



IEEE 1512 Message Set
for
AZTech™
Regional Archive Data Server

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Submitted by:



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Glossary

ADOT	Arizona Department of Transportation
ADUS	Archived Data User Service
ASN.1	Abstract Syntax Notation Number One. International Standard: ITU-T X.680 to X.683, ISO/IEC 8824-1 to 4. Supports many operating systems and programming languages to describe the data exchanged between two communication applications
ASTM	American Society for Testing and Materials
ATIS	SAE Standard J2354: Advanced Traveler Information Standard (Message Set).
CAD	Computer Aided Dispatch
C2C	Computer-to-Computer
DMS	Dynamic Message Sign
DSRC	Dedicated short-range communications
EMS	Emergency Management System
ESS	Environmental Sensing Station
HazMat	Hazardous Material
HCRS	Highway Condition Reporting System
IEEE	Institute of Electrical and Electronics Engineers
IJIS	Integrated Justice Information Systems
IM	IEEE 1512: Incident Management family of standards
ITE	Institute of Transportation Engineers
ITIS	International Traveler Information Interchange Standard. SAE J2540-2: IT IS Phrase Lists.
ITS	Intelligent Transportation Systems, or ITS, encompass a broad range of wireless and wireline communications-based information, control and electronics technologies. When integrated into the transportation system infrastructure, and in vehicles themselves, these technologies help monitor and manage traffic flow, reduce congestion, provide alternate routes to travelers, enhance productivity, and save lives, time and money. See itsa.org

ITSDR	Intelligent Transportation Systems Data Registry. The ITS DR is a centralized dictionary for all formally specified ITS terms and messages which currently contains data elements and concepts from the Traffic Management Data Dictionary (TMDD), Transit Communications for ITS Profiles (TCIP), National Transportation Communications for ITS Protocol (NTCIP), etc.
LRMS	SAE Standard, J2266: Location Referencing Message Specification
MAG	Maricopa Association of Governments
MCDOT	Maricopa County Department of Transportation
NTCIP	National Transportation Communications for ITS Protocol (NTCIP) family of standards defines protocols and profiles that are open, consensus-based data communications standards. Used for the remote control of roadside and other transportation management devices. See ntcip.org
NWS	National Weather Service
RADS	Regional Archive Data Server
RCRS	RoadClosures and Restrictions System
RPU	Remote Processing Unit
RWIS	Road Weather Information System
SAE	Society of Automotive Engineers
SDO	Standards Development Organization, e.g., ITE, SAE, IEEE and ASTM
TCIP	Transit Communications Interface Profiles, or Transit Communications for ITS Profiles
TMC	Traffic Management Center
TMDD	Traffic Management Data Dictionary
TT	Travel Time
URL	Uniform Resource Locator
VMS	Variable Message Sign
XML	eXtensible Markup Language ¹
XSD	XML Schema Definition ²

¹ **XML Tutorial** see <http://www.w3schools.com/xml/default.asp>

² **XML Schema Tutorial** see <http://www.w3schools.com/schema/default.asp>

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1 INTRODUCTION

AZTech is the Phoenix metropolitan area partnership of public and private transportation agencies. The objective of this project is to share Intelligent Transportation Systems (ITS) data throughout the region. The first agency to participate was the Phoenix Fire Department 9-1-1 Computer Aided Dispatch (CAD) Center which has been sending their traffic-related incidents (approximately 10% of their daily total) to the Regional Archive Data Server (RADS) since May 2006. Next, the Arizona Department of Transportation (ADOT) Highway Condition Reporting System (HCRS) and the Maricopa County Department of Transportation (MCDOT) Road Closure and Restriction System (RCRS) will “pull” the 9-1-1 data from RADS, and translate it to HCRS and RCRS incidents, respectively, to be automatically posted on the ADOT’s Traveler Information Line 5-1-1, and the State and County Websites. In an effort to broaden the Valley traffic picture with more street detail from municipalities, the Cities of Scottsdale and Tempe will be sharing their barricade mapping system data via RADS. Thereafter, the City of Phoenix with their Traffic Restrictions and Closures System (TRACS) and the City of Surprise’s permitting system are expected to provide their traffic-related data. Each agency is responsible for “filtering” which incidents they wish to share with their regional partners. Moreover, ADOT and MCDOT further “filter” what they pass on to 5-1-1 callers and web browsers.

The Institute of Electrical and Electronics Engineers (IEEE) utilized families of national standards to arrive at its 1512 Standard for Common Incident Management Message Sets for for Use by Emergency Management Centers. This national standard defines the transportation management related data exchange format in a public safety context. The objective of the “1512 Family of Standards” is “to support efficient communications for the real-time, interagency management of transportation-related events...that impact transportation systems, or that causes a report to be received by an emergency management system...”³

This document addresses the Computer-to-Computer (C2C) data exchange between the Regional Archive Data Server (RADS) and traffic management centers (TMC), emergency management systems (EMS), and other ITS-related applications. It defines the RADS subset of IEEE 1512, specifying those data elements that are mandatory and optional.

³ IEEE 1512 Combined/Draft F/Rev35

see [HTTP://WWW.ITSWARE.NET/BLINDLINKS/IM/P1512_IJIS.ZIP](http://www.itsware.net/blindlinks/im/p1512_ijis.zip)

2 IEEE 1512 XML DOCUMENT STRUCTURE

Let us first examine the top level single message for all Incident Management messages in the entire 1512 family of standards. It begins with an XML header declaring the version and encoding.

```
<?xml version="1.0" encoding="UTF-8"?>
```

Next, the XML root `<iMWrapper>` indicates that the elements and data types used in the schema (schema, element, complexType, sequence, string, boolean, etc.) come from the following namespaces:

```
<xs:schema targetNamespace="http://www.rads1512"
xmlns:rspa="http://hazmat.dot.gov/XMLSchema/IncidentReport" xmlns:local="http://www.dummy-local-address"
xmlns:lrms="http://www.dummy-lrms-address" xmlns:itis="http://www.dummy-itis-address"
xmlns:dsrc="http://www.dummy-dsrc-address" xmlns:tcip="http://www.dummy-tcip-address"
xmlns:ntcip="http://www.dummy-ntcip-address" xmlns:jxdd="http://www.dummy-jxdd-address"
xmlns:tmdd="http://www.dummy-tmdd-address" xmlns:atis="http://www.dummy-atis-address"
xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns="http://www.dummy-im-address"
elementFormDefault="unqualified" attributeFormDefault="unqualified" version="DRAFT">
  <xs:import namespace="http://www.dummy-atis-address" schemaLocation="atis.xsd"/>
  <xs:import namespace="http://www.dummy-tmdd-address" schemaLocation="tmdd.xsd"/>
  <xs:import namespace="http://www.dummy-jxdd-address" schemaLocation="jxdd.xsd"/>
  <xs:import namespace="http://www.dummy-ntcip-address" schemaLocation="ntcip.xsd"/>
  <xs:import namespace="http://www.dummy-tcip-address" schemaLocation="tcip.xsd"/>
  <xs:import namespace="http://www.dummy-dsrc-address" schemaLocation="dsrc.xsd"/>
  <xs:import namespace="http://www.dummy-itis-address" schemaLocation="itis.xsd"/>
  <xs:import namespace="http://www.dummy-lrms-address" schemaLocation="lrms.xsd"/>
  <xs:import namespace="http://www.dummy-local-address" schemaLocation="local.xsd"/>
  <xs:import namespace="http://hazmat.dot.gov/XMLSchema/IncidentReport"
schemaLocation="rspa.xsd"/>
```

* local.xsd contains an insertion to `<LinkTrafficInformation>`
(see Restrictions below)



The RADS <iMWrapper> must contain a sequence of at least the mandatory <incidentDescription> tag, followed by an optional <publicIncidentDescription> tag.

```
<xs:complexType name="IMWrapper">
  <xs:sequence>
    <xs:element name="incidentDescription" type="IncidentDescription"/>
    <xs:element name="publicIncidentDescription"
      type="PublicIncidentDescription" minOccurs="0"/>
    <xs:element name="localIMWrapper" type="local:IMWrapper" minOccurs="0"/>
  </xs:sequence>
</xs:complexType>
```

The <publicIncidentDescription> tag is optionally included as information to be shared among the regional agencies and with the public.

The <IncidentDescription> type is composed of the sequence:

```
<xs:complexType name="IncidentDescription">
  <xs:sequence>
    <xs:element name="header" type="Header"/>
    <xs:element name="idxSubParts" type="IDX-Wrapper"/>
    <xs:element name="localIncidentDescription"
      type="local:IncidentDescription" minOccurs="0"/>
    <!-- if an inner element is not present then the header content of the message which
    carries this DF shall be applied to the context of this message. The header has the
    data creator, time stamps, location, and what to do when the message becomes
    old (how to get a fresh one) and the reference ID of this message or submessage
    sets of sub messages are appended here
    [the older &xxx type styles have been removed and simple ASN forms are now be
    used] -->
  </xs:sequence>
</xs:complexType>
```

2.1 Header

The <header> tag decomposes into:

```
<xs:complexType name="Header">
  <xs:sequence>
    <xs:element name="senderIncidentID" type="ReferenceID"/>
    <xs:element name="sender" type="OrganizationPosition" minOccurs="0"/>
    <xs:element name="basics" type="Basics" minOccurs="0"/>
    <xs:element name="issueTime" type="IssueStamp" minOccurs="0"/>
    <xs:element name="updateTime" type="atis:DateTimePair"
minOccurs="0"/>
    <xs:element name="urgency" type="Urgency" minOccurs="0"/>
    <xs:element name="localHeader" type="local:Header" minOccurs="0"/>
  </xs:sequence>
</xs:complexType>
```

2.1.1 senderIncidentID

The <senderIncidentID> is of type ReferenceID:

```
<xs:simpleType name="ReferenceID" >
  <xs:restriction base="xs:string">
    <xs:minLength value="1"/>
    <xs:maxLength value="64"/>
  </xs:restriction>
</xs:simpleType>
```

2.1.2 sender

The <sender> tag is of type OrganizationPosition:

```
<xs:complexType name="OrganizationPosition">
  <xs:sequence>
    <xs:annotation>
      <xs:documentation>
        sender (NTCIP 1104)
      </xs:documentation>
    </xs:annotation>
    <xs:element name="group" type="ICS-Activity"/>
    <xs:choice>
      <xs:element name="personRef" type="ReferenceID"/>

```

```

                <xs:element name="person" type="PersonInformation"/>
            </xs:choice>
            <xs:element name="positionRef" type="ReferenceID"/>
            <xs:element name="localOrganizationPosition" type="local:OrganizationPosition"
                minOccurs="0"/>
        </xs:sequence>
    </xs:complexType>

```

2.1.2.1 person

The <person> tag is of type PersonInformation:

```

<xs:complexType name="PersonInformation">
    <xs:annotation>
        <xs:documentation>person</xs:documentation>
    </xs:annotation>
    <xs:sequence>
        <xs:element name="header" type="Header"/>
        <xs:element name="personData" type="jxdd:PersonType"/>
        <xs:element name="agencyName" type="tmdd:Link-ownership" minOccurs="0"/>
        <xs:element name="agencyIdentifier" type="tmdd:Organization-identifier" minOccurs="0"/>
        <xs:element name="contacts" type="atis:ContactInformation" minOccurs="0"/>
        <xs:element name="agencyResponsible" type="tmdd:Link-ownership" minOccurs="0"/>
        <xs:element name="localPersonInformation" type="local:PersonInformation"
            minOccurs="0"/>
    </xs:sequence>
</xs:complexType>

```

2.1.2.1.1 personData

The <personData> tag is of type PersonType:

```

<xs:complexType name="PersonType">
    <xs:annotation>
        <xs:documentation>personData</xs:documentation>
    </xs:annotation>
    <xs:sequence>
        <xs:element name="contactInformation" type="PrimaryContactInformation"
            minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
</xs:complexType>

```

2.1.2.1.2 agencyName

The <agencyName> is of type Link-ownership:



```
<xs:simpleType name="Link-ownership" >
  <xs:annotation>
    <xs:documentation>
      Any set of ASCII characters up to 25656
    </xs:documentation>
  </xs:annotation>
  <xs:restriction base="xs:string">
    <xs:minLength value="1"/>
    <xs:maxLength value="256"/>
  </xs:restriction>
</xs:simpleType>
```

2.1.2.1.3 agencyIdentifier

The <agencyIdentifier> tag is of type Organization-identifier:

```
<xs:simpleType name="Organization-identifier" >
  <xs:annotation>
    <xs:documentation>
      Any set of alphanumeric characters up to 32
    </xs:documentation>
  </xs:annotation>
  <xs:restriction base="xs:string">
    <xs:minLength value="1"/>
    <xs:maxLength value="32"/>
  </xs:restriction>
</xs:simpleType>
```

2.1.2.1.4 contacts

The <contacts> tag is type ContactInformation:

```
<xs:complexType name="ContactInformation" >
  <xs:sequence>
    <xs:element name="emails" minOccurs="0">
      <xs:complexType>
        <xs:sequence minOccurs="1" maxOccurs="10">
          <xs:element name="email" type="Email" />
        </xs:sequence>
      </xs:complexType>
    </xs:element>
    <xs:element name="phones" minOccurs="0">
      <xs:complexType>
        <xs:sequence minOccurs="1" maxOccurs="10">
          <xs:element name="phone" type="PhoneInformation" />
          <!-- made up of country code, phone#, ext & allow phones.fax.pager/etc to be entered -->
        </xs:sequence>
      </xs:complexType>
    </xs:element>
  </xs:sequence>
</xs:complexType>
```

```

</xs:element>
<xs:element name="device-Identity" type="Device-Identity" minOccurs="0"/>
</xs:sequence>
</xs:complexType>

```

2.1.3 Basics

The <Basics> contains a sequence of tags containing basic incident information:

```

<xs:complexType name="Basics">
  <xs:sequence>
    <xs:element name="incidentLoc" type="lrms:LocationReference"/>
    <xs:element name="estimate1" type="Reliability"/>
    <xs:element name="typeEvent" type="itis:ITISEventType"/>
    <xs:element name="severity" type="tmdd:Event-incident-severity" minOccurs="0"/>
    <xs:element name="status" type="itis:IncidentResponseStatus" minOccurs="0"/>
    <xs:element name="localBasics" type="local:Basics" minOccurs="0"/>
  </xs:sequence>
</xs:complexType>

```

2.1.3.1 incidentLoc

The incident location is referenced in a number of ways. To begin with, the geographic coordinates are specified in the <geoLocationPoint> below:

```

<xs:complexType name="LocationReference" >
  <xs:choice>
    <xs:element name="geometry" type="GeometryProfile" />
    <xs:element name="geocoordinate" type="GeographicCoordinate" />
    <xs:element name="grid" type="GridProfile" />
    <xs:element name="linearReferencing" type="LinearReferenceProfile" />
    <xs:element name="crossStreets" type="CrossStreetsProfile" />
    <xs:element name="address" type="AddressProfile" />
    <xs:element name="addressPoint" type="AddressPointProfile" />
    <xs:element name="areaLocation" type="AreaLocation" />
  </xs:choice>
</xs:complexType>

<xs:complexType name="GeographicCoordinate" >
  <xs:sequence>
    <xs:element name="locationName" type="Text-name255" minOccurs="0"/>
    <xs:choice >
      <xs:element name="geoLocationPoint" type="GeoLocation" />
      <xs:element name="geoLocationLink" type="GeoLocationLink" />
      <xs:element name="polarCoordinates" type="PolarCoordinates" />
    </xs:choice >
  </xs:sequence>
</xs:complexType>

```

```

    <xs:element name="geoLocationDelta" type="GeoLocationDelta" />
  </xs:choice>
</xs:sequence>
  <xs:attribute name="locationID" type="String-index64" />
</xs:complexType>

<xs:complexType name="GeoLocation" >
  <xs:sequence>
    <xs:element name="latitude" type="Latitude" />
    <xs:element name="longitude" type="Longitude" />
    <xs:element name="horizontalDatum" type="HorizontalDatum" minOccurs="0"/>
    <xs:element name="height" type="Height" minOccurs="0"/>
  </xs:sequence>
</xs:complexType>

```

2.1.3.2 estimate1

The <estimate1> tag is simply set to 100% as a required field:

```

<xs:complexType name="Reliability">
  <xs:sequence>
    <xs:annotation>
      <xs:documentation>
        a percentage to be used in the general value case: use 100
      </xs:documentation>
    </xs:annotation>
    <xs:element name="percent" >
      <xs:simpleType>
        <xs:restriction base="xs:unsignedByte">
          <xs:maxInclusive value="100"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:element>
  </xs:sequence>
</xs:complexType>

```

2.1.3.3 typeEvent

The <ITISEventType> is an elaborate categorization of incidents and events. It begins with the following categories:

- TrafficConditions
- AccidentsAndIncidents
- Closures
- Roadwork
- Obstruction
- DelayStatusCancellation
- UnusualDriving
- MobileSituation
- DeviceStatus
- RestrictionClass



- IncidentResponseStatus
- Disasters
- Disturbances
- SportingEvents
- SpecialEvents
- ParkingInformation
- SystemInformation
- WeatherConditions
- Precipitation
- Winds
- VisibilityAndAirQuality
- Temperature
- PavementConditions
- WinterDrivingRestrictions
- WinterDrivingIndex
- SuggestionAdvice
- WarningAdvice
- AdviceInstructionsRecommendations
- AdviceInstructionsMandatory
- Qualifiers
- GenericLocations
- LaneRoadway
- AlternateRoute
- Units
- TransitMode
- VehicleGroupAffected
- TravelerGroupAffected
- ResponderGroupAffected
- IncidentResponseEquipment
- AssetStatus
- RoadsideAssets
- TransitLocations

Then each category is further detailed in the International Traveler Information System standard.

2.1.3.4 severity

```
<xs:simpleType name="Event-incident-severity" >
  <xs:annotation>
    <xs:appinfo>
      none (1)
      minor (2)
      major (3)
      natural disaster (4)
    </xs:appinfo>
  </xs:annotation>
  <xs:union>
    <xs:simpleType>
      <xs:restriction base="xs:unsignedInt">
        <xs:minInclusive value="1"/>
        <xs:maxInclusive value="4"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:simpleType>
      <xs:restriction base="xs:string">
        <xs:enumeration value="none"/>
        <xs:enumeration value="minor"/>
        <xs:enumeration value="major"/>
        <xs:enumeration value="natural disaster"/>
      </xs:restriction>
    </xs:simpleType >
```



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

2.1.3.5 status

```
<xs:simpleType name="IncidentResponseStatus">
  <xs:union>
    <xs:simpleType>
      <xs:restriction base="xs:unsignedShort">
        <xs:minInclusive value="2817"/>
        <xs:maxInclusive value="2833"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:simpleType>
      <xs:restriction base="xs:string">
        <xs:enumeration value="unconfirmed report" id="_2817"/>
        <xs:enumeration value="initial response en-route" id="_2818"/>
        <xs:enumeration value="follow-up response en-route" id="_2819"/>
        <xs:enumeration value="initial response on scene" id="_2820"/>
        <xs:enumeration value="follow-up response on scene" id="_2821"/>
        <xs:enumeration value="confirmed report" id="_2822"/>
        <xs:enumeration value="scene is unsecured at this time" id="_2823"/>
        <xs:enumeration value="response scene secured" id="_2824"/>
        <xs:enumeration value="rescue and recovery work in progress" id="_2825"/>
        <xs:enumeration value="extraction in progress" id="_2826"/>
        <xs:enumeration value="clearance work in progress" id="_2827"/>
        <xs:enumeration value="body removal operations" id="_2828"/>
        <xs:enumeration value="fire or containment contained" id="_2829"/>
        <xs:enumeration value="fire or containment not contained" id="_2830"/>
        <xs:enumeration value="event cleared" id="_2831"/>
        <xs:enumeration value="traffic clearing" id="_2832"/>
        <xs:enumeration value="incident closed" id="_2833"/>
      </xs:restriction>
    </xs:simpleType>
  </xs:union>
</xs:simpleType>
```

2.1.4 issueTime

```
<xs:complexType name="IssueStamp">
  <xs:sequence>
    <xs:element name="timePoint" type="atis:DateTimePair"/>
    <xs:element name="count">
      <xs:annotation>
        <xs:documentation>
          the version count of the issued data
          a rolling count of updates of messages
        </xs:documentation>
      </xs:annotation>
    </xs:element>
  </xs:sequence>
</xs:complexType>
```

```

        <xs:restriction base="xs:unsignedInt">
            <xs:minInclusive value="1"/>
            <xs:maxInclusive value="100000"/>
        </xs:restriction>
    </xs:simpleType>
</xs:element>
<xs:element name="issueType">
    <xs:simpleType>
        <xs:union>
            <xs:simpleType>
                <xs:restriction base="xs:unsignedInt">
                    <xs:minInclusive value="1"/>
                    <xs:maxInclusive value="3"/>
                </xs:restriction>
            </xs:simpleType>
            <xs:simpleType>
                <xs:restriction base="xs:string">
                    <xs:enumeration value="create"/>
                    <xs:enumeration value="update"/>
                    <xs:enumeration value="delete"/>
                </xs:restriction>
            </xs:simpleType>
        </xs:union>
    </xs:simpleType>
</xs:element>
<xs:element name="author" minOccurs="0">
    <xs:simpleType>
        <xs:restriction base="FreeText">
            <xs:minLength value="1"/>
            <xs:maxLength value="200"/>
        </xs:restriction>
    </xs:simpleType>
</xs:element>
<xs:element name="localIssueStamp" type="local:IssueStamp" minOccurs="0"/>
</xs:sequence>
</xs:complexType>

```

2.1.4.1 timePoint

```

<xs:complexType name="DateTimePair" >
    <xs:sequence>
        <xs:element name="date" type="Date" />
        <xs:element name="time" type="Time" />
        <xs:element name="offset" type="TimeOffset" minOccurs="0"/>
    </xs:sequence>
</xs:complexType>

```

2.1.4.1.1 date

```
<xs:simpleType name="Date" >
  <xs:annotation>
    <xs:documentation>
      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>
```

2.1.4.1.2 time

```
<xs:simpleType name="Time" >
  <xs:annotation>
    <xs:documentation>
      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
      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>
```

2.1.5 urgency

```
<xs:simpleType name="Urgency">
  <xs:restriction base="xs:unsignedByte">
    <xs:maxInclusive value="5"/>
  </xs:restriction>
</xs:simpleType>
```



2.2 idxSubParts

The Incident Description is packaged in the >IDX-Wrapper<. It contains many required reports which for this scope are unused but present. Only the following are used:

- <descriptionReports>
- <networkConditionReports>
- <responseReports>
- <severityReports>

```

<xs:complexType name="IDX-Wrapper">
  <xs:sequence>
    <xs:element name="cargoDocsReports" />
    <xs:element name="cargoUnitsReports" />
    <xs:element name="cargoVehicleReports" />
    <xs:element name="cautionsForResponderReports" />
    <xs:element name="centerPlans" />
    <xs:element name="descriptionReports">
      <xs:complexType>
        <xs:sequence minOccurs="0" maxOccurs="64">
          <xs:element name="descriptionReport" type="Description"/>
        </xs:sequence>
      </xs:complexType>
    </xs:element>
    <xs:element name="evacuationReports" />
    <xs:element name="facilitiesReports" />
    <xs:element name="fileTransferReports" />
    <xs:element name="immediateSiteEvacuationReports" />
    <xs:element name="impactReports" />
    <xs:element name="manageCommandReports" />
    <xs:element name="materialReleaseReports" />
    <xs:element name="needEMSReports" />
    <xs:element name="needFireSuppressionReports" />
    <xs:element name="needLawEnforcementReports" />
    <xs:element name="needOtherServicesReports" />
    <xs:element name="needRescueServicesReports" />
    <xs:element name="networkConditionsReports">
      <xs:annotation>
        <xs:documentation>
          restrictions
          owner
          jurisdiction
        </xs:documentation>
      </xs:annotation>
    </xs:element>
  </xs:sequence>
</xs:complexType>
  <xs:sequence minOccurs="0" maxOccurs="64">

```



```

                <xs:annotation>
                    <xs:documentation>
affectedLanes
restrictions
owner
jurisdiction
                    </xs:documentation>
                </xs:annotation>
                <xs:element name="networkConditionsReport"
type="NetworkConditions"/>
            </xs:sequence>
        </xs:complexType>
    </xs:element>
    <xs:element name="placardsLabelsSignageReports" />
    <xs:element name="preemptionUserDataReports" />
    <xs:element name="requestImmedAssistanceReports" />
    <xs:element name="requestNetworkConditions" />
    <xs:element name="requestPhysicalAssets" />
    <xs:element name="requestPhysicalAssetStatus" />
    <xs:element name="requestPreemptionUserDataReports" />
    <xs:element name="requestRouteAdviceReports" />
    <xs:element name="requestTrafficControlPlans" />
    <xs:element name="requestWorkZoneDataReports" />
    <xs:element name="resourceAssignmentReports" />
    <xs:element name="responseReports">
        <xs:annotation>
            <xs:documentation>
responders
responding assets
        </xs:documentation>
        </xs:annotation>
    </xs:complexType>
        <xs:sequence minOccurs="0" maxOccurs="64">
            <xs:element name="responseReport" type="Response"/>
        </xs:sequence>
    </xs:complexType>
</xs:element>
<xs:element name="routeAdviceReports" />
<xs:element name="sceneStagingReports" />
<xs:element name="severityReports">
    <xs:annotation>
        <xs:documentation>
injuries
    </xs:documentation>
    </xs:annotation>
</xs:complexType>
        <xs:sequence minOccurs="0" maxOccurs="64">
            <xs:element name="severityReport" type="Severity"/>
        </xs:sequence>
    </xs:complexType>
</xs:element>

```

```

<xs:element name="trackInvolvedPersonReports" />
<xs:element name="trackInvolvedVehicleReports" />
<xs:element name="trackResponsePersonnelReports" />
<xs:element name="trackSpecialCircumstancesReports" />
<xs:element name="trafficControlPlanReports" />
<xs:element name="transitEventSourceReports" />
<xs:element name="transitVehicleInvolvedReports" />
<xs:element name="vehicleMAYDAYReports" />
<xs:element name="vehiclesDataReports" />
<xs:element name="watchForRequests" />
<xs:element name="watchForResponseReports" />
<xs:element name="witnessStatementReports" />
<xs:element name="workZoneDataReports" />
<xs:element name="localIDX-Wrapper" type="local:IDX-Wrapper" minOccurs="0"/>
</xs:sequence>
</xs:complexType>

```

2.2.1 descriptionReports

Normally, there is only one <descriptionReport> of the Description type .

```

<xs:complexType name="Description">
  <xs:annotation>
    <xs:documentation>descriptionReports</xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="header" type="Header"/>
    <xs:element name="typeEvent" type="itis:ITISEventType"/>
    <xs:element name="subject" type="FreeText" minOccurs="0"/>
    <xs:element name="furtherData" type="URL-Link" minOccurs="0"/>
    <xs:element name="localDescription" type="local:Description" minOccurs="0"/>
  </xs:sequence>
</xs:complexType>

```

2.2.1.1 header

Following the redundant <senderIncidentID>, the <basics> tag will contain <incidentLoc><linearReference> structure as follows:

```

<xs:complexType name="LinearReference" >
  <xs:sequence>
    <xs:element name="locationName" type="Text-name255" minOccurs="0"/>
    <xs:element name="linearRefMethod" type="LRMethod" minOccurs="0"/>
    <xs:element name="transElement" type="StreetInfo" minOccurs="0"/>
    <xs:element name="startRefPoint" type="PointLocation" minOccurs="0"/>
  </xs:sequence>
</xs:complexType>

```



```

<!-- Start (first) reference point -->
<xs:element name="endRefPoint" type="PointLocation" minOccurs="0"/>
<!-- End (second_ reference point -->
<xs:element name="startDistance" type="Distance" minOccurs="0"/>
<!-- From start of element or the start reference point -->
<xs:element name="endDistance" type="Distance" minOccurs="0"/>
<!-- From start of element or the second reference point -->
<xs:element name="startNormDistance" type="NormalizedDistance" minOccurs="0"/>
<!-- Percentage of link length from start of
element or start reference point to start
of referenced link. -->
<xs:element name="endNormDistance" type="NormalizedDistance" minOccurs="0"/>
<!-- Percentage of link length from start of
element or start reference point to end
of referenced link.
Note: normalized distances should only be
used for references involving known link
lengths. -->
<xs:element name="distanceDirection" type="Direction" minOccurs="0"/>
<!-- Direction for distance measures along
the transport element -->
<xs:element name="lateralOffsetRef" type="LROffsetRef" />
<!-- Defines from where lateral offset is measured.
'centerline' is the default value -->
<xs:element name="positiveOffsetDir" type="LRPosOffsetDir" minOccurs="0"/>
<!-- positive direction of a lateral offset.
'right' is the default value -->
<xs:element name="startLateralOffset" type="Distance" minOccurs="0"/>
<!-- Start offset perpendicular to the road -->
<xs:element name="endLateralOffset" type="Distance" minOccurs="0"/>
<!-- End offset perpendicular to the road -->
<xs:element name="travelDirection" type="Direction" minOccurs="0"/>
<!-- Direction the vehicle is traveling; may be different
from the distance direction -->
<xs:element name="side" type="Side" minOccurs="0"/>
<!-- of the referenced point or link -->
<xs:element name="startHeight" type="Height" minOccurs="0"/>
<!-- of the first (start) referenced point -->
<xs:element name="endheight" type="Height" minOccurs="0"/>
<!-- of the second (ending) point of a link -->
<xs:element name="startAdminAreas" type="AdminAreaGroup" minOccurs="0"/>
<!-- of the first (start) referenced point -->
<xs:element name="endAdminAreas" type="AdminAreaGroup" minOccurs="0"/>
<!-- of the second (ending) point of a link -->
</xs:sequence>
<xs:attribute name="locationID" type="String-index64" />
</xs:complexType>

```

2.2.1.1.1 transElement

The <transElement> tag is of type StreetInfo:

```
<xs:complexType name="StreetInfo" >
  <xs:choice>
    <xs:sequence>
      <xs:element name="prefix" type="Text-name-presuf4" minOccurs="0" maxOccurs="4" />
      <xs:element name="name" type="Text-name255" />
      <xs:element name="suffix" type="Text-name-presuf4" minOccurs="0" maxOccurs="4" />
    </xs:sequence>
    <xs:element name="streetIndex" type="IdType" />
  </xs:choice>
</xs:complexType>
```

2.2.1.1.2 startDistance

```
<xs:simpleType name="Distance" >
  <xs:restriction base="xs:string">
    <xs:length value="100"/>
  </xs:restriction>
</xs:simpleType>
```

2.2.1.2 subject/furtherData

Following the redundant <typeEvent>, the <subject> and <furtherData> tags contain FreeText which will identify the sender.

2.2.2 networkConditionReports

Again, there normally will be a single report composed of a redundant <header><senderIncidentID>. The <basics><incidentLoc> sequence will contain the <crossStreetsPoint> of type CrossStreetPoint:

```
<xs:complexType name="CrossStreetsPoint" >
  <xs:sequence>
    <xs:element name="onStreetInfo" type="StreetInfo" />
    <xs:element name="atStreetInfo" type="StreetInfo" />
    <xs:element name="geoLocation" type="GeoLocation" minOccurs="0"/>
  </xs:sequence>
</xs:complexType>
```



```

<xs:element name="intersectionType" type="IntersectionType" minOccurs="0"/>
<xs:element name="offset" type="Distance" minOccurs="0"/>
<xs:element name="direction" type="Direction" minOccurs="0"/>
<xs:element name="side" type="Side" minOccurs="0"/>
<xs:element name="height" type="Height" minOccurs="0"/>
<xs:element name="adminAreas" type="AdminAreaGroup" minOccurs="0"/>
</xs:sequence>
</xs:complexType>

```

Then the <basics> tag is closed out with the redundant <estimate1><typeEvent> sequence. The <header> tag is completed with the redundant <issueTime><updateTime><urgency> sequence. Finally, the <networkConditionReport> is completed with an empty, required <bundledATIS/>.

2.2.3 responseReports

The normally single report is of type Response:

```

<xs:complexType name="Response">
  <xs:sequence>
    <xs:element name="header" type="Header"/>
    <xs:element name="respOrgId" type="tmdd:Organization-identifier" minOccurs="0"/>
    <xs:element name="respOrgContact"
      type="tmdd:Organization-contact-person-on-site-name-or-id" minOccurs="0"/>
    <xs:element name="respOrgStatus" type="itis:IncidentResponseStatus" minOccurs="0"/>
    <xs:element name="respStatusOtherText" minOccurs="0">
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:minLength value="1"/>
          <xs:maxLength value="4000"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:element>
    <xs:element name="respGroupType" type="itis:ResponderGroupAffected"
      minOccurs="0"/>
    <xs:element name="respEquipType" type="itis:IncidentResponseEquipment"
      minOccurs="0"/>
    <xs:element name="respEquipTypOther" type="FreeText" minOccurs="0"/>
    <xs:element name="localResponse" type="local:Response" minOccurs="0"/>
  </xs:sequence>
</xs:complexType>

```

The ever-present <header> contains the redundant <senderIncidentID>. The <respOrgId> tag is of type Organization-identifier listed above. It is expected that only the <respStatusOtherText> and <respEquipTypOther> tags will be used.



2.2.4 severityReports

The single severityReport will follow the following:

```
<xs:complexType name="Severity">
  <xs:sequence>
    <xs:element name="header" type="Header"/>
    <xs:element name="vehiclesCount" type="tmdd:Event-incident-vehicles-involved-count"
      minOccurs="0"/>
    <xs:element name="vehicleTypes" minOccurs="0">
      <xs:complexType>
        <xs:sequence maxOccurs="16">
          <xs:element name="vehicleType" type="atis:VehiclesInvolved"/>
        </xs:sequence>
      </xs:complexType>
    </xs:element>
    <xs:element name="injuries" minOccurs="0">
      <xs:complexType>
        <xs:sequence maxOccurs="5">
          <xs:element name="injury" type="InjuryCounts"/>
        </xs:sequence>
      </xs:complexType>
    </xs:element>
    <xs:element name="localSeverity" type="local:Severity" minOccurs="0"/>
  </xs:sequence>
</xs:complexType>
```

The redundant <header><senderIncidentID> sequence will be followed by the <localSeverity> which is type FreeText.

Appendix A aztech1512.xsd

The following listing is the XML definition in its entirety.

```
<?xml version="1.0" encoding="UTF-8"?>
<!--
edited with XMLSPY v2004 rel. 3 U (http://www.xmlspy.com) by kenSatoyoshi (OZ Engineering LLC)
-->
<xs:schema
  targetNamespace=http://www.rads1512
  xmlns:rspa=http://hazmat.dot.gov/XMLSchema/IncidentReport
  xmlns:local=http://www.dummy-local-address
  xmlns:lrms=http://www.dummy-lrms-address
  xmlns:itis=http://www.dummy-itis-address
  xmlns:dsrc=http://www.dummy-dsrc-address
  xmlns:tcip=http://www.dummy-tcip-address
  xmlns:ntcip=http://www.dummy-ntcip-address
  xmlns:jxdd=http://www.dummy-jxdd-address
  xmlns:tmdd=http://www.dummy-tmdd-address
  xmlns:atis=http://www.dummy-atis-address
  xmlns:xs=http://www.w3.org/2001/XMLSchema
  xmlns=http://www.dummy-im-address
  elementFormDefault="unqualified" attributeFormDefault="unqualified" version="DRAFT">
  <!-- add for each space you define: xmlns:$NAME$="http://www.dummy-$NAME$-address -->
  <xs:import namespace="http://www.dummy-atis-address" schemaLocation="atis.xsd"/>
  <xs:import namespace="http://www.dummy-tmdd-address" schemaLocation="tmdd.xsd"/>
  <xs:import namespace="http://www.dummy-jxdd-address" schemaLocation="jxdd.xsd"/>
  <xs:import namespace="http://www.dummy-ntcip-address" schemaLocation="ntcip.xsd"/>
  <xs:import namespace="http://www.dummy-tcip-address" schemaLocation="tcip.xsd"/>
  <xs:import namespace="http://www.dummy-dsrc-address" schemaLocation="dsrc.xsd"/>
  <xs:import namespace="http://www.dummy-itis-address" schemaLocation="itis.xsd"/>
  <xs:import namespace="http://www.dummy-lrms-address" schemaLocation="lrms.xsd"/>
  <xs:import namespace="http://www.dummy-local-address" schemaLocation="local.xsd"/>
  <xs:import namespace=http://hazmat.dot.gov/XMLSchema/IncidentReport
    schemaLocation="rspa.xsd"/>

  <xs:element name="IMWrapper" type="IMWrapper"/>
  <xs:complexType name="IMWrapper">
    <xs:sequence>
      <xs:element name="incidentDescription" type="IncidentDescription"/>
      <xs:element name="publicIncidentDescription" type="PublicIncidentDescription"
        minOccurs="0"/>
      <xs:element name="localIMWrapper" type="local:IMWrapper" minOccurs="0"/>
    </xs:sequence>
  </xs:complexType>
  <!-- -->
  <xs:complexType name="IncidentDescription">
    <xs:sequence>
      <xs:element name="header" type="Header"/>

```



```

        <xs:element name="idxSubParts" type="IDX-Wrapper"/>
        <xs:element name="localIncidentDescription" type="local:IncidentDescription"
            minOccurs="0"/>
        <!-- if an inner element is not present then the header content of the message which
            carries this DF shall be applied to the context of this message. The header has the
            data creator, time stamps, location, and what to do when the message becomes
            old (how to get a fresh one) and the reference ID of this message or submessage
            sets of sub messages are appended here
        [the older &xxx type styles have been removed and simple ASN forms are now be used]
-->
    </xs:sequence>
</xs:complexType>
<!-- -->
<xs:complexType name="PublicIncidentDescription">
    <xs:sequence>
        <xs:element name="header" type="Header"/>
        <xs:element name="idxSubParts" type="IDX-Wrapper"/>
        <xs:element name="localPublicIncidentDescription"
            type="local:PublicIncidentDescription" minOccurs="0"/>
        <!-- if an inner element is not present then the header content of the message which
            carries this DF shall be applied to the context of this message. The header has the
            data creator, time stamps, location, and what to do when the message becomes
            old (how to get a fresh one) and the reference ID of this message or submessage
            sets of sub messages are appended here
        [the older &xxx type styles have been removed and simple ASN forms are now be used]
-->
    </xs:sequence>
</xs:complexType>
<xs:complexType name="Header">
    <xs:sequence>
        <xs:element name="senderIncidentID" type="ReferenceID"/>
        <xs:element name="sender" type="OrganizationPosition" minOccurs="0"/>
        <xs:element name="basics" type="Basics" minOccurs="0"/>
        <xs:element name="issueTime" type="IssueStamp" minOccurs="0"/>
        <xs:element name="updateTime" type="atis:DateTimePair" minOccurs="0"/>
        <xs:element name="urgency" type="Urgency" minOccurs="0"/>
        <xs:element name="localHeader" type="local:Header" minOccurs="0"/>
    </xs:sequence>
</xs:complexType>
<xs:simpleType name="ReferenceID">
    <xs:restriction base="xs:string">
        <xs:minLength value="1"/>
        <xs:maxLength value="64"/>
    </xs:restriction>
</xs:simpleType>
<xs:complexType name="OrganizationPosition">
    <xs:sequence>
        <xs:annotation>
            <xs:documentation>
                sender (NTCIP 1104)
            </xs:documentation>
        </xs:annotation>
    </xs:sequence>
</xs:complexType>

```

```

</xs:annotation>
<xs:element name="group" type="ICS-Activity"/>
<xs:choice>
  <xs:element name="personRef" type="ReferenceID"/>
  <xs:element name="person" type="PersonInformation"/>
</xs:choice>
<xs:element name="positionRef" type="ReferenceID"/>
<xs:element name="localOrganizationPosition" type="local:OrganizationPosition"
  minOccurs="0"/>

  <!-- Incident Command System -->
</xs:sequence>
</xs:complexType>
<xs:simpleType name="Urgency">
  <xs:restriction base="xs:unsignedByte">
    <xs:maxInclusive value="5"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="PersonInformation">
  <xs:annotation>
    <xs:documentation>person</xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="header" type="Header"/>
    <xs:element name="personData" type="jxdd:PersonType"/>
    <xs:element name="agencyName" type="tmdd:Link-ownership" minOccurs="0"/>
    <xs:element name="agencyIdentifier" type="tmdd:Organization-identifier"
      minOccurs="0"/>
    <xs:element name="contacts" type="atis:ContactInformation" minOccurs="0"/>
    <xs:element name="agencyResponsible" type="tmdd:Link-ownership"
      minOccurs="0"/>
    <xs:element name="localPersonInformation" type="local:PersonInformation"
      minOccurs="0"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Basics">
  <xs:sequence>
    <xs:element name="incidentLoc" type="lrms:LocationReference"/>
    <xs:element name="estimate1" type="Reliability"/>
    <xs:element name="typeEvent" type="itis:ITISEventType"/>
    <xs:element name="severity" type="tmdd:Event-incident-severity"
      minOccurs="0"/>
    <xs:element name="status" type="itis:IncidentResponseStatus" minOccurs="0"/>
    <xs:element name="localBasics" type="local:Basics" minOccurs="0"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="PersonType">
  <xs:annotation>
    <xs:documentation>personData</xs:documentation>
  </xs:annotation>
  <xs:sequence>

```



```

        <xs:element name="contactInformation" type="PrimaryContactInformation"
            minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
</xs:complexType>
<!--
-->
<xs:complexType name="IssueStamp">
    <xs:sequence>
        <xs:element name="timePoint" type="atis:DateTimePair"/>
        <xs:element name="count">
            <xs:annotation>
                <xs:documentation>
                    the version count of the issued data
                    a rolling count of updates of messages
                </xs:documentation>
            </xs:annotation>
            <xs:simpleType>
                <xs:restriction base="xs:unsignedInt">
                    <xs:minInclusive value="1"/>
                    <xs:maxInclusive value="100000"/>
                </xs:restriction>
            </xs:simpleType>
        </xs:element>
        <xs:element name="issueType">
            <xs:simpleType>
                <xs:union>
                    <xs:simpleType>
                        <xs:restriction base="xs:unsignedInt">
                            <xs:minInclusive value="1"/>
                            <xs:maxInclusive value="3"/>
                        </xs:restriction>
                    </xs:simpleType>
                    <xs:simpleType>
                        <xs:restriction base="xs:string">
                            <xs:enumeration value="create"/>
                            <xs:enumeration value="update"/>
                            <xs:enumeration value="delete"/>
                        </xs:restriction>
                    </xs:simpleType>
                </xs:union>
            </xs:simpleType>
        </xs:element>
        <xs:element name="author" minOccurs="0">
            <xs:simpleType>
                <xs:restriction base="FreeText">
                    <xs:minLength value="1"/>
                    <xs:maxLength value="200"/>
                </xs:restriction>
            </xs:simpleType>
        </xs:element>
    </xs:sequence>
</xs:complexType>

```

```

        <xs:element name="localIssueStamp" type="local:IssueStamp" minOccurs="0"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="Reliability">
<xs:sequence>
    <xs:annotation>
        <xs:documentation>
            a percentage to be used in the general value case: use 100
        </xs:documentation>
    </xs:annotation>
<xs:element name="percent" >
    <xs:simpleType>
        <xs:restriction base="xs:unsignedByte">
            <xs:maxInclusive value="100"/>
        </xs:restriction>
    </xs:simpleType>
</xs:element>
</xs:sequence>
</xs:complexType>

<xs:simpleType name="Event-incident-severity">
    <xs:annotation>
        <xs:appinfo>
            none (1)
            minor (2)
            major (3)
            natural disaster (4)
        </xs:appinfo>
        <xs:documentation>
            <Definition>
                A code which describes the severity of an incident.
                Each region must define the meaning of the values defined.
                [Is used by ATIS and IM, but not seemed to be used by TMDD, what is the preferred item to use?]
            </Definition>
        </xs:documentation>
    </xs:annotation>
    <xs:union>
        <xs:simpleType>
            <xs:restriction base="xs:unsignedInt">
                <xs:minInclusive value="1"/>
                <xs:maxInclusive value="4"/>
            </xs:restriction>
        </xs:simpleType>
        <xs:simpleType>
            <xs:restriction base="xs:string">
                <xs:enumeration value="none"/>
                <xs:enumeration value="minor"/>
                <xs:enumeration value="major"/>
                <xs:enumeration value="natural disaster"/>
            </xs:restriction>
        </xs:simpleType>
    </xs:union>
</xs:simpleType>

```



```

        </xs:union>
    </xs:simpleType>
    <xs:complexType name="IDX-Wrapper">
        <xs:sequence>
            <xs:element name="cargoDocsReports" />
            <xs:element name="cargoUnitsReports" />
            <xs:element name="cargoVehicleReports" />
            <xs:element name="cautionsForResponderReports" />
            <xs:element name="centerPlans" />
            <xs:element name="descriptionReports">
                <xs:complexType>
                    <xs:sequence minOccurs="0" maxOccurs="64">
                        <xs:element name="descriptionReport"
                            type="Description"/>
                    </xs:sequence>
                </xs:complexType>
            </xs:element>
            <xs:element name="evacuationReports" />
            <xs:element name="facilitiesReports" />
            <xs:element name="fileTransferReports" />
            <xs:element name="immediateSiteEvacuationReports" />
            <xs:element name="impactReports" />
            <xs:element name="manageCommandReports" />
            <xs:element name="materialReleaseReports" />
            <xs:element name="needEMSReports" />
            <xs:element name="needFireSuppressionReports" />
            <xs:element name="needLawEnforcementReports" />
            <xs:element name="needOtherServicesReports" />
            <xs:element name="needRescueServicesReports" />
            <xs:element name="networkConditionsReports">
                <xs:annotation>
                    <xs:documentation>
                        restrictions
                        owner
                        jurisdiction
                    </xs:documentation>
                </xs:annotation>
            </xs:element>
            <xs:element name="networkConditionsReport"
                type="NetworkConditions"/>
        </xs:sequence>
    </xs:complexType>

```



```

</xs:element>
<xs:element name="placardsLabelsSignageReports" />
<xs:element name="preemptionUserDataReports" />
<xs:element name="requestImmedAssistanceReports" />
<xs:element name="requestNetworkConditions" />
<xs:element name="requestPhysicalAssets" />
<xs:element name="requestPhysicalAssetStatus" />
<xs:element name="requestPreemptionUserDataReports" />
<xs:element name="requestRouteAdviceReports" />
<xs:element name="requestTrafficControlPlans" />
<xs:element name="requestWorkZoneDataReports" />
<xs:element name="resourceAssignmentReports" />
<xs:element name="responseReports">
  <xs:annotation>
    <xs:documentation>
      responders
      responding assets
    </xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence minOccurs="0" maxOccurs="64">
      <xs:element name="responseReport"
        type="Response"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>
<xs:element name="routeAdviceReports" />
<xs:element name="sceneStagingReports" />
<xs:element name="severityReports">
  <xs:annotation>
    <xs:documentation>
      </xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence minOccurs="0" maxOccurs="64">
      <xs:element name="severityReport" type="Severity"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>
<xs:element name="trackInvolvedPersonReports" />
<xs:element name="trackInvolvedVehicleReports" />
<xs:element name="trackResponsePersonnelReports" />
<xs:element name="trackSpecialCircumstancesReports" />
<xs:element name="trafficControlPlanReports" />
<xs:element name="transitEventSourceReports" />
<xs:element name="transitVehicleInvolvedReports" />
<xs:element name="vehicleMAYDAYReports" />
<xs:element name="vehiclesDataReports" />
<xs:element name="watchForRequests" />
  <xs:element name="watchForResponseReports" />

```

injuries



```

        <xs:element name="witnessStatementReports" />
        <xs:element name="workZoneDataReports" />
        <xs:element name="localIDX-Wrapper" type="local:IDX-Wrapper"
            minOccurs="0"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="Description">
    <xs:annotation>
        <xs:documentation>descriptionReports</xs:documentation>
    </xs:annotation>
    <xs:sequence>
        <xs:element name="header" type="Header"/>
        <xs:element name="typeEvent" type="itis:ITISEventType"/>
        <xs:element name="subject" type="FreeText" minOccurs="0"/>
        <xs:element name="furtherData" type="URL-Link" minOccurs="0"/>
        <xs:element name="localDescription" type="local:Description" minOccurs="0"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="NetworkConditions">
    <xs:sequence>
        <xs:element name="header" type="Header"/>
        <xs:element name="bundledATIS">
            <xs:complexType>
                <xs:sequence>
                    <xs:element name="links" minOccurs="0">
                        <xs:complexType>
                            <xs:sequence maxOccurs="100">
                                <xs:element name="link"
                                    type="atis:LinkTrafficInformation"/>
                            </xs:sequence>
                        </xs:complexType>
                    </xs:element>
                    <xs:element name="incidents" minOccurs="0">
                        <xs:complexType>
                            <xs:sequence maxOccurs="100">
                                <xs:element name="incident"
                                    type="atis:IncidentInformation"/>
                            </xs:sequence>
                        </xs:complexType>
                    </xs:element>
                    <xs:element name="events" minOccurs="0">
                        <xs:complexType>
                            <xs:sequence maxOccurs="100">
                                <xs:element name="event"
                                    type="atis:EventInformation"/>
                            </xs:sequence>
                        </xs:complexType>
                    </xs:element>
                    <xs:element name="localNetworkConditions"
                        type="local:NetworkConditions"
                        minOccurs="0"/>
                </xs:sequence>
            </xs:complexType>
        </xs:element>
    </xs:sequence>
</xs:complexType>

```

```

                </xs:sequence>
            </xs:complexType>
        </xs:element>
        <xs:element name="rawTMDD" type="LinkDataSet" minOccurs="0"/>
        <xs:element name="localNetworkConditions2"
            type="local:NetworkConditions2" minOccurs="0"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="Response">
    <xs:sequence>
        <xs:element name="header" type="Header"/>
        <xs:element name="respOrgId" type="tmdd:Organization-identifier"
            minOccurs="0"/>
        <xs:element name="respOrgContact"
            type="tmdd:Organization-contact-person-on-site-name-or-id"
            minOccurs="0"/>
        <xs:element name="respOrgStatus"
            type="itis:IncidentResponseStatus" minOccurs="0"/>
        <xs:element name="respStatusOtherText" minOccurs="0">
            <xs:simpleType>
                <xs:restriction base="xs:string">
                    <xs:minLength value="1"/>
                    <xs:maxLength value="4000"/>
                </xs:restriction>
            </xs:simpleType>
        </xs:element>
        <xs:element name="respGroupType"
            type="itis:ResponderGroupAffected" minOccurs="0"/>
        <xs:element name="respEquipType"
            type="itis:IncidentResponseEquipment" minOccurs="0"/>
        <xs:element name="respEquipTypOther" type="FreeText" minOccurs="0"/>
        <xs:element name="localResponse" type="local:Response" minOccurs="0"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="Severity">
    <xs:sequence>
        <xs:element name="header" type="Header"/>
        <xs:element name="vehiclesCount"
            type="tmdd:Event-incident-vehicles-involved-count" minOccurs="0"/>
        <xs:element name="vehicleTypes" minOccurs="0">
            <xs:complexType>
                <xs:sequence maxOccurs="16">
                    <xs:element name="vehicleType"
                        type="atis:VehiclesInvolved"/>
                </xs:sequence>
            </xs:complexType>
        </xs:element>
        <xs:element name="injuries" minOccurs="0">
            <xs:complexType>
                <xs:sequence maxOccurs="5">

```

```

                <xs:element name="injury" type="InjuryCounts"/>
            </xs:sequence>
        </xs:complexType>
    </xs:element>
    <xs:element name="localSeverity" type="local:Severity" minOccurs="0"/>
</xs:sequence>
</xs:complexType>
<!-- -->
<xs:complexType name="LinkTrafficInformation">
    <xs:sequence>
        <xs:element name="head" type="Head" minOccurs="0"/>
        <xs:element name="location" type="lrms:LocationReference"/>
        <xs:element name="coverageTime" type="ComplexTime" minOccurs="0"/>
        <xs:element name="affectedLanes" minOccurs="0">
            <xs:complexType>
                <xs:sequence maxOccurs="16">
                    <xs:element name="affectedLane"
                        type="im:LaneDescription"/>
                </xs:sequence>
            </xs:complexType>
        </xs:element>
        <xs:element name="lanesMinimumNumber"
            type="tmdd:Link-lanes-number-open" minOccurs="0"/>
        <xs:element name="lanesNumberOpen"
            type="tmdd:Link-lanes-number-open" minOccurs="0"/>
        <xs:element name="name" type="tmdd:Link-name" minOccurs="0"/>
        <xs:element name="restrictionAxleWeight"
            type="tmdd:Link-restriction-weight-axle" minOccurs="0"/>
        <xs:element name="restrictionClass"
            type="itis:RestrictionClass" minOccurs="0"/>
        <xs:element name="restrictionHeight" type="tmdd:Link-restriction-height"
minOccurs="0"/>
        <xs:element name="restrictionLength"
            type="tmdd:Link-restriction-length" minOccurs="0"/>
        <xs:element name="restrictionWeight"
            type="tmdd:Link-restriction-weight-vehicle" minOccurs="0"/>
        <xs:element name="restrictionWidth"
            type="tmdd:Link-restriction-width" minOccurs="0"/>
        <xs:element name="tmddOther" type="tmdd:Link-other" minOccurs="0"/>
        <xs:element name="furtherData" type="URL-Link" minOccurs="0"/>
        <xs:element name="tail" type="Tail" minOccurs="0"/>
        <xs:element name="localLinkTrafficInformation"
            type="local:LinkTrafficInformation" minOccurs="0"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="IncidentInformation">
    <xs:sequence>
        <xs:element name="head" type="Head" minOccurs="0"/>
        <xs:element name="location" type="lrms:LocationReference"/>
        <xs:element name="typeEvent" type="itis:ITISEventType"/>
        <xs:element name="severity"

```



```

        type="tmdd:Event-incident-severity" minOccurs="0"/>
<xs:element name="status" type="itis:IncidentResponseStatus" minOccurs="0"/>
<xs:element name="description" type="itis:ITIScodesAndText" minOccurs="0"/>
<xs:element name="affectedLanes" minOccurs="0">
    <xs:complexType>
        <xs:sequence maxOccurs="16">
            <xs:element name="affectedLane"
                type="im:LaneDescription"/>
        </xs:sequence>
    </xs:complexType>
</xs:element>
<xs:element name="vehiclesInvolvedCount"
    type="tmdd:Event-incident-vehicles-involved-count" minOccurs="0"/>
<xs:element name="types" minOccurs="0">
    <xs:complexType>
        <xs:sequence maxOccurs="16">
            <xs:element name="type" type="VehiclesInvolved"/>
        </xs:sequence>
    </xs:complexType>
</xs:element>
<xs:element name="injuries" minOccurs="0">
    <xs:complexType>
        <xs:sequence maxOccurs="5">
            <xs:element name="injury" type="im:InjuryCounts"/>
        </xs:sequence>
    </xs:complexType>
</xs:element>
<xs:element name="startTime" type="DateTimePair" minOccurs="0"/>
<xs:element name="clearTime" type="DateTimePair" minOccurs="0"/>
<xs:element name="furtherData" type="URL-Link" minOccurs="0"/>
<xs:element name="tail" type="Tail" minOccurs="0"/>
<xs:element name="localIncidentInformation"
    type="local:IncidentInformation" minOccurs="0"/>
<!-- point in time this event started -->
<!-- an estimated clear time -->
</xs:sequence>
</xs:complexType>
<xs:complexType name="EventInformation">
    <xs:sequence>
        <xs:element name="head" type="Head" minOccurs="0"/>
        <xs:element name="location" type="lrms:LocationReference"/>
        <xs:element name="coverageTime" type="ComplexTime" minOccurs="0"/>
        <xs:element name="typeEvent" type="itis:ITISEventType"/>
        <xs:element name="severity"
            type="tmdd:Event-incident-severity" minOccurs="0"/>
        <xs:element name="status" type="itis:IncidentResponseStatus" minOccurs="0"/>
        <xs:element name="description" type="itis:ITIScodesAndText" minOccurs="0"/>
        <xs:element name="affectedLanes" minOccurs="0">
            <xs:complexType>
                <xs:sequence maxOccurs="16">
                    <xs:element name="affectedLane"

```



```

type="im:LaneDescription"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>
<xs:element name="vehiclesInvolvedCount"
  type="tmdd:Event-incident-vehicles-involved-count" minOccurs="0"/>
<xs:element name="types" minOccurs="0">
  <xs:complexType>
    <xs:sequence maxOccurs="16">
      <xs:element name="type" type="VehiclesInvolved"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>
<xs:element name="injuries" minOccurs="0">
  <xs:complexType>
    <xs:sequence maxOccurs="5">
      <xs:element name="injury" type="im:InjuryCounts"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>
<xs:element name="startTime" type="DateTimePair" minOccurs="0"/>
<xs:element name="clearTime" type="DateTimePair" minOccurs="0"/>
<xs:element name="repeatTimes" type="ComplexTime" minOccurs="0"/>
<xs:element name="furtherData" type="URL-Link" minOccurs="0"/>
<xs:element name="tail" type="Tail" minOccurs="0"/>
<xs:element name="localEventInformation"
  type="local:EventInformation" minOccurs="0"/>
<!-- point in time this event started -->
<!-- an estimated clear time -->
<!-- a set of repeating times for events which re-occur over a periods of days -->
</xs:sequence>
</xs:complexType>
<xs:complexType name="InjuryCounts">
  <xs:sequence>
    <xs:element name="injuryLevel">
      <xs:simpleType>
        <xs:union>
          <xs:simpleType>
            <xs:restriction base="xs:unsignedInt">
              <xs:minInclusive value="0"/>
              <xs:maxInclusive value="3"/>
            </xs:restriction>
          </xs:simpleType>
          <xs:simpleType>
            <xs:restriction base="xs:string">
              <xs:enumeration value="unknown"/>
              <xs:enumeration value="minor"/>
              <xs:enumeration value="major"/>
              <xs:enumeration value="fatal"/>
            </xs:restriction>
          </xs:simpleType>
        </xs:union>
      </xs:element>
    </xs:sequence>
  </xs:complexType>

```



```

        </xs:union>
    </xs:simpleType>
</xs:element>
<xs:element name="count">
    <xs:simpleType>
        <xs:restriction base="xs:unsignedInt">
            <xs:maxInclusive value="100000"/>
        </xs:restriction>
    </xs:simpleType>
</xs:element>
<!-- use the value 100000 if greater -->
</xs:sequence>
</xs:complexType>
<xs:complexType name="Head">
    <xs:sequence>
        <xs:element name="id" type="im:ReferenceID" minOccurs="0"/>
        <xs:element name="references" minOccurs="0">
            <xs:complexType>
                <xs:sequence maxOccurs="64">
                    <xs:element name="reference" type="im:ReferenceID"/>
                </xs:sequence>
            </xs:complexType>
        </xs:element>
        <!-- the Reference numbers for related messages or part of messages -->
        </xs:sequence>
    </xs:complexType>
</xs:element>
<xs:element name="language" type="LanguageCode" minOccurs="0"/>
<xs:element name="issuingAgency"
    type="tmdd:Organization-resource-identifier" minOccurs="0"/>
<xs:element name="updateTime" type="DateTimePair" minOccurs="0"/>
<xs:element name="expiryTime" type="DateTimePair" minOccurs="0"/>
<xs:element name="onExpiry" type="ExpireAction" minOccurs="0"/>
<xs:element name="urgency" type="im:Urgency" minOccurs="0"/>
<!-- the ref ident number for this message or part of message -->
<!-- the language used in the text (English, French, etc.) presumed to be English if not specified -->
<!-- the agency or center issuing this information, the name format
    shall follow the format devised in NTCIP 1601 for centers presumed unknown if not specified -->
<!-- the moment the date set was lasted updated; presumed to unknown if not specified -->
<!-- the moment the date set is presumed to be outdated; presumed to unknown if not specified -->
<!-- suggested use of this data once outdated; presumed to be unknown if not specified -->
<!-- a gross rating of the urgency of the message (0=least, 5=most) -->
    </xs:sequence>
</xs:complexType>
<xs:complexType name="PrimaryContactInformation">
    <xs:sequence>
        <xs:element name="emails" minOccurs="0">
            <xs:complexType>
                <xs:sequence maxOccurs="10">
                    <xs:element name="email" type="Email"/>
                </xs:sequence>
            </xs:complexType>
        </xs:element>
        <xs:element name="phones" minOccurs="0">

```



```
        <xs:complexType>
            <xs:sequence maxOccurs="10">
                <xs:element name="phone" type="PhoneInformation"/>
        <!-- made up of country code, phone#, and ext and allow phones.fax.pager/etc to be entered -->
            </xs:sequence>
        </xs:complexType>
    </xs:element>
    <xs:element name="deviceIdentity" type="Device-Identity" minOccurs="0"/>
    <xs:element name="furtherData" type="im:ReferenceID" minOccurs="0"/>
</xs:sequence>
</xs:complexType>
</xs:schema>
```



Appendix B Sample ems1512.xml

The following is a sample eXtended Markup Language listing for the Phoenix Fire Department 9-1-1 Emergency Management System:

```
<?xml version="1.0" encoding="UTF-8" ?>
<!--
Phoenix Fire Department 9-1-1 Emergency Management System (EMS) Sample XML Output
Using IEEE 1512 Common Incident Management Message Sets

Version 1.0 28 Aug 2006

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Prepared by: OZ Engineering LLC
3230 E Broadway Rd
Suite 216
Phoenix AZ 85040

-->
<iMWrapper xmlns="http://www.dummy-im-address" xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:atis="http://www.dummy-atis-address" xmlns:tmdd="http://www.dummy-tmdd-address"
xmlns:jxdd="http://www.dummy-jxdd-address" xmlns:ntcip="http://www.dummy-ntcip-address"
xmlns:tcip="http://www.dummy-tcip-address" xmlns:dsrc="http://www.dummy-dsrc-address"
xmlns:itis="http://www.dummy-itis-address" xmlns:lrms="http://www.dummy-lrms-address"
xmlns:local="http://www.dummy-local-address"
xmlns:rspa="http://hazmat.dot.gov/XMLSchema/IncidentReport"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://www.aztech1512-
address aztech1512.xsd">
  <incidentDescription xmlns="">
    <header>
      <senderIncidentID>06123456</senderIncidentID>
    </header>
    <sender>
      <group>phoenix.gov/fire/rdc</group>
      <personRef>99999</personRef>
    </sender>
    <basics>
      <incidentLoc><geocoordinate><geoLocationPt>
        <latitude>-33388499</latitude>
        <longitude>-112081466</longitude>
      </geoLocationPt></geocoordinate></incidentLoc>
      <estimate1><percent>100</percent></estimate1>
    </basics>
  </incidentDescription>
</iMWrapper>
```



```

        <typeEvent>
            <AccidentsAndIncidents>
                MEDICAL EMERGENCY
            </AccidentsAndIncidents>
        </typeEvent>
        <severity>2</severity>
        <status>fire containment not contained</status>
    </basics>
    <issueTime>
        <timePoint>
            <date>20060830</date>
            <time>1133240000</time>
            <offset>-0700</offset>
        </timePoint>
        <count>2</count>
        <issueType>1</issueType>
    </issueTime>
    <updateTime>
        <date>20060830</date>
        <time>1513210310</time>
        <offset>-0700</offset>
    </updateTime>
    <urgency>1</urgency>
</header>
<idxSubParts>
    <cargoDocsReports/> <!-- req'd -->
    <cargoUnitsReports/> <!-- req'd -->
    <cargoVehicleReports/> <!-- req'd -->
    <cautionsForResponderReports/> <!-- req'd -->
    <centerPlans/> <!-- req'd -->
    <descriptionReports><descriptionReport>
        <header> <!-- req'd -->
            <senderIncidentID>06123456</senderIncidentID>
            <basics>
                <incidentLoc>
                    <linearReferencing>
                        <transElement>
                            <name>
                                Interstate 17
                            </name>
                        </transElement>
                        <startDistance>
                            <miDec>455</miDec>
                        </startDistance>
                        <side>north</side>
                    </linearReferencing>
                </incidentLoc>
                <estimate1><percent>100</percent></estimate1>
            </typeEvent>
            <AccidentsAndIncidents>

```

MEDICAL EMERGENCY



```

                </AccidentsAndIncidents>
            </typeEvent>
        </basics>
    </header>
</typeEvent>
    <AccidentsAndIncidents>
        MEDICAL EMERGENCY
    </AccidentsAndIncidents>
</typeEvent>
<subject>Regional Dispatch Center</subject>
<furtherData>
    phoenix.gov/fire/rdc
</furtherData>
</descriptionReport></descriptionReports>
<evacuationReports/> <!-- req'd -->
<facilitiesReports/> <!-- req'd -->
<fileTransferReports/> <!-- req'd -->
<immediateSiteEvacuationReports/> <!-- req'd -->
<impactReports/> <!-- req'd -->
<manageCommandReports/> <!-- req'd -->
<materialReleaseReports/> <!-- req'd -->
<needEMSReports/> <!-- req'd -->
<needFireSuppressionReports/> <!-- req'd -->
<needLawEnforcementReports/> <!-- req'd -->
<needOtherServicesReports/> <!-- req'd -->
<needRescueServicesReports/> <!-- req'd -->
<networkConditionsReports><networkConditionsReport>
    <header> <!-- req'd -->
        <senderIncidentID>06123456</senderIncidentID>
    <basics>
        <incidentLoc>
            <crossStreetsPoint>
                <onStreetInfo>
                    <name>
                        Interstate 17
                    </name>
                </onStreetInfo>
                <atStreetInfo>
                    <prefix>W</prefix>
                    <name>
                        THOMAS
                    </name>
                    <suffix>RD</suffix>
                </atStreetInfo>
                <side>north</side>
                <localAdminAreaGroup>
                    PHX
                </localAdminAreaGroup>
            </crossStreetsPoint>
        </incidentLoc>
    </basics>
</networkConditionsReport>
</networkConditionsReports>
<estimate1>

```



```

                <percent>100</percent>
            </estimate1>
        <typeEvent>
            <AccidentsAndIncidents>
                MEDICAL EMERGENCY
            </AccidentsAndIncidents>
        </typeEvent>
    </basics>
    <issueTime>
        <timePoint>
            <date>20060830</date>
            <time>1133240000</time>
            <offset>-0700</offset>
        </timePoint>
        <count>2</count>
        <issueType>1</issueType>
    </issueTime>
    <updateTime>
        <date>20060830</date>
        <time>1513210310</time>
        <offset>-0700</offset>
    </updateTime>
    <urgency>1</urgency>
</header>
    <bundledATIS/>                                <!-- req'd -->
</networkConditionsReport></networkConditionsReports>
<placardsLabelsSignageReports/>                <!-- req'd -->
<preemptionUserDataReports/>                   <!-- req'd -->
<requestImmedAssistanceReports/>               <!-- req'd -->
<requestNetworkConditions/>                   <!-- req'd -->
<requestPhysicalAssets/>                       <!-- req'd -->
<requestPhysicalAssetStatus/>                 <!-- req'd -->
<requestPreemptionUserDataReports/>           <!-- req'd -->
<requestRouteAdviceReports/>                 <!-- req'd -->
<requestTrafficControlPlans/>                 <!-- req'd -->
<requestWorkZoneDataReports/>                 <!-- req'd -->
<resourceAssignmentReports/>                   <!-- req'd -->
<responseReports><responseReport>
    <header>
        <senderIncidentID>06123456</senderIncidentID>
    </header>
    <respOrgId>PHX</respOrgId>
    <respStatusOtherText>WF</respStatusOtherText>
    <respEquipTypOther>9995=5</respEquipTypOther>
    <respEquipTypOther>9996=2</respEquipTypOther>
    <respEquipTypOther>10085=1</respEquipTypOther>
    <respEquipTypOther>10076=3</respEquipTypOther>
    <respEquipTypOther>10084=2</respEquipTypOther>
</responseReport></responseReports>
<routeAdviceReports/>                            <!-- req'd -->

```



```

<sceneStagingReports/>                                <!-- req'd -->
<severityReports><severityReport>
  <header>
    <senderIncidentID>06123456</senderIncidentID>
  </header>
  <localSeverity>alarm=1</localSeverity>
</severityReport></severityReports>
<trackInvolvedPersonReports/>                          <!-- req'd -->
<trackInvolvedVehicleReports/>                         <!-- req'd -->
<trackResponsePersonnelReports/>                       <!-- req'd -->
<trackSpecialCircumstancesReports/>                    <!-- req'd -->
<trafficControlPlanReports/>                           <!-- req'd -->
<transitEventSourceReports/>                           <!-- req'd -->
<transitVehicleInvolvedReports/>                       <!-- req'd -->
<vehicleMAYDAYReports/>                                 <!-- req'd -->
<vehiclesDataReports/>                                  <!-- req'd -->
<watchForRequests/>                                    <!-- req'd -->
<watchForResponseReports/>                             <!-- req'd -->
<witnessStatementReports/>                             <!-- req'd -->
<workZoneDataReports/>                                 <!-- req'd -->
</idxSubParts>
</incidentDescription>
<iMWrapper>

```