inventory, status, schedule, or timing plan information for a given set of devices.

3.2.9.2 ASN.1 REPRESENTATION

```
deviceInformationRequestMsg ITS-MESSAGE ::= {
  DATA-CONCEPT-IDENTIFIER 13
  DATA-CONCEPT-VERSION 1
  DESCRIPTIVE-NAME "deviceInformationRequestMsg:message"
  ASN-NAME "deviceInformationRequestMsg"
  ASN-OBJECT-IDENTIFIER { pems-message deviceInformationRequestMsg(1) }
  DEFINITION "The information content necessary to request the PEMS NOC to provide
  inventory, status, schedule, or timing plan information for a given set of devices."
  DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}
  ARCHITECTURE-REFERENCE {
    "nil"
  }
}
ARCHITECTURE-NAME {"U.S. National ITS Architecture"}
ARCHITECTURE-VERSION {"6.0"}
DATA-CONCEPT-TYPE message
STANDARD "PEMS DD"
META-DATA-SOURCE direct
PRIORITY "routine"
FREQUENCY-OR-MESSAGE-MODE "on demand"
REFERENCED-DATA-FRAMES {
  { pems-data-frame deviceInformationRequest(1) }
}
DATA-TYPE "
deviceInformationRequestMsg ::= deviceInformationRequest
"
REGISTRATION-STATUSqualitative:draft
DATE-REGISTERED "200202200000Z"
LAST-CHANGE-DATE "200202200000Z"
LAST-CHANGE-USER "ITE Editor"
REGISTRAR-ORGANIZATION-NAME "NEMA"
REGISTRAR-PHONE-NUMBER "+1 111-222-3333"-- NEMA Phone Number
STEWARDSHIP-ORGANIZATION-NAME "ITE"
STEWARDSHIP-PHONE-NUMBER "+1 444-555-6666"-- ITE Phone Number
SUBMITTER-ORGANIZATION-NAME "ITE-AASHTO TMDD Steering Committee"
SUBMITTER-PHONE-NUMBER "+1 444-555-6666"-- ITE Project Manager
USER {""}
}
```

3.2.9.3 XML REPRESENTATION

```
<xs:element xmlns:xs="http://www.w3.org/2001/XMLSchema" name="deviceInformationRequest"
  type="deviceInformationRequestMsg">
  <xs:annotation>
    <xs:documentation>
      <objectClass>Device</objectClass>
    </xs:documentation>
  </xs:annotation>
  <xs:complexType name="MSG_DeviceInformationRequest">
    <xs:sequence>
      <xs:element name="organization-Owning" type="Organization-Information" minOccurs="1"
        maxOccurs="1" />
      <xs:element name="organization-Requesting" type="Organization-Information"
        minOccurs="1" maxOccurs="1" />
      <xs:element name="device-Type" type="Device-Type" minOccurs="1" maxOccurs="1" />
      <xs:element name="device-Information-Type" type="Device-Information-Type"
        minOccurs="1" maxOccurs="1" />
    </xs:sequence>
  </xs:complexType>
</xs:element>
```

3.2.10 errorReportMsg

3.2.10.1 DEFINITION

The information content describing errors in handling of requests made from a PCC to an PEMS NOC.

3.2.10.2 ASN.1 REPRESENTATION

```
errorReportMsg ITS-MESSAGE ::= {
  DATA-CONCEPT-IDENTIFIER 3
  DATA-CONCEPT-VERSION 1
  DESCRIPTIVE-NAME "errorReportMsg:message"
  ASN-NAME "errorReportMsg"
  ASN-OBJECT-IDENTIFIER { pems-message errorReportMsg(1) }
  DEFINITION "The information content describing errors in handling of requests made from a
  PCC to an PEMS NOC."
  DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}
  ARCHITECTURE-REFERENCE {
    "nil"
  }
  ARCHITECTURE-NAME {"U.S. National ITS Architecture"}
  ARCHITECTURE-VERSION {"6.0"}
  DATA-CONCEPT-TYPE message
  STANDARD "PEMS DD"
  META-DATA-SOURCE direct
  PRIORITY "routine"
  FREQUENCY-OR-MESSAGE-MODE "on demand"
  REFERENCED-DATA-FRAMES {
    { pems-data-frame errorReport(1) }
  }
  DATA-TYPE "
  errorReportMsg ::= errorReport
  "
}
```

3.2.10.3 XML REPRESENTATION

```
<xs:element xmlns:xs="http://www.w3.org/2001/XMLSchema" name="errorReport" type="errorReportMsg">
  <xs:annotation>
    <xs:documentation>
      <objectClass>ConnectionManagement</objectClass>
    </xs:documentation>
  </xs:annotation>
</xs:element>
```

3.3 Data Frames

3.3.1 CCTVInventory

3.3.1.1 DEFINITION

The information content describing an entry in the PEMS NOC's CCTV inventory for a single device.

3.3.1.2 ASN.1 REPRESENTATION

```
CCTVInventory ITS-DATA-FRAME ::= {
  DATA-CONCEPT-IDENTIFIER 67
  DATA-CONCEPT-VERSION 1
  DESCRIPTIVE-NAME "CCTVInventory:frame"
  ASN-NAME "CCTVInventory"
  ASN-OBJECT-IDENTIFIER { pems-data-frame CCTVInventory(1) }
  DEFINITION "The information content describing an entry in the PEMS NOC's CCTV inventory
  for a single device."
  DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}
  DATA-CONCEPT-TYPE data-frame
  STANDARD "PEMS DD"
  REFERENCED-DATA-FRAMES {
    { pems-data-frame DeviceInventoryHeader(1) }
  }
  REFERENCED-DATA-ELEMENTS {
```



```

    { PEMS-data-element cctv-image-supported(1) },
  }
  DATA-TYPE "
  CCTVInventory ::= SEQUENCE {
    device-inventory-header DeviceInventoryHeader,
    cctv-image cctv-image-supported,
  }

```

XML REPRESENTATION

```

<xs:complexType xmlns:xs="http://www.w3.org/2001/XMLSchema" name="CCTVInventory">
  <xs:annotation>
    <xs:documentation>
      <objectClass>CCTV</objectClass>
    </xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="device-inventory-header" type="DeviceInventoryHeader"></xs:element>
    <xs:element name="cctv-image" type="cctv-image-supported"></xs:element>
  </xs:sequence>
</xs:complexType>

```

3.3.2 c2cMessageReceipt

3.3.2.1 Definition

Defined as a c2cMessageReceipt

3.3.2.2 XML Representation

```

<!-- Descriptive Name: c2cMessageReceipt -->
<xs:element name="c2cMessageReceipt" type="C2CMessageReceipt"/>
  <xs:complexType name="C2CMessageReceipt" >
    <xs:sequence>
      <xs:element name="informationalText" type="InformationalText"/>
    </xs:sequence>
  </xs:complexType>

```

3.3.3 CancelSubscription

3.3.3.1 DEFINITION

The information content to cancel a subscription.

3.3.3.2 ASN.1 REPRESENTATION

```

cancelSubscription ITS-DATA-FRAME ::= {
  DATA-CONCEPT-IDENTIFIER 2
  DATA-CONCEPT-VERSION 1
  DESCRIPTIVE-NAME "cancelSubscription:frame"
  ASN-NAME "cancelSubscription"
  ASN-OBJECT-IDENTIFIER { pems-data-frame cancelSubscription(1) }
  DEFINITION " The information content to cancel a subscription."
  DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}
  DATA-CONCEPT-TYPE data-frame
  STANDARD "PEMS DD"
  REFERENCED-DATA-FRAMES {
    { pems-data-frame organizationInformation(1) }
  }
  REFERENCED-DATA-ELEMENTS {
    { PEMS-data-element organization-resource-identifier(1) },
    { PEMS-data-element Organization-resource-name(1) }
  }
  DATA-TYPE "

```

```
cancelSubscription ::= SEQUENCE {  
    organization-information organizationInformation,  
    center-id organization-resource-identifier,  
    center-name Organization-resource-name  
}  
"  
}
```

3.3.3.3 XML REPRESENTATION

```
<xs:complexType xmlns:xs="http://www.w3.org/2001/XMLSchema" name="cancelSubscription">  
    <xs:annotation>  
        <xs:documentation>  
            <objectClass>ConnectionManagement</objectClass>  
            <definition/>  
        </xs:documentation>  
    </xs:annotation>  
    <xs:sequence>  
        <xs:element name="organization-information" type="organizationInformation">  
            <xs:annotation>  
                <xs:documentation>  
                    <requirement>REQ308</requirement>  
                    <requirement>REQ310</requirement>  
                </xs:documentation>  
            </xs:annotation>  
        </xs:element>  
        <xs:element name="center-id" type="organization-resource-identifier">  
            <xs:annotation>  
                <xs:documentation>  
                    <requirement>REQ308</requirement>  
                </xs:documentation>  
            </xs:annotation>  
        </xs:element>  
        <xs:element name="center-name" type="Organization-resource-name">  
            <xs:annotation>  
                <xs:documentation>  
                    <requirement>REQ308</requirement>  
                </xs:documentation>  
            </xs:annotation>  
        </xs:element>  
    </xs:sequence>  
</xs:complexType>
```

3.3.4 dateTimeZone

3.3.4.1 Definition

Defined as DateTime Stamp

3.3.4.2 XML Representation

```
<xs:complexType xmlns:xs="http://www.w3.org/2001/XMLSchema" name="dateTimeZone">  
    <xs:annotation>  
        <xs:documentation>  
            <objectClass>ConnectionManagement</objectClass>  
        </xs:documentation>  
    </xs:annotation>  
    <xs:element name="date-time-stamp" type="DateTimePair"/></xs:element>  
</xs:complexType>
```

3.3.5 DetectorData

3.3.5.1 DEFINITION

The information content describing the PEMS NOC detector data for a single station or sensor.

3.3.5.2 ASN.1 REPRESENTATION

```

detectorData ITS-DATA-FRAME ::= {
    DATA-CONCEPT-IDENTIFIER 74
    DATA-CONCEPT-VERSION 1
    DESCRIPTIVE-NAME "detectorData:frame"
    ASN-NAME "detectorData"
    ASN-OBJECT-IDENTIFIER { pems-data-frame detectorData(1) }
    DEFINITION "The information content describing the PEMS NOC detector data for a single
    station or sensor."
    DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}
    DATA-CONCEPT-TYPE data-frame
    STANDARD "PEMS DD"
    REFERENCED-DATA-FRAMES {
        { pems-data-frame detectorDataDetail(1) }
    }
    DATA-TYPE "
detectorData ::= SEQUENCE {
    detector-list SEQUENCE (SIZE(1..1024)) OF detectorDataDetail
}
"
}
    
```

3.3.5.3 XML REPRESENTATION

```

<xs:complexType xmlns:xs="http://www.w3.org/2001/XMLSchema" name="detectorData">
    <xs:annotation>
        <xs:documentation>
            <objectClass>Detector</objectClass>
        </xs:documentation>
    </xs:annotation>
    <xs:sequence>
        <xs:element name="detector-list">
            <xs:complexType>
                <xs:sequence maxOccurs="1024">
                    <xs:element name="detector-data-detail" type="detectorDataDetail"/>
                </xs:sequence>
            </xs:complexType>
        </xs:element>
    </xs:sequence>
</xs:complexType>
    
```

3.3.6 DetectorDataRequest

3.3.6.1 DEFINITION

The information content necessary to request the [PEMS NOC](#) detector data for a given set of stations and/or sensors.

3.3.6.2 ASN.1 REPRESENTATION

```

detectorDataRequest ITS-DATA-FRAME ::= {
    DATA-CONCEPT-IDENTIFIER 72
    DATA-CONCEPT-VERSION 1
    DESCRIPTIVE-NAME "detectorDataRequest:frame"
    ASN-NAME "detectorDataRequest"
    ASN-OBJECT-IDENTIFIER { pems-data-frame detectorDataRequest(1) }
    DEFINITION "The information content necessary to request the PEMS NOC detector data for a
    given set of stations and/or sensors."
    DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}
    DATA-CONCEPT-TYPE data-frame
    STANDARD "PEMS DD"
    REFERENCED-DATA-FRAMES {
        { pems-data-frame deviceInformationRequest(1) }
    }
    REFERENCED-DATA-ELEMENTS {
        { PEMS-data-element device-sensor-data-type(1) }
    }
    DATA-TYPE "
    
```

```

detectorDataRequest ::= SEQUENCE {
    device-information-request-header deviceInformationRequest,
    detector-data-type device-sensor-data-type OPTIONAL
}
"
}

```

3.3.6.3 XML REPRESENTATION

```

<xs:complexType xmlns:xs="http://www.w3.org/2001/XMLSchema" name="detectorDataRequest">
  <xs:annotation>
    <xs:documentation>
      <objectClass>Detector</objectClass>
      <requirement>REQ1101</requirement>
      <definition/>
    </xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="device-information-request-header" type="deviceInformationRequest">
      <xs:annotation>
        <xs:documentation>
          <requirement>REQ422</requirement>
        </xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="detector-data-type" type="device-sensor-data-type" minOccurs="0">
      <xs:annotation>
        <xs:documentation>
          <requirement>REQ374</requirement>
        </xs:documentation>
      </xs:annotation>
    </xs:element>
  </xs:sequence>
</xs:complexType>

```

3.3.7 DetectorDataDetail

3.3.7.1 DEFINITION

The information content describing the PEMS NOC detector data for a single station or sensor.

3.3.7.2 ASN.1 REPRESENTATION

```

detectorDataDetail ITS-DATA-FRAME ::= {
  DATA-CONCEPT-IDENTIFIER 79
  DATA-CONCEPT-VERSION 1
  DESCRIPTIVE-NAME "detectorDataDetail:frame"
  ASN-NAME "detectorDataDetail"
  ASN-OBJECT-IDENTIFIER { pems-data-frame detectorDataDetail(1) }
  DEFINITION "The information content describing the PEMS NOC detector data for a single
  station or sensor."
  DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}
  DATA-CONCEPT-TYPE data-frame
  STANDARD "PEMS DD"
  REFERENCED-DATA-FRAMES {
    { pems-data-frame organizationInformation(1) },
    { pems-data-frame dateTimeZone(1) }
  }
  REFERENCED-DATA-ELEMENTS {
    { PEMS-data-element organization-resource-identifier (1) },
  }
  DATA-TYPE "
  detectorDataDetail ::= SEQUENCE {
    organization-information organizationInformation,
    station-id organization-resource-identifier,
    detector-id organization-resource-identifier,
    detection-time-stamp dateTimeZone,
  }
  "
}

```

3.3.7.3 XML REPRESENTATION

```
<xs:complexType xmlns:xs="http://www.w3.org/2001/XMLSchema" name="detectorDataDetail">
  <xs:annotation>
    <xs:documentation>
      <objectClass>Detector</objectClass>
    </xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="organization-Information" type="OrganizationInformation" minOccurs="1"
      maxOccurs="1" />
    <xs:element name="station-Id" type="OrganizationInformation" minOccurs="1" maxOccurs="1" />
    <xs:element name="detector-Id" type="OrganizationInformation" minOccurs="1" maxOccurs="1"
      />
    <xs:element name="dateTimeZone" type="DateTimePair" minOccurs="1" maxOccurs="1" />
    <xs:element name="detector1-Vehicle-Count" type="Detector-Vehicle-Count" minOccurs="1"
      maxOccurs="1" />
    <xs:element name="detector1-Occupancy" type="Detector-Occupancy" minOccurs="1"
      maxOccurs="1" />
    <xs:element name="detector1-Vehicle-Speed" type="Detector-Vehicle-Speed" minOccurs="1"
      maxOccurs="1" />
    <xs:element name="detector2-Vehicle-Count" type="Detector-Vehicle-Count" minOccurs="1"
      maxOccurs="1" />
    <xs:element name="detector2-Occupancy" type="Detector-Occupancy" minOccurs="1"
      maxOccurs="1" />
    <xs:element name="detector2-Vehicle-Speed" type="Detector-Vehicle-Speed" minOccurs="1"
      maxOccurs="1" />
    <xs:element name="detector3-Vehicle-Count" type="Detector-Vehicle-Count" minOccurs="1"
      maxOccurs="1" />
    <xs:element name="detector3-Occupancy" type="Detector-Occupancy" minOccurs="1"
      maxOccurs="1" />
    <xs:element name="detector3-Vehicle-Speed" type="Detector-Vehicle-Speed" minOccurs="1"
      maxOccurs="1" />
    <xs:element name="detector4-Vehicle-Count" type="Detector-Vehicle-Count" minOccurs="1"
      maxOccurs="1" />
    <xs:element name="detector4-Occupancy" type="Detector-Occupancy" minOccurs="1"
      maxOccurs="1" />
    <xs:element name="detector4-Vehicle-Speed" type="Detector-Vehicle-Speed" minOccurs="1"
      maxOccurs="1" />
    <xs:element name="detector5-Vehicle-Count" type="Detector-Vehicle-Count" minOccurs="1"
      maxOccurs="1" />
    <xs:element name="detector5-Occupancy" type="Detector-Occupancy" minOccurs="1"
      maxOccurs="1" />
    <xs:element name="detector5-Vehicle-Speed" type="Detector-Vehicle-Speed" minOccurs="1"
      maxOccurs="1" />
  </xs:sequence> </xs:complexType>
```

3.3.8 DetectorInventory

3.3.8.1 DEFINITION

The information content describing an entry in the PEMS NOC's detector/station inventory for a single device.

3.3.8.2 ASN.1 REPRESENTATION

```
detectorInventory ITS-DATA-FRAME ::= {
  DATA-CONCEPT-IDENTIFIER 70
  DATA-CONCEPT-VERSION 1
  DESCRIPTIVE-NAME "detectorInventory:frame"
  ASN-NAME "detectorInventory"
  ASN-OBJECT-IDENTIFIER { pems-data-frame detectorInventory(1) }
  DEFINITION "The information content describing an entry in the PEMS NOC's
  detector/station inventory for a single device."
  DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}
  DATA-CONCEPT-TYPE data-frame
  STANDARD "PEMS DD"
  REFERENCED-DATA-FRAMES {
    { pems-data-frame DeviceInventoryHeader(1) },
```

```

    { pems-data-frame detectorInventoryDetails(1) }
  }
  DATA-TYPE "
  detectorInventory ::= SEQUENCE {
    detector-station-inventory-header DeviceInventoryHeader,
    detector-list SEQUENCE (SIZE(1..64)) OF detectorInventoryDetails
  }
  "
  }

```

3.3.8.3 XML REPRESENTATION

```

<xs:complexType xmlns:xs="http://www.w3.org/2001/XMLSchema" name="DetectorInventory">
  <xs:annotation>
    <xs:documentation>
      <objectClass>Detector</objectClass>
    </xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="detector-station-inventory-header"
      type="DeviceInventoryHeader"></xs:element>
    <xs:element name="detector-list">
      <xs:complexType>
        <xs:sequence maxOccurs="64">
          <xs:element name="detector" type="detectorInventoryDetails"/>
        </xs:sequence>
      </xs:complexType>
    </xs:element>
  </xs:sequence>
</xs:complexType>

```

3.3.9 DetectorInventoryDetails

3.3.9.1 DEFINITION

The information content describing an entry in the PEMS NOC detector/station inventory.

3.3.9.2 ASN.1 REPRESENTATION

```

detectorInventoryDetails ITS-DATA-FRAME ::= {
  DATA-CONCEPT-IDENTIFIER 77
  DATA-CONCEPT-VERSION 1
  DESCRIPTIVE-NAME "detectorInventoryDetails:frame"
  ASN-NAME "detectorInventoryDetails"
  ASN-OBJECT-IDENTIFIER { pems-data-frame detectorInventoryDetails(1) }
  DEFINITION "The information content describing an entry in the PEMS NOC detector/station
  inventory."
  DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}
  DATA-CONCEPT-TYPE data-frame
  STANDARD "PEMS DD"
  REFERENCED-DATA-FRAMES {
    { pems-data-frame DeviceInventoryHeader(1) },
  }
  REFERENCED-DATA-ELEMENTS {
    { PEMS-data-element detector-type(1) },
  }
  DATA-TYPE "
  detectorInventoryDetails ::= SEQUENCE {
    detector-inventory-header DeviceInventoryHeader,
    detector-type detector-type,
  }
  "
  }

```

3.3.9.3 XML REPRESENTATION

```

<xs:complexType xmlns:xs="http://www.w3.org/2001/XMLSchema" name="detectorInventoryDetails">
  <xs:annotation>
    <xs:documentation>

```

```
    <objectClass>Detector</objectClass>
  </xs:documentation>
</xs:annotation>
<xs:sequence>
  <xs:element name="detector-inventory-header" type="DeviceInventoryHeader"></xs:element>
  <xs:element name="detector-type" type="detector-type"></xs:element>
  <xs:element name="detection-lanes" minOccurs="0">
    <xs:complexType>
      <xs:sequence maxOccurs="64">
        <xs:element name="detection-lane" type="detectionLane"/>
      </xs:sequence>
    </xs:complexType>
  </xs:element>
</xs:sequence>
</xs:complexType>
```

3.3.10 Detector-vehicle-count

3.3.10.1 Definition

The number of vehicles detected by a detector during a specific time period.

3.3.10.2 XML Definition

```
<xs:simpleType name="Detector-Vehicle-Count">
  <xs:annotation>
    <xs:documentation>
      the number of vehicles detected by a detector during a specific time period.
    </xs:documentation>
  </xs:annotation>
  <xs:restriction base="xs:unsignedInt">
    <xs:maxInclusive value="100000" />
  </xs:restriction>
</xs:simpleType>
```

3.3.10.3 Detector-vehicle-speed

3.3.10.4 Definition

The average vehicle speed over a detector during accumulation period in kilometers per hour.

3.3.10.5 XML Definition

```
<xs:simpleType name="Detector-Vehicle-Speed">
  <xs:annotation>
    <xs:documentation>
      the average vehicle speed over a detector during accumulation period in kilometers per
      hour
    </xs:documentation>
  </xs:annotation>
  <xs:restriction base="xs:unsignedByte" />
</xs:simpleType>
```

3.3.11 Detector-Type

3.3.11.1 Definition

Specifies the type of detector

3.3.11.2 XML Definition

```
<xs:simpleType name="Detector-Type">
  <xs:annotation>
    <xs:appinfo>
```

```

    inductive loop (1)
    magnetic (2)
    magnetometers (3)
    pressure cells (4)
    microwave radar (5)
    ultrasonic (6)
    video image (7)
    laser (8)
    infrared (9)
    road tube (10)
  </xs:appinfo>
  <xs:documentation>
    definition: code naming the type of a vehicular detector providing traffic data.
    remarks: v1.1 - revised permissible data element values.
    v1.2 - revised valid value list and internal layout max/min size.
    v1.4 - revised definition and valid value list.
    v1.7 - added fadd_id attribute; revised class name, classification scheme
    name/version, data concept identifier/version to reflect harmonization with its data
    registry.
  </xs:documentation>
</xs:annotation>
<xs:union>
  <xs:simpleType>
    <xs:restriction base="xs:unsignedInt">
      <xs:minInclusive value="1" />
      <xs:maxInclusive value="10" />
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:enumeration value="inductive loop" />
      <xs:enumeration value="magnetic" />
      <xs:enumeration value="magnetometers" />
      <xs:enumeration value="pressure cells" />
      <xs:enumeration value="microwave radar" />
      <xs:enumeration value="ultrasonic" />
      <xs:enumeration value="video image" />
      <xs:enumeration value="laser" />
      <xs:enumeration value="infrared" />
      <xs:enumeration value="road tube" />
    </xs:restriction>
  </xs:simpleType>
</xs:union>
</xs:simpleType>

```

3.3.12 Link-Lane-Number

3.3.12.1 Definition

The number which indicates the lane a particular detector is monitoring

3.3.12.2 XML Definition

```

<xs:simpleType name="Link-Lane-Number">
  <xs:annotation>
    <xs:documentation>
      definition: the number which indicates the lane a particular detector is monitoring
      remarks: v1.1 - changed maximum number of lanes from 9 to 50.
      v1.4 - changed representation class term from number to code. revised data type,
      value domain, and valid value rule.
      v1.7 - added fadd_id attribute; revised class name, classification scheme
      name/version, data concept identifier/version to reflect harmonization with its data
      registry.
      select one bit per lane. lanes are numbered from the median out beginning with 1.
    </xs:documentation>
  </xs:annotation>
  <xs:restriction base="binary">
    <xs:minLength value="1" />
    <xs:maxLength value="255" />
  </xs:restriction>

```


</xs:simpleType>

3.3.13 Detector-occupancy

3.3.13.1 Definition

The current average percent occupancy of the vehicles on a detector. this is percent of time within a given time period, that a point on the roadway is occupied by traffic.

3.3.13.2 XML Definition

```
<xs:simpleType name="Detector-Occupancy">
  <xs:annotation>
    <xs:documentation>
      the current average percent occupancy of the vehicles on a detector. this is percent of
      time within a given time period, that a point on the roadway is occupied by traffic.
    </xs:documentation>
  </xs:annotation>
  <xs:restriction base="xs:unsignedByte">
    <xs:maxInclusive value="100" />
  </xs:restriction>
</xs:simpleType>
```

3.3.14 DeviceInformationRequest

3.3.14.1 DEFINITION

The information content necessary to request the PEMS NOC to provide inventory, status, schedule, or timing plan information for a given set of devices.

3.3.14.2 ASN.1 REPRESENTATION

```
deviceInformationRequest ITS-DATA-FRAME ::= {
  DATA-CONCEPT-IDENTIFIER 58
  DATA-CONCEPT-VERSION 1
  DESCRIPTIVE-NAME "deviceInformationRequest:frame"
  ASN-NAME "deviceInformationRequest"
  ASN-OBJECT-IDENTIFIER { pems-data-frame deviceInformationRequest(1) }
  DEFINITION "The information content necessary to request the PEMS NOC to provide
  inventory, status, schedule, or timing plan information for a given set of devices."
  DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}
  DATA-CONCEPT-TYPE data-frame
  STANDARD "PEMS DD"
  REFERENCED-DATA-FRAMES {
    { pems-data-frame organizationInformation(1) },
  }
  REFERENCED-DATA-ELEMENTS {
    { PEMS-data-element device-type(1) },
    { PEMS-data-element device-information-type(1) }
  }
  DATA-TYPE "
deviceInformationRequest ::= SEQUENCE {
  organization-information organizationInformation,
  organization-requesting organizationInformation,
  device-type device-type,
  device-information-type Device-information-type,
}
"
```

3.3.14.3 XML REPRESENTATION

```
<xs:complexType xmlns:xs="http://www.w3.org/2001/XMLSchema" name="deviceInformationRequest">
  <xs:annotation>
    <xs:documentation>
      <objectClass>Device</objectClass>
```

```

        <definition/>
    </xs:documentation>
</xs:annotation>
<xs:sequence>
    <xs:element name="organization-information" type="organizationInformation"></xs:element>
    <xs:element name="organization-requesting" type="organizationInformation"></xs:element>
    <xs:element name="device-type" type="device-type"></xs:element>
    <xs:element name="device-information-type" type="Device-information-type"></xs:element>
</xs:sequence>
</xs:complexType>

```

3.3.15 DeviceInventoryHeader

3.3.15.1 DEFINITION

The information content header included with all device inventories.

3.3.15.2 ASN.1 REPRESENTATION

```

DeviceInventoryHeader ITS-DATA-FRAME ::= {
DATA-CONCEPT-IDENTIFIER 63
DATA-CONCEPT-VERSION 1
DESCRIPTIVE-NAME "DeviceInventoryHeader:frame"
ASN-NAME "DeviceInventoryHeader"
ASN-OBJECT-IDENTIFIER { pems-data-frame DeviceInventoryHeader(1) }
DEFINITION          "The information content header included with all device inventories."
DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}
DATA-CONCEPT-TYPE data-frame
STANDARD "PEMS DD"
REFERENCED-DATA-FRAMES {
    { pems-data-frame organizationInformation(1) },
    { lrms-data-frame geoLocation(1) },
}
REFERENCED-DATA-ELEMENTS {
    { PEMS-data-element organization-resource-identifier(1) },
}
DATA-TYPE "
DeviceInventoryHeader ::= SEQUENCE {
    organization-information organizationInformation,
    device-id organization-resource-identifier,
    device-location LRMS.geoLocation,
}
"
}

```

3.3.15.3 XML REPRESENTATION

```

<xs:complexType xmlns:xs="http://www.w3.org/2001/XMLSchema" name="DeviceInventoryHeader">
    <xs:annotation>
        <xs:documentation>
            <objectClass>Device</objectClass>
        </xs:documentation>
    </xs:annotation>
    <xs:sequence>
        <xs:element name="organization-information" type="organizationInformation"></xs:element>
        <xs:element name="device-id" type="organization-resource-identifier"></xs:element>
        <xs:element name="device-location" type="lrms:geoLocation"></xs:element>
    </xs:sequence>
</xs:complexType>

```

3.3.16 ErrorReport

3.3.16.1 DEFINITION

The information content describing errors in handling a single request made from a PCC to an PEMS NOC.

3.3.16.2 ASN.1 REPRESENTATION

```

errorReport ITS-DATA-FRAME ::= {
    DATA-CONCEPT-IDENTIFIER 3
    DATA-CONCEPT-VERSION 1
    DESCRIPTIVE-NAME "errorReport:frame"
    ASN-NAME "errorReport"
    ASN-OBJECT-IDENTIFIER { pems-data-frame errorReport(1) }
    DEFINITION "The information content describing errors in handling a single request made
    from a PCC to an PEMS NOC."
    DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}
    DATA-CONCEPT-TYPE data-frame
    STANDARD "PEMS DD"
    REFERENCED-DATA-FRAMES {
        { pems-data-frame organizationInformation(1) }
    }
    REFERENCED-DATA-ELEMENTS {
        { PEMS-data-element ErrorReportCode(1) },
        { c2c-data-element informationalText(1) }
    }
    DATA-TYPE "
errorReport ::= SEQUENCE {
    organization-information organizationInformation,
    organization-requesting organizationInformation,
    error-code ErrorReportCode,
    error-text C2C.informationalText
}
"
}
    
```

3.3.16.3 XML REPRESENTATION

```

<xs:complexType xmlns:xs="http://www.w3.org/2001/XMLSchema" name="errorReport">
    <xs:annotation>
        <xs:documentation>
            <objectClass>ConnectionManagement</objectClass>
        </xs:documentation>
    </xs:annotation>
    <xs:sequence>
        <xs:element name="organization-information" type="organizationInformation"></xs:element>
        <xs:element name="organization-requesting" type="organizationInformation"></xs:element>
        <xs:element name="error-code" type="ErrorReportCode"></xs:element>
        <xs:element name="error-text" type="c2c:informationalText"></xs:element>
    </xs:sequence>
</xs:complexType>
    
```

3.3.17 geoLocation

3.3.17.1 Definition

The GPS Location of the Device

3.3.17.2 XML Representation

```

<xs:complexType name="GeoLocation">
    <xs:annotation>
        <xs:documentation>
            definition: the geolocatio sub-profile conveys a two- or three- dimensional
            geographic location. the standard horizontal datum for a spot location is wg-84;
            other horizontal datums can be specified by horizontaldatum. vertical datum is an
            option within height.
            remarks: v2.1 - new external message from lrms to define location.
        </xs:documentation>
    </xs:annotation>
    <xs:sequence>
        <xs:element name="latitude" type="Latitude" />
        <xs:element name="longitude" type="Longitude" />
    </xs:sequence>
</xs:complexType>
    
```

3.3.17.3 XML Representation

3.3.18 Organization Information

3.3.18.1 DEFINITION

The information content describing an organization information for a single organization.

3.3.18.2 ASN.1 REPRESENTATION

```
organizationInformation ITS-DATA-FRAME ::= {
    DATA-CONCEPT-IDENTIFIER 5
    DATA-CONCEPT-VERSION 1
    DESCRIPTIVE-NAME "organizationInformation:frame"
    ASN-NAME "organizationInformation"
    ASN-OBJECT-IDENTIFIER { pems-data-frame organizationInformation(1) }
    DEFINITION "The information content describing an organization information for a single
    organization."
    DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}
    DATA-CONCEPT-TYPE data-frame
    STANDARD "PEMS DD"
    REFERENCED-DATA-FRAMES {
    }
    REFERENCED-DATA-ELEMENTS {
        { PEMS-data-element organization-resource-identifier(1) },
    }
    DATA-TYPE "
organizationInformation ::= SEQUENCE {
    organization-id organization-resource-identifier,
}
"
```

3.3.18.3 XML REPRESENTATION

```
<xs:complexType xmlns:xs="http://www.w3.org/2001/XMLSchema" name="organizationInformation">
  <xs:annotation>
    <xs:documentation>
      <objectClass>Organization</objectClass>
      <definition/>
    </xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="organization-id" type="organization-resource-identifier">
      </xs:element>
    </xs:sequence>
  </xs:complexType>
```

3.4 Data Elements

Each data element in section 3.4 has the following code from TMDD as part of the ASN.1 representation.

```
REGISTRATION-STATUSqualitative:draft
DATE-REGISTERED "200202200000Z"
LAST-CHANGE-DATE "200202200000Z"
LAST-CHANGE-USER "ITE Editor"
REGISTRAR-ORGANIZATION-NAME "NEMA"
REGISTRAR-PHONE-NUMBER "+1 111-222-3333"-- NEMA Phone Number
STEWARD-ORGANIZATION-NAME "ITE"
STEWARD-PHONE-NUMBER "+1 444-555-6666"-- ITE Phone Number
SUBMITTER-ORGANIZATION-NAME "ITE-AASHTO TMDD Steering Committee"
SUBMITTER-PHONE-NUMBER "+1 444-555-6666"-- ITE Project Manager
USER {""}
```

This set of ASN representation was omitted for brevity and because the PEMS design is based on TMDD version 3 voluntarily.

3.4.1 Cctv-image-supported

3.4.1.1 DEFINITION

MISSING DEFINITION

3.4.1.2 ASN.1 REPRESENTATION

```
cctv-image-supported ITS-DATA-ELEMENT ::= {
  DATA-CONCEPT-IDENTIFIER 82
  DATA-CONCEPT-VERSION 1
  DESCRIPTIVE-NAME "CCTV.Cctv-image-supported:cd"
  ASN-NAME "Cctv-image-supported"
  ASN-OBJECT-IDENTIFIER { PEMS-data-element cctv-image-supported(1) }
  DEFINITION "MISSING DEFINITION"
  DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}
  DATA-CONCEPT-TYPE data-element
  STANDARD "PEMS DD"
  DATA-TYPE "
  Cctv-image-supported ::= ENUMERATED {
    jpeg (1),
    tiff (2),
    mpeg (3),
    ntsc (4),
    pal (5),
    secam (6),
    hdtv (7),
    other (8),
    ...
  }
  "
  FORMAT "ASN.1 encoding"
  UNIT-OF-MEASURE ""
  VALID-VALUE-RULE "see the ASN.1 DATA-TYPE"
}
```

3.4.1.3 XML REPRESENTATION

```
<xs:simpleType xmlns:xs="http://www.w3.org/2001/XMLSchema" name="Cctv-image-supported">
  <xs:annotation>
    <xs:documentation>
      <objectClass>CCTV</objectClass>
      <definition>The type of images supported by a CCTV.</definition>
      <valueDomainTerm>cd</valueDomainTerm>
      <units/>
    </xs:documentation>
  </xs:annotation>
  <xs:union>
    <xs:simpleType>
      <xs:restriction base="xs:unsignedInt">
        <xs:minInclusive value="1"/>
        <xs:maxInclusive value="8"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:simpleType>
      <xs:restriction base="xs:string">
        <xs:enumeration value="jpeg"/>
        <xs:enumeration value="tiff"/>
        <xs:enumeration value="mpeg"/>
        <xs:enumeration value="ntsc"/>
        <xs:enumeration value="pal"/>
        <xs:enumeration value="secam"/>
        <xs:enumeration value="hdtv"/>
        <xs:enumeration value="other"/>
      </xs:restriction>
    </xs:simpleType>
  </xs:union>
</xs:simpleType>
```

```
        </xs:restriction>
      </xs:simpleType>
    </xs:union>
  </xs:simpleType>
```

3.4.2 DateTimePair

3.4.2.1 Definition

Defined as a DateTimePair Datatype

3.4.2.2 XML Representation

```
<xs:complexType xmlns="http://www.w3.org/2001/XMLSchema" name="DateTimePair">
  <xs:annotation>
    <xs:documentation>
      definition: a data and time value.  in addition, the timeoffset element can be used to
      convey the local time zone.  this is required when merging data sources over multiple
      time zones.
      remarks: this structure has been changed to add an optional time zone (offset from
      gmt) as well.
    </xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="date" type="Date" minOccurs="1" maxOccurs="1" />
    <xs:element name="time" type="Time" minOccurs="1" maxOccurs="1" />
    <xs:element name="offset" type="TimeOffset" minOccurs="0" maxOccurs="1" />
  </xs:sequence>
</xs:complexType>
```

3.4.3 Detector-type

3.4.3.1 DEFINITION

Code naming the type of a vehicular detector providing traffic data.

3.4.3.2 ASN.1 REPRESENTATION

```
detector-type ITS-DATA-ELEMENT ::= {
  DATA-CONCEPT-IDENTIFIER 90
  DATA-CONCEPT-VERSION 1
  DESCRIPTIVE-NAME "Detector.Detector-type:cd"
  ASN-NAME "Detector-type"
  ASN-OBJECT-IDENTIFIER { PEMS-data-element detector-type(1) }
  DEFINITION "Code naming the type of a vehicular detector providing traffic data."
  DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}
  DATA-CONCEPT-TYPE data-element
  STANDARD "PEMS DD"
  DATA-TYPE "
Detector-type ::= ENUMERATED {
  inductive-loop (1),
  magnetic (2),
  magnetometers (3),
  pressure-cells (4),
  microwave-radar (5),
  ultrasonic (6),
  video-image (7),
  laser (8),
  infrared (9),
  road-tube (10),
  ...
}
"
  FORMAT "ASN.1 encoding"
  UNIT-OF-MEASURE ""
  VALID-VALUE-RULE "see the ASN.1 DATA-TYPE"
}
```

3.4.3.3 XML REPRESENTATION

```
<xs:simpleType xmlns:xs="http://www.w3.org/2001/XMLSchema" name="Detector-type">
  <xs:annotation>
    <xs:documentation>
      <objectClass>Detector</objectClass>
      <definition>Code naming the type of a vehicular detector providing traffic data.
      </definition>
      <valueDomainTerm>cd</valueDomainTerm>
      <units/>
    </xs:documentation>
  </xs:annotation>
  <xs:union>
    <xs:simpleType>
      <xs:restriction base="xs:unsignedInt">
        <xs:minInclusive value="1"/>
        <xs:maxInclusive value="10"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:simpleType>
      <xs:restriction base="xs:string">
        <xs:enumeration value="inductive loop"/>
        <xs:enumeration value="magnetic"/>
        <xs:enumeration value="magnetometers"/>
        <xs:enumeration value="pressure cells"/>
        <xs:enumeration value="microwave radar"/>
        <xs:enumeration value="ultrasonic"/>
        <xs:enumeration value="video Image"/>
        <xs:enumeration value="laser"/>
        <xs:enumeration value="infrared"/>
        <xs:enumeration value="road tube"/>
      </xs:restriction>
    </xs:simpleType>
  </xs:union>
</xs:simpleType>
```

3.4.4 Device-information-type

3.4.4.1 DEFINITION

3.4.4.2 ASN.1 REPRESENTATION

```
device-information-type ITS-DATA-ELEMENT ::= {
  DATA-CONCEPT-IDENTIFIER 76
  DATA-CONCEPT-VERSION 1
  DESCRIPTIVE-NAME "Device.Device-information-type:cd"
  ASN-NAME "Device-information-type"
  ASN-OBJECT-IDENTIFIER { PEMS-data-element device-information-type(1) }
  DEFINITION ""
  DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}
  DATA-CONCEPT-TYPE data-element
  STANDARD "PEMS DD"
  DATA-TYPE "
  Device-information-type ::= ENUMERATED {
    device-inventory (1),
    device-status (2),
    device-control-schedule (3),
    device-message-library (4),
    device-timing-plan (5),
    device-maintenance-history (6),
    station-data (7),
    sensor-data (8),
    station-and-sensor-data (9),
    ...
  }
  "
  FORMAT "ASN.1 encoding"
  UNIT-OF-MEASURE ""
  VALID-VALUE-RULE "see the ASN.1 DATA-TYPE"
```

}

3.4.4.3 XML REPRESENTATION

```
<xs:simpleType xmlns:xs="http://www.w3.org/2001/XMLSchema" name="Device-information-type">
  <xs:annotation>
    <xs:documentation>
      <objectClass>Device</objectClass>
      <definition/>
      <valueDomainTerm>cd</valueDomainTerm>
      <units/>
    </xs:documentation>
  </xs:annotation>
  <xs:union>
    <xs:simpleType>
      <xs:restriction base="xs:unsignedInt">
        <xs:minInclusive value="1"/>
        <xs:maxInclusive value="8"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:simpleType>
      <xs:restriction base="xs:string">
        <xs:enumeration value="device inventory"/>
        <xs:enumeration value="device status"/>
        <xs:enumeration value="device control schedule"/>
        <xs:enumeration value="device message library"/>
        <xs:enumeration value="device timing plan"/>
        <xs:enumeration value="device maintenance history"/>
        <xs:enumeration value="station data"/>
        <xs:enumeration value="sensor data"/>
        <xs:enumeration value="station and sensor data"/>
      </xs:restriction>
    </xs:simpleType>
  </xs:union>
</xs:simpleType>
```

3.4.5 Device-type

3.4.5.1 DEFINITION

A code which specifies the type of device.

3.4.5.2 ASN.1 REPRESENTATION

```
device-type ITS-DATA-ELEMENT ::= {
  DATA-CONCEPT-IDENTIFIER 74
  DATA-CONCEPT-VERSION 1
  DESCRIPTIVE-NAME "Device.Device-type:cd"
  ASN-NAME "Device-type"
  ASN-OBJECT-IDENTIFIER { PEMS-data-element device-type(1) }
  DEFINITION "A code which specifies the type of device."
  DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}
  DATA-CONCEPT-TYPE data-element
  STANDARD "PEMS DD"
  DATA-TYPE "
Device-type ::= ENUMERATED {
  detector-station (1),
  cctv-camera (2),
  dynamic-message-sign (3),
  environmental-sensor-station (4),
  gate (5),
  highway-advisory-radio (6),
  lane-control-signal (7),
  ramp-meter (8),
  signal-controller (9),
  signal-section (10),
  ...
}
"
FORMAT "ASN.1 encoding"
```



```
UNIT-OF-MEASURE      ""
VALID-VALUE-RULE    "see the ASN.1 DATA-TYPE"
}
```

3.4.5.3 XML REPRESENTATION

```
<xs:simpleType xmlns:xs="http://www.w3.org/2001/XMLSchema" name="Device-type">
  <xs:annotation>
    <xs:documentation>
      <objectClass>Device</objectClass>
      <definition>A code which specifies the type of device.</definition>
      <valueDomainTerm>cd</valueDomainTerm>
      <units/>
    </xs:documentation>
  </xs:annotation>
  <xs:union>
    <xs:simpleType>
      <xs:restriction base="xs:unsignedInt">
        <xs:minInclusive value="1"/>
        <xs:maxInclusive value="10"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:simpleType>
      <xs:restriction base="xs:string">
        <xs:enumeration value="detector station"/>
        <xs:enumeration value="cctv camera"/>
        <xs:enumeration value="dynamic message sign"/>
        <xs:enumeration value="environmental sensor station"/>
        <xs:enumeration value="gate"/>
        <xs:enumeration value="highway advisory radio"/>
        <xs:enumeration value="lane control signal"/>
        <xs:enumeration value="ramp meter"/>
        <xs:enumeration value="signal controller"/>
        <xs:enumeration value="signal section"/>
      </xs:restriction>
    </xs:simpleType>
  </xs:union>
</xs:simpleType>
```

3.4.6 ErrorReportCode

3.4.6.1 DEFINITION

MISSING DEFINITION

3.4.6.2 ASN.1 REPRESENTATION

```
ErrorReportCode ITS-DATA-ELEMENT ::= {
  DATA-CONCEPT-IDENTIFIER 1
  DATA-CONCEPT-VERSION 1
  DESCRIPTIVE-NAME "ConnectionManagement.ErrorReportCode:cd"
  ASN-NAME "ErrorReportCode"
  ASN-OBJECT-IDENTIFIER { PEMS-data-element ErrorReportCode(1) }
  DEFINITION "MISSING DEFINITION"
  DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}
  DATA-CONCEPT-TYPE data-element
  STANDARD "PEMS DD"
  DATA-TYPE "
ErrorReportCode ::= ENUMERATED {
  unknown-processing-error (1),
  center-does-not-support-this-type-request (2),
  request-does-not-conform-with-owner-center-request-format (3),
  missing-information-prevents-processing-request (4),
  permission-not-granted-for-request (5),
  authentication-not-recognized (6),
  ...
}
"
FORMAT "ASN.1 encoding"
UNIT-OF-MEASURE ""
```

```

VALID-VALUE-RULE      "see the ASN.1 DATA-TYPE"
REGISTRATION-STATUS  qualitative:draft
DATE-REGISTERED      "200202200000Z"
LAST-CHANGE-DATE     "200202200000Z"
LAST-CHANGE-USER     "ITE Editor"
REGISTRAR-ORGANIZATION-NAME  "NEMA"
REGISTRAR-PHONE-NUMBER      "+1 111-222-3333"-- NEMA Phone Number
STEWARD-ORGANIZATION-NAME    "ITE"
STEWARD-PHONE-NUMBER        "+1 444-555-6666"-- ITE Phone Number
SUBMITTER-ORGANIZATION-NAME  "ITE-AASHTO TMDD Steering Committee"
SUBMITTER-PHONE-NUMBER      "+1 444-555-6666"-- ITE Project Manager
USER {""}
}
  
```

3.4.6.3 XML REPRESENTATION

```

<xs:simpleType xmlns:xs="http://www.w3.org/2001/XMLSchema" name="ErrorReportCode">
  <xs:annotation>
    <xs:documentation>
      <objectClass>ConnectionManagement</objectClass>
      <definition>
        Code representing type of error in processing of a TMDD message.
      </definition>
      <valueDomainTerm>cd</valueDomainTerm>
      <units/>
    </xs:documentation>
  </xs:annotation>
  <xs:union>
    <xs:simpleType>
      <xs:restriction base="xs:unsignedInt">
        <xs:minInclusive value="1"/>
        <xs:maxInclusive value="6"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:simpleType>
      <xs:restriction base="xs:string">
        <xs:enumeration value="unknown processing error"/>
        <xs:enumeration value="center does not support this type request"/>
        <xs:enumeration value=
          "request does not conform with PEMS NOC request format"/>
        <xs:enumeration value=
          "missing information prevents processing request"/>
        <xs:enumeration value="permission not granted for request"/>
        <xs:enumeration value="authentication not recognized"/>
      </xs:restriction>
    </xs:simpleType>
  </xs:union>
</xs:simpleType>
  
```

3.4.7 informationalText

3.4.7.1 Definition

Defined as a String with a length of 256

3.4.7.2 XML Representation

```

<xs:simpleType xmlns:xs="http://www.w3.org/2001/XMLSchema" name="informationalText">
  <xs:annotation>
    <xs:documentation>
      <objectClass>Organization</objectClass>
    </xs:documentation>
  </xs:annotation>
  <xs:restriction base="xs:string">
    <xs:minLength value="1"/>
    <xs:maxLength value="256"/>
  </xs:restriction>
</xs:simpleType>
  
```

3.4.7.3

3.4.8 Organization-resource-identifier

3.4.8.1 DEFINITION

A unique identifier within an organization for a resource (organization, center, event, person, vehicle, device, etc).

Any set of alphanumeric characters up to 32.

3.4.8.2 ASN.1 REPRESENTATION

```
organization-resource-identifier ITS-DATA-ELEMENT ::= {
  DATA-CONCEPT-IDENTIFIER 8
  DATA-CONCEPT-VERSION 1
  DESCRIPTIVE-NAME "Organization.organization-resource-identifier:id"
  ASN-NAME "organization-resource-identifier"
  ASN-OBJECT-IDENTIFIER { PEMS-data-element organization-resource-identifier(1) }
  DEFINITION "A unique identifier within an organization for a resource (organization,
  center, event, person, vehicle, device, etc).
  Any set of alphanumeric characters up to 32."
  DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}
  DATA-CONCEPT-TYPE data-element
  STANDARD "PEMS DD"
  DATA-TYPE "
  organization-resource-identifier ::= IA5String (SIZE(1..32))
  "
  FORMAT "ASN.1 encoding"
  UNIT-OF-MEASURE ""
  VALID-VALUE-RULE "see the ASN.1 DATA-TYPE"
}
```

3.4.8.3 XML REPRESENTATION

```
<xs:simpleType xmlns:xs="http://www.w3.org/2001/XMLSchema" name="organization-resource-
identifier">
  <xs:annotation>
    <xs:documentation>
      <objectClass>Organization</objectClass>
      <definition>
        A unique identifier within an organization for a resource (organization, center,
        event, person, vehicle, device, etc).
        Any set of alphanumeric characters up to 32.</definition>
      <valueDomainTerm>id</valueDomainTerm>
      <units/>
    </xs:documentation>
  </xs:annotation>
  <xs:restriction base="xs:string">
    <xs:minLength value="1"/>
    <xs:maxLength value="32"/>
  </xs:restriction>
</xs:simpleType>
```

3.4.9 Organization-resource-name

3.4.9.1 DEFINITION

A name used to identify an organization center resource (organization, center, event, person, vehicle, device, etc).

3.4.9.2 ASN.1 REPRESENTATION

```
organization-resource-name ITS-DATA-ELEMENT ::= {
  DATA-CONCEPT-IDENTIFIER 9
  DATA-CONCEPT-VERSION 1
  DESCRIPTIVE-NAME "Organization.organization-resource-name:txt"
  ASN-NAME "organization-resource-name"
  ASN-OBJECT-IDENTIFIER { PEMS-data-element organization-resource-name(1) }
```

```

DEFINITION          "A name used to identify an organization center resource (organization,
center, event, person, vehicle, device, etc)."
```

DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}
 DATA-CONCEPT-TYPE data-element
 STANDARD "PEMS DD"
 DATA-TYPE "

organization-resource-name ::= IA5String (SIZE(1..128))
 "

```

FORMAT              "ASN.1 encoding"
UNIT-OF-MEASURE     ""
VALID-VALUE-RULE    "see the ASN.1 DATA-TYPE"
}
```

3.4.9.3 XML REPRESENTATION

```

<xs:simpleType xmlns:xs="http://www.w3.org/2001/XMLSchema" name="organization-resource-name">
  <xs:annotation>
    <xs:documentation>
      <objectClass>Organization</objectClass>
      <definition>
        A name used to identify an organization center resource (organization, center,
        event, person, vehicle, device, etc).</definition>
      <valueDomainTerm>txt</valueDomainTerm>
      <units/>
    </xs:documentation>
  </xs:annotation>
  <xs:restriction base="xs:string">
    <xs:minLength value="1"/>
    <xs:maxLength value="128"/>
  </xs:restriction>
</xs:simpleType>
```

3.4.10 Latitude

3.4.10.1 Definition

The geographic latitude of a node, expressed in integer microdegrees, with reference to the horizontal datum specified by horizontaldatum. remarks: v2.1 - external data element taken from: sae j2266 draft-rev00 [issued: 07-21-03]

3.4.10.2 XML Definition

```

<xs:simpleType name="Latitude">
  <xs:annotation>
    <xs:documentation>
      definition: the geographic latitude of a node, expressed in integer microdegrees, with
      reference to the horizontal datum specified by horizontaldatum.
      remarks: v2.1 - external data element taken from: sae j2266 draft-rev00 [issued: 07-
      21-03. Microdegrees. If unkown, value is blank or min integer value()
    </xs:documentation>
  </xs:annotation>
  <xs:restriction base="xs:int">
    <xs:minInclusive value="-90000000" />
    <xs:maxInclusive value="90000000" />
  </xs:restriction>
</xs:simpleType>
```

3.4.11 Longitude

3.4.11.1 Definition

The geographic longitude of a node, expressed in integer microdegrees, with reference to the horizontal datum specified by horizontaldatum.microdegrees

3.4.11.2 XML Definition

```
<xs:simpleType name="Longitude">
  <xs:annotation>
    <xs:documentation>
      definition: the geographic longitude of a node, expressed in integer microdegrees,
      with reference to the horizontal datum specified by horizontaldatum.
      microdegrees
    </xs:documentation>
  </xs:annotation>
  <xs:restriction base="xs:int">
    <xs:minInclusive value="-180000000" />
    <xs:maxInclusive value="180000000" />
  </xs:restriction>
</xs:simpleType>
```

3.4.12 Date

3.4.12.1 Definition

Date for which a directory entry, or other use, is being requested by a traveler or used in a returned message. the precise time at which this date starts may vary with the time zone of the service. for example: saturday stay over rates for an airline begin at the point of departure.

3.4.12.2 XML Definition

```
<xs:simpleType name="Date">
  <xs:annotation>
    <xs:documentation>
      definition: date for which a directory entry, or other use, is being requested by a
      traveler or used in a returned message. the precise time at which this date starts
      may vary with the time zone of the service. for example: saturday stay over rates for
      an airline begin at the point of departure.
      format as: yyyyMMdd where
      yyyy the year, in common era units
      mm the month, range 01 to 12
      dd the day, range 01 to 31
      use zero for mm and dd when not applicable
    </xs:documentation>
  </xs:annotation>
  <xs:restriction base="xs:string">
    <xs:length value="8" />
  </xs:restriction>
</xs:simpleType>
```

3.4.13 Time

3.4.13.1 Definition

Time for which a directory entry is being requested by a traveler or used in a returned message.

3.4.13.2 XML Definition

```
<xs:simpleType name="Time">
  <xs:annotation>
    <xs:documentation>
      definition: time for which a directory entry is being requested by a traveler or
      used in a returned message.
      format: hhmmsssss
      valid times using 24 hour notation.
      hh=00 through 23; mm=00 through 59;
      ss=00 through 59; 00 if na
      ssss=0000 through 9999.
      use ss= 60 for leap seconds
      hh represents hours, mm minutes, ss seconds,
      and ssss decimal seconds to whatever number
    </xs:documentation>
  </xs:annotation>
</xs:simpleType>
```

```
        of significant digits is required (up to four)
    </xs:documentation>
</xs:annotation>
<xs:restriction base="xs:string">
    <xs:minLength value="6" />
    <xs:maxLength value="10" />
</xs:restriction>
</xs:simpleType>
```

3.4.14 Offset

3.4.14.1 Definition

Time zone, or offset, for a local time from gmt. note that not all time offsets are in units of even hours.

3.4.14.2 XML Definition

```
<xs:simpleType name="TimeOffset">
    <xs:annotation>
        <xs:documentation>
            definition: time zone, or offset, for a local time from gmt. note that not all time
            offsets are in units of even hours.
                valid time offset using 24 hour notation.
                hh=00 through 23; mm=00 through 59;
        </xs:documentation>
    </xs:annotation>
    <xs:restriction base="xs:string">
        <xs:length value="4" />
    </xs:restriction>
</xs:simpleType>
```

3.4.15 Security-User-Name

3.4.15.1 Definition

User name field for login.

3.4.15.2 XML Definition

```
<xs:simpleType name="Security-User-Name">
    <xs:restriction base="xs:string">
        <xs:minLength value="1" />
        <xs:maxLength value="32" />
    </xs:restriction>
</xs:simpleType>
```

3.4.16 Security-Password

3.4.16.1 Definition

Password field for login. There is currently no encryption on the password.

3.4.16.2 XML Definition

```
<xs:simpleType name="Security-Password">
    <xs:restriction base="xs:string">
        <xs:minLength value="1" />
        <xs:maxLength value="32" />
    </xs:restriction>
</xs:simpleType>
```

3.5 Object Classes

3.5.1 CCTV

3.5.1.1 DEFINITION

An object class representing the interfaces and associated information content of the [CCTV](#).

3.5.1.2 ASN.1 REPRESENTATION

```
cCCTV ITS-OBJECT-CLASS ::= {  
  DATA-CONCEPT-IDENTIFIER 7  
  DATA-CONCEPT-VERSION 1  
  DESCRIPTIVE-NAME "CCTV"  
  ASN-OBJECT-IDENTIFIER { PEMS-object-class cCCTV(1) }  
  DEFINITION ""  
  DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}  
  DATA-CONCEPT-TYPE object-class}
```

3.5.1.3 XML REPRESENTATION

```
<objectClass>  
  <name>CCTV</name>  
  <definition/>  
</objectClass>
```

3.5.2 ConnectionManagement

3.5.2.1 DEFINITION

An object class representing the interfaces and associated information content of connection management.

3.5.2.2 ASN.1 REPRESENTATION

```
connectionManagement ITS-OBJECT-CLASS ::= {  
  DATA-CONCEPT-IDENTIFIER 3  
  DATA-CONCEPT-VERSION 1  
  DESCRIPTIVE-NAME "ConnectionManagement"  
  ASN-OBJECT-IDENTIFIER { PEMS-object-class connectionManagement(1) }  
  DEFINITION ""  
  DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}  
  DATA-CONCEPT-TYPE object-class}
```

3.5.2.3 XML REPRESENTATION

```
<objectClass>  
  <name>ConnectionManagement</name>  
  <definition/>  
</objectClass>
```

3.5.3 Detector

3.5.3.1 DEFINITION

An object class representing the interfaces and associated information content of the detector station.

3.5.3.2 ASN.1 REPRESENTATION

```
detector ITS-OBJECT-CLASS ::= {  
  DATA-CONCEPT-IDENTIFIER 8  
  DATA-CONCEPT-VERSION 1  
  DESCRIPTIVE-NAME "Detector"  
  ASN-OBJECT-IDENTIFIER { PEMS-object-class detector(1) }  
  DEFINITION ""  
  DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}  
  DATA-CONCEPT-TYPE object-class  
}
```

3.5.3.3 XML REPRESENTATION

```
<objectClass>  
  <name>Detector</name>  
  <definition/>  
</objectClass>
```

3.5.4 Device

3.5.4.1 DEFINITION

An object class representing the interfaces and associated information content of the generic device.

3.5.4.2 ASN.1 REPRESENTATION

```
device ITS-OBJECT-CLASS ::= {  
  DATA-CONCEPT-IDENTIFIER 6  
  DATA-CONCEPT-VERSION 1  
  DESCRIPTIVE-NAME "Device"  
  ASN-OBJECT-IDENTIFIER { PEMS-object-class device(1) }  
  DEFINITION ""  
  DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}  
  DATA-CONCEPT-TYPE object-class}
```

3.5.4.3 XML REPRESENTATION

```
<objectClass>  
  <name>Device</name>  
  <definition/>  
</objectClass>
```

3.5.5 Organization

3.5.5.1 DEFINITION

An object class representing the interfaces and associated information content of the organization.

3.5.5.2 ASN.1 REPRESENTATION

```
organization ITS-OBJECT-CLASS ::= {  
  DATA-CONCEPT-IDENTIFIER 4  
  DATA-CONCEPT-VERSION 1  
  DESCRIPTIVE-NAME "Organization"  
  ASN-OBJECT-IDENTIFIER { PEMS-object-class organization(1) }  
  DEFINITION ""  
  DESCRIPTIVE-NAME-CONTEXT {"Manage Traffic"}  
  DATA-CONCEPT-TYPE object-class}
```


3.5.5.3 XML REPRESENTATION

```
<objectClass>  
  <name>Organization</name>  
  <definition/>  
</objectClass>
```