



Data Pump User Guide

FleetOutlook | Data Pump User Guide

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Revision History:		
Version #	Revision Date	Details
0.1	10/20/2008	First draft, revised from older document.
0.2	10/21/2008	Sample web service call details
1.0	12/08/2008	Added Replay Messages operation details
2.0	10/05/2010	Updated with usage clarifications
3.0	10/2013	Updated for OBD and JBUS data
3.1	12/04/2013	Updated with Alert data
4.0	02/18/2014	Updated JBUS data. Added JBUSDTCEvent data.
4.1	05/2015	Updated Web Service tables with field types and descriptions
5.0	07/2015	Updated Jbus data for 8.2 FleetOutlook release
6.0	8/14/2015	Added example JbusEvents data to explain the “null” fields

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1 PURPOSE

This document explains the Data Pump Service. This service enables a customer to receive live event data for vehicles that have active devices reporting to FleetOutlook.

1.1 DOCUMENT SCOPE

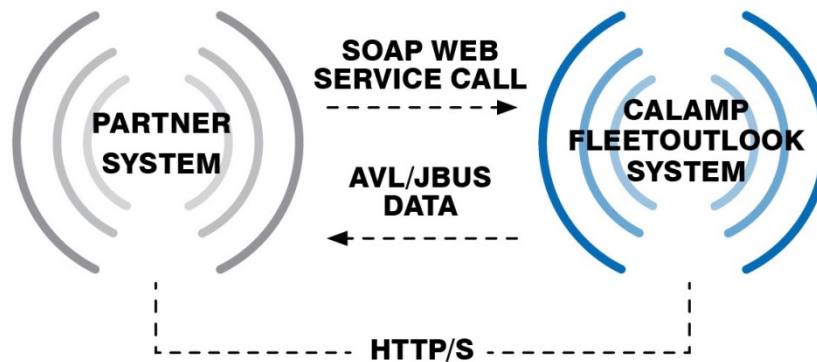
The document provides an overview of the Data Pump Service. The audience includes partners who need to interface and interact with the Data Pump Service.

2 DATA PUMP OVERVIEW

The Data Pump service is a standard SOAP messaging protocol in a web service executed over HTTP/S. The Data Pump service enables a read-only call to pull operational data from FleetOutlook directly to your business for use with third-party systems. The format of the response is an XML schema structure containing the most recent event messages.

Using the Data Pump service ensures that your entire enterprise receives intelligence about your fleet operations in a format that allows maximum use with the systems that manage your business.

Sample Data Returned		
AVL Data	OBD-II	J1708 and J1939 (JBUS) Data
Event Time	Odometer	Odometer
GPS Location (Latitude and Longitude)	Fuel Usage	Total Fuel
Event Address	Engine Hours	DTC
Speed		



2.1 DATA PUMP USAGE

CalAmp provides the Data Pump service to FleetOutlook customers who want an automated process to obtain live event message data from vehicles reporting periodically. This process enables customers to utilize the data within their own applications and reporting systems, in addition to employing the FleetOutlook application.

Each vehicle reporting to FleetOutlook sends an event message containing AVL and/or JBUS data such as speed, heading, odometer and input state. FleetOutlook processes these event messages and then plots the vehicle location history on tracking maps as well as generates alerts based on predefined conditions. The Data Pump service enables customers to retrieve the data from the raw event messages in a standard XML format.

The Customer System requests the data using a SOAP messaging protocol in a web service call. The SOAP messaging protocol enables communication between two systems using HTTP/S and XML. FleetOutlook temporarily stores the event messages for an entire enterprise in an enterprise specific queue until the Customer System enables a SOAP web service call (i.e., `getEvents`). FleetOutlook returns the event messages stored in the queue. Once pulled, an event message is no longer available in the queue.

2.2 AUTHENTICATION

The FleetOutlook SOAP web service requires WS-Security Username Token format where password type is PasswordText. The web service requires authentication in each call from the Customer System. Login credentials are sent in the SOAP header.

Note: CalAmp provides the login credentials to each Customer System. The login credentials are for the SOAP web service not for the FleetOutlook application.

2.3 DATA PUMP QUEUES

Each Customer System may have one or more queues depending on an enterprise's organizational needs. Each queue requires authentication at the time of a call using the WS-Security UsernameToken format, and each web service call is handled as an independent transaction. The polling frequency set by the Customer System is dependent on the enterprise size and number of active devices. CalAmp does not recommend invoking calls more than once per minute.

The Customer System defines the number of event messages returned for each call. If the parameter is not defined, the default number is 100 event messages.

2.4 CAPACITY

Currently, each queue is provisioned to hold approximately 25,000 event messages. All Customer System queues are stored on shared infrastructure and queue size is monitored for stability.

2.5 MONITORING

The CalAmp Network Operations Center (NOC) actively monitors the queues for all our Customer Systems. NOC alerts a Customer System when the number of event messages in a queue exceeds the threshold. Each Customer System has a grace period of four hours to begin invoking web service calls to retrieve event messages. In the event the grace period has expired and the Customer System's queue is still above threshold, CalAmp may delete undelivered event messages in a queue.

Note: The current monitoring system only allows CalAmp to remove all event messages stored in a queue. CalAmp cannot remove a subset of event messages.

Refer to [CalAmp Capacity Policies](#) for detailed information on event message storage and queue threshold.

2.5.1 CALAMP CAPACITY POLICIES

The Data Pump message queue is not a long-term storage container for an enterprise's event messages. The CalAmp NOC (Network Operations Center) monitors each queue. To ensure optimal performance, CalAmp adheres to the following procedures and policies.

- Event messages stored in a Customer System's queue are temporary. CalAmp expects each Customer System to pull event messages on a regular basis. Pulling frequency is dependent on enterprise size and number of active devices.
- CalAmp requests prior notification for any outage on the Customer System. Based on expected outage duration, CalAmp will adjust the queue threshold assigned to the Customer System.
- CalAmp's NOC (Network Operations Center) actively monitors all queues. In the event that a Customer System queue is above the threshold, NOC notifies the customer to pull event messages.
- In the event the Customer System is unresponsive to NOC alerts and queue continues to exceed, CalAmp may delete undelivered event messages stored in the queue and stop delivery of new messages to the queue.

3 WEB SERVICE CALLS

CalAmp supports two web service calls: `getEvents` and `getMessageCount`. `getEvents` enables the Customer System to pull a user-specified number of event messages from a queue. `getMessageCount` enables the Customer System to monitor the number of event messages currently in their queue. Additionally, `getMessageCount` enables the Customer System to ensure their queue does not grow to an excessive number.

WSDL Operation: `getEvents`

The `getEvents` WSDL operation does not require any additional input parameters; however, if you do not specify a number of event messages to pull, the default return number is 100.

Field	Description	Format	Optional
Messages	Number of messages to pull	Integer	Yes

WSDL Operation: `getMessageCount`

The `getMessageCount` WSDL operation does not require any additional input parameters.

4 FLEETOUTLOOK OUTPUT

FleetOutlook returns data in the web service call, `getEventsResponse`. The `getEventReponse` web service returns all AVLEvents, JBUSEvents, AlertEvents or JBUSDTCEvents, depending on the device capability and customer specific configurations.

WSDL Operation: `getEventsResponse`

AVLEvent

AVLEvent			
Field	Description	Source	Format
deviceId	Device ESN	Device	String
vehicleID	Look up from Vehicle > Vehicle ID field	FleetOutlook	String
vehicleVIN	Look up from Vehicle > VIN field	FleetOutlook	String
driverID	Look up from Vehicle > Driver ID field	FleetOutlook	String
event			
GMTTime	Location time of the event	Device	Date/Time
timeOffset	Offset from GMTTime to the enterprise's FleetOutlook configured time zone.	FleetOutlook	Integer
eventype	AVL events such as moving, stopped, etc.	Device	String
GPS			
GPSValidity	True or False. Indicates satellite fix.	Device	Boolean
latitude	GPS coordinates of AVLEvent	Device	Double
longitude		Device	Double
address	Reverse geocode of Latitude/Longitude coordinates	FleetOutlook	address
street			String
crossStreet			String
city			String
state			String
zip			String
country			String
telemetry			
vehicleSpeed	True speed reported for vehicles with an OBD-II or Jbus-enabled device. Otherwise, GPS speed is reported.	Device	Integer (MPH or KPH)
heading	Moving direction.	Device	Integer (Degrees from North)
odometer	True odometer reported for vehicles with an OBD-II or Jbus-enabled device. Otherwise, GPS odometer is reported.	Device	Double

engineHours	Calculated from Ignition On/Off events.	FleetOutlook	Double (Cumulative Hours: recorded plus seed from FleetOutlook Admin)
fuelUsage	Reported for vehicles with an OBD-II or Jbus-enabled device.	Device	Double (Cumulative Usage)
digitalIO			
pin	Input number that changed state (1-4). *For Jbus-enabled devices, input 4 is always used.	Device	Integer (1-4)
value	New state: High or Low (1 or 0)	Device	1 or 0
messageSeqID	Unique ID by enterprise Used to detect missing messages.	FleetOutlook	Long
messageDataID	Unique ID across the entire system. Used to troubleshoot message issues.	FleetOutlook	Long

WSDL Operation: getEventsResponse**JBUSEvent**

JBUSEvent				
Field	Description		Source	Format
GMTTime	Location time of the event	Every event	Device	DateTime
deviceID	Device ESN	Every event	Device	String
vehicleID	Look up from Vehicle > Vehicle ID field	Every event	FleetOutlook	String
vehicleVIN	Look up from Vehicle > VIN field	Every event	FleetOutlook	String
driverID	Look up from Vehicle > Driver ID field	Every event	FleetOutlook	String
GPS	Refer to GPS field in the AVLEvent table for fields and descriptions.			GPS
JBUSMessage				
JbusProtocol	Indicates either J1708 or J1939.	Every event	Device	String
VIN	Reported from Jbus	Daily	Device	String
Odometer	Latest reported odometer in x.x miles	Every event	Device	Double
High Res Odometer	Latest reported HR odometer in x.x miles	Every event	Device	Double
Battery voltage	Main battery reported in x.x volts	Hourly	Device	Double
Switched battery voltage	Regulated voltage supply reported in x.x volts	Hourly	Device	Double
Engine Speed	Null field. Not reported.	N/A	N/A	Null
Total Fuel	Lifetime reading of fuel consumed by the engine in x.x gallons	Every Event	Device	Double
Total Idle fuel	Reading of fuel consumed by the engine while not in motion in x.x gallons	Daily or 8 hours	Device	Double
Total Idle hours	Number of hours spent with the engine on while not in motion in x.x hours	Daily or 8 hours	Device	Double
Total Engine Hours	Lifetime reading of hours with engine on reported in x.x hours	Daily or 8 hours	Device	Double
Engine Coolant Temp	Reported in x.x degrees F	Hourly	Device	Integer
Engine Oil Temp	Reported in x.x degrees F	Hourly	Device	Double
Seat Belt Used	Null field. Not reported.	Hourly	N/A	Null

Note: Jbus PTO is reported in the digitalio field of the AVLEvent.

Note: Data is reported in such a manner that many fields may be null in a response because the device reports data at different times. For example, VIN is reported once a day, and all fields are null except the VIN field. Operating conditions are reported hourly, every 8 hours, or at the end of the day. Fields that are not scheduled to report will contain null values. [See Appendix H](#) for an example of the Data Pump output and reporting intervals.

WSDL Operation: **getEventsResponse** **AlertEvent**

AlertEvent			
Field	Description	Source	Format
transactionID	Internal ID	FleetOutlook	String
alertName	Name of alert as defined in FleetOutlook	FleetOutlook	String
alertType*	Three supported landmarks: Entering Landmark, Stopped at Landmark and Leaving Landmark	FleetOutlook	String
GMTTime	Time the conditions triggered the alert	Device	DateTime
group	Group defined in the alert configuration	FleetOutlook	String
deviceID	Device ESN	Device	String
vehicleID	Look up from Vehicle > Vehicle ID field	FleetOutlook	String
driverID	Look up from Vehicle > Driver ID field	FleetOutlook	String
address	Reverse geocoded address where the alert was triggered	FleetOutlook	String
landmarkName	Name of Landmark as defined in FleetOutlook	FleetOutlook	String
landmarkCategory	Landmark category as defined in FleetOutlook	FleetOutlook	String
stopTimeThreshold	Only for Stopped at Landmark. The amount of time the vehicle must stop at the landmark to trigger the alert	FleetOutlook	Integer (Minutes)

***Note:** Currently, FleetOutlook Data Pump supports the three alert types: Entering Landmark, Stopped at Landmark and Leaving Landmark.

WSDL Operation: getEventsResponse**JBUSDTCEvent**

JBUSDTCEvent			
Field	Description	Source	Format
GMTTime	Time the DTC event occurred. (device)	Device	DateTime
deviceId	Device ESN (Device)	Device	String
vehicleID	Lookup from Vehicle > Vehicle ID field	FleetOutlook	String
vehicleVIN	Lookup from Vehicle > VIN field	FleetOutlook	String
driverID	Lookup from Vehicle > Driver ID field	FleetOutlook	String
JBUSDTCTCMessage			
SPN	Suspect Parameter Number	Device	Integer (2-4 digits)
FMI	Failure Mode Identifier	Device	Integer (Single number between 0 and 31)
OC	Occurrence Count. Cumulative number of times the error occurred	Device	Integer

4.1 MESSAGE SEQUENCE

Each message has a unique Message ID (i.e., XML tag is <MessageDataID>). The Customer System uses the MessageDataID field to detect and remove duplicate event messages.

Each message also carries a per-company, non-decreasing consecutive number (Sequence Number) in a tag (i.e., XML tag is <MsgSeqID>). Using the sequence number, the Customer System can determine if any event message is missing. For example, MsgSeqID 708 is missing if the Customer System received MsgSeqID 707 and MsgSeqID 709.

APPENDIX A: FLEETOUTLOOK SAMPLE XML OUTPUT

```
<?xml version='1.0' encoding='UTF-8'?><wsdl:definitions xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/" xmlns:tns="http://calamp.com/DataFeedService/"
xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/" name="DataFeedService" targetNamespace="http://calamp.com/DataFeedService/">
  <wsdl:types>
    <xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
xmlns:tns="http://calamp.com/DataFeedService/" xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/"
targetNamespace="http://calamp.com/DataFeedService/">
      <xsd:element name="getMessagesRequest">
        <xsd:complexType>
          <xsd:sequence>
            <xsd:element minOccurs="0" name="messages" type="xsd:int"/>
          </xsd:sequence>
        </xsd:complexType>
      </xsd:element>
      <xsd:element name="getMessagesResponse">
        <xsd:complexType>
          <xsd:sequence>
            <xsd:element name="AlertEvents" nillable="true" type="xsd:int"/>
            <xsd:element name="AVLEvents" nillable="true" type="xsd:int"/>
            <xsd:element name="JBUSEvents" nillable="true" type="xsd:int"/>
            <xsd:element name="AlertEventList" nillable="true" type="tns:AlertEventList"/>
            <xsd:element name="AVLEventList" nillable="true" type="tns:AVLEventList"/>
            <xsd:element name="JBUSEventList" nillable="true" type="tns:JBUSEventList"/>
            <xsd:element name="errorMessage" nillable="true" type="xsd:string"/>
            <xsd:element name="JBUSDTCEvents" nillable="true" type="xsd:int"/>
            <xsd:element name="JBUSDTCEventList" nillable="true" type="tns:JBUSDTCEventList"/>
            <xsd:any maxOccurs="unbounded" minOccurs="0" processContents="skip"/>
          </xsd:sequence>
        </xsd:complexType>
      </xsd:element>
      <xsd:complexType name="AlertEventList">
        <xsd:sequence>
          <xsd:element maxOccurs="unbounded" minOccurs="0" name="AlertEvent" type="tns:AlertEvent"/>
        </xsd:sequence>
      </xsd:complexType>
      <xsd:complexType name="AVLEventList">
        <xsd:sequence>
          <xsd:element maxOccurs="unbounded" minOccurs="0" name="AVLEvent" type="tns:AVLEvent"/>
        </xsd:sequence>
      </xsd:complexType>
      <xsd:complexType name="JBUSDTCEventList">
        <xsd:sequence>
          <xsd:element maxOccurs="unbounded" minOccurs="0" name="JBUSDTCEvent" type="tns:JBUSDTCEvent"/>
        </xsd:sequence>
      </xsd:complexType>
      <xsd:complexType name="JBUSEventList">
        <xsd:sequence>
          <xsd:element maxOccurs="unbounded" minOccurs="0" name="JBUSEvent" type="tns:JBUSEvent"/>
        </xsd:sequence>
      </xsd:complexType>
      <xsd:complexType name="AlertEvent">
        <xsd:sequence>
          <xsd:element name="transactionId" nillable="true" type="xsd:string"/>
          <xsd:element name="alertName" nillable="true" type="xsd:string"/>
          <xsd:element name="alertType" nillable="true" type="xsd:string"/>
          <xsd:element name="GMTTime" nillable="true" type="xsd:dateTime"/>
          <xsd:element name="group" nillable="true" type="xsd:string"/>
          <xsd:element name="deviceId" nillable="true" type="xsd:string"/>
          <xsd:element name="vehicleID" nillable="true" type="xsd:string"/>
          <xsd:element name="driverID" nillable="true" type="xsd:string"/>
          <xsd:element name="address" nillable="true" type="xsd:string"/>
        </xsd:sequence>
      </xsd:complexType>
    </xsd:schema>
  </wsdl:types>

```

```

<xsd:element name="landmarkName" nillable="true" type="xsd:string"/>
<xsd:element name="landmarkCategory" nillable="true" type="xsd:string"/>
<xsd:element name="stopTimeThreshold" nillable="true" type="xsd:int"/>
<xsd:any maxOccurs="unbounded" minOccurs="0" processContents="skip"/>
</xsd:sequence>
</xsd:complexType>
<xsd:complexType name="AVLEvent">
<xsd:sequence>
<xsd:element name="deviceId" nillable="true" type="xsd:string"/>
<xsd:element name="vehicleID" nillable="true" type="xsd:string"/>
<xsd:element name="vehicleVIN" nillable="true" type="xsd:string"/>
<xsd:element name="driverID" nillable="true" type="xsd:string"/>
<xsd:element name="event" nillable="true" type="tns:event"/>
<xsd:element name="messageSeqID" nillable="true" type="xsd:long"/>
<xsd:element name="messageDataID" nillable="true" type="xsd:long"/>
<xsd:any maxOccurs="unbounded" minOccurs="0" processContents="skip"/>
</xsd:sequence>
</xsd:complexType>
<xsd:complexType name="event">
<xsd:sequence>
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<xsd:element name="address" nillable="true" type="tns:address"/>
<xsd:element name="telemetry" nillable="true" type="tns:telemetry"/>
<xsd:element name="digitalIO" nillable="true" type="tns:digitalIO"/>
<xsd:element name="speeding" nillable="true" type="tns:speeding"/>
<xsd:any maxOccurs="unbounded" minOccurs="0" processContents="skip"/>
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</xsd:sequence>
</xsd:complexType>
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<xsd:element name="crossStreet" nillable="true" type="xsd:string"/>
<xsd:element name="city" nillable="true" type="xsd:string"/>
<xsd:element name="state" nillable="true" type="xsd:string"/>
<xsd:element name="zip" nillable="true" type="xsd:string"/>
<xsd:element name="country" nillable="true" type="xsd:string"/>
<xsd:element name="POIName" nillable="true" type="xsd:string"/>
<xsd:element name="POIType" nillable="true" type="xsd:string"/>
<xsd:any maxOccurs="unbounded" minOccurs="0" processContents="skip"/>
</xsd:sequence>
</xsd:complexType>
<xsd:complexType name="telemetry">
<xsd:sequence>
<xsd:element name="vehicleSpeed" nillable="true" type="xsd:int"/>
<xsd:element name="heading" nillable="true" type="xsd:int"/>
<xsd:element name="odometer" nillable="true" type="xsd:double"/>
<xsd:element name="engineHours" nillable="true" type="xsd:double"/>
<xsd:element name="fuelUsage" nillable="true" type="xsd:double"/>
<xsd:any maxOccurs="unbounded" minOccurs="0" processContents="skip"/>
</xsd:sequence>
</xsd:complexType>
<xsd:complexType name="speeding">
<xsd:sequence>
<xsd:element name="speedingEventType" nillable="true" type="tns:speedingEventType"/>
<xsd:element name="speedingDuration" nillable="true" type="xsd:int"/>

```

```
<xsd:element name="maximumSpeed" nillable="true" type="xsd:int"/>
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</xsd:sequence>
</xsd:complexType>
<xsd:simpleType name="speedingEventType">
<xsd:restriction base="xsd:string">
<xsd:enumeration value="Begin"/>
<xsd:enumeration value="End"/>
</xsd:restriction>
</xsd:simpleType>
<xsd:complexType name="digitalIO">
<xsd:sequence>
<xsd:element name="pin" nillable="true" type="xsd:string"/>
<xsd:element name="value" nillable="true" type="xsd:string"/>
<xsd:any maxOccurs="unbounded" minOccurs="0" processContents="skip"/>
</xsd:sequence>
</xsd:complexType>
<xsd:complexType name="JBUSEvent">
<xsd:sequence>
<xsd:element name="GMTTime" nillable="true" type="xsd:dateTime"/>
<xsd:element name="deviceId" nillable="true" type="xsd:string"/>
<xsd:element name="vehicleID" nillable="true" type="xsd:string"/>
<xsd:element name="vehicleVIN" nillable="true" type="xsd:string"/>
<xsd:element name="driverID" nillable="true" type="xsd:string"/>
<xsd:element name="JBUSMessageList" nillable="true" type="tns:JBUSMessageList"/>
<xsd:any maxOccurs="unbounded" minOccurs="0" processContents="skip"/>
</xsd:sequence>
</xsd:complexType>
<xsd:complexType name="JBUSMessageList">
<xsd:sequence>
<xsd:element maxOccurs="2" name="JBUSMessage" type="tns:JBUSMessage"/>
</xsd:sequence>
</xsd:complexType>
<xsd:complexType name="JBUSMessage">
<xsd:sequence>
<xsd:element maxOccurs="1" name="jbusProtocol" nillable="true" type="tns:JBusProtocol"/>
<xsd:element name="vin" nillable="true" type="xsd:string"/>
<xsd:element name="odometer" nillable="true" type="xsd:double"/>
<xsd:element name="highResolutionOdometer" nillable="true" type="xsd:double"/>
<xsd:element name="batteryVoltage" nillable="true" type="xsd:double"/>
<xsd:element name="switchedBatteryVoltage" nillable="true" type="xsd:double"/>
<xsd:element name="engineSpeed" nillable="true" type="xsd:double"/>
<xsd:element name="totalFuel" nillable="true" type="xsd:double"/>
<xsd:element name="totalIdleFuel" nillable="true" type="xsd:double"/>
<xsd:element name="totalIdleHours" nillable="true" type="xsd:double"/>
<xsd:element name="totalEngineHours" nillable="true" type="xsd:double"/>
<xsd:element name="engineCoolantTemperature" nillable="true" type="xsd:int"/>
<xsd:element name="engineOilTemperature" nillable="true" type="xsd:double"/>
<xsd:element name="seatBeltUsed" nillable="true" type="xsd:boolean"/>
<xsd:any maxOccurs="unbounded" minOccurs="0" processContents="skip"/>
</xsd:sequence>
</xsd:complexType>
<xsd:simpleType name="JBusProtocol">
<xsd:restriction base="xsd:string">
<xsd:enumeration value="1708"/>
<xsd:enumeration value="1939"/>
</xsd:restriction>
</xsd:simpleType>
<xsd:complexType name="JBUSDTCEvent">
<xsd:sequence>
<xsd:element name="GMTTime" nillable="true" type="xsd:dateTime"/>
<xsd:element name="deviceId" nillable="true" type="xsd:string"/>
<xsd:element name="vehicleID" nillable="true" type="xsd:string"/>
<xsd:element name="vehicleVIN" nillable="true" type="xsd:string"/>
<xsd:element name="driverID" nillable="true" type="xsd:string"/>
<xsd:element name="JBUSDTCMessage" nillable="true" type="tns:JBUSDTCMessage"/>
```

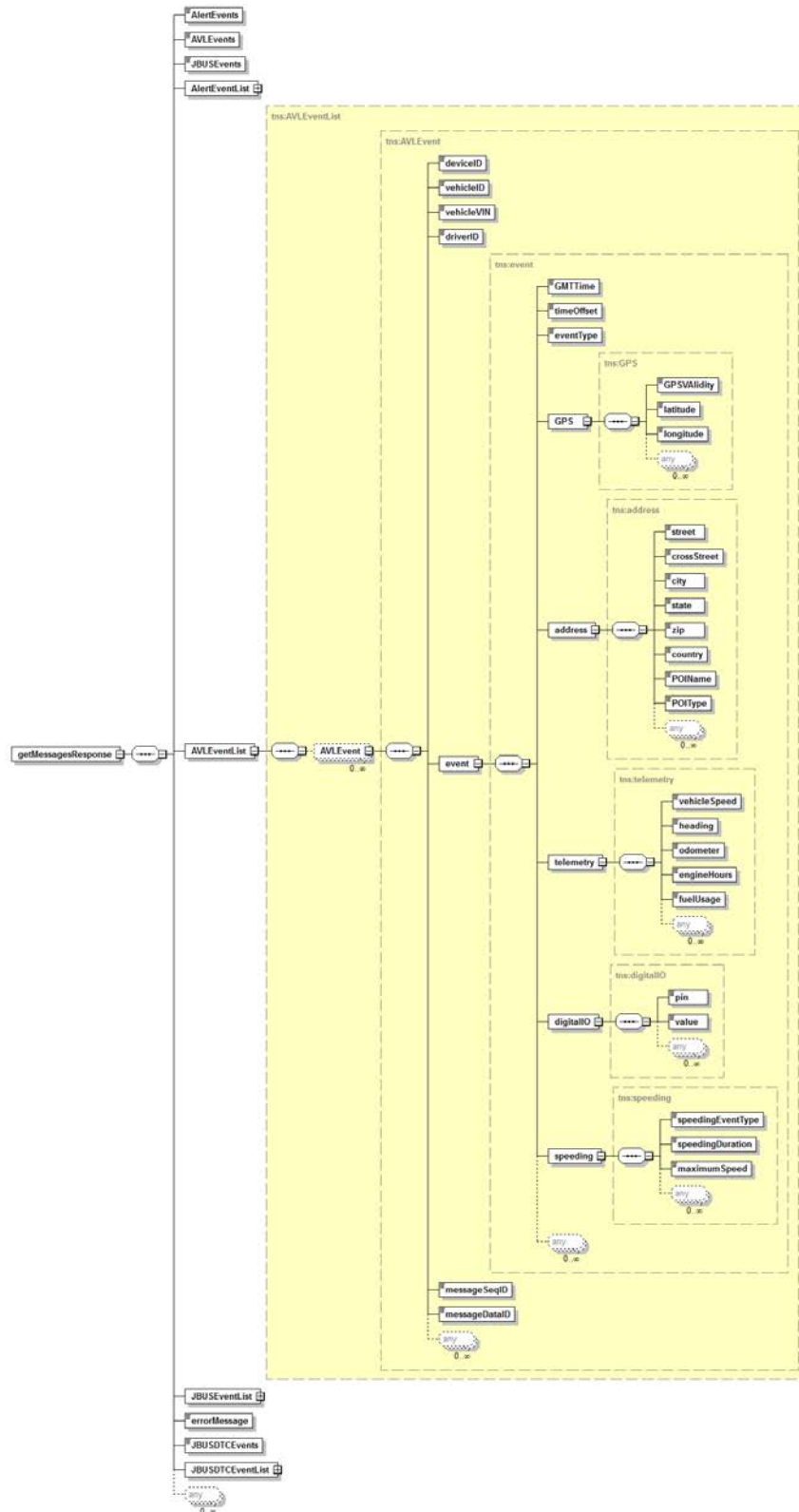
```

    <xsd:any maxOccurs="unbounded" minOccurs="0" processContents="skip"/>
  </xsd:sequence>
</xsd:complexType>
<xsd:complexType name="JBUSDTCMessage">
  <xsd:sequence>
    <xsd:element maxOccurs="1" name="SPN" nillable="true" type="xsd:int"/>
    <xsd:element maxOccurs="1" name="FMI" nillable="true" type="xsd:int"/>
    <xsd:element maxOccurs="1" name="OC" nillable="true" type="xsd:int"/>
    <xsd:any maxOccurs="unbounded" minOccurs="0" processContents="skip"/>
  </xsd:sequence>
</xsd:complexType>
<xsd:element name="getMessageCountRequest">
  <xsd:complexType/>
</xsd:element>
<xsd:element name="getMessageCountResponse">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element name="messageCount" nillable="true" type="xsd:long"/>
      <xsd:element name="errorMessage" nillable="true" type="xsd:string"/>
      <xsd:any maxOccurs="unbounded" minOccurs="0" processContents="skip"/>
    </xsd:sequence>
  </xsd:complexType>
</xsd:element>
</xsd:schema>
</wsdl:types>
<wsdl:message name="getMessagesResponse">
  <wsdl:part element="tns:getMessagesResponse" name="getMessagesResponse">
  </wsdl:part>
</wsdl:message>
<wsdl:message name="getMessageCountRequest">
  <wsdl:part element="tns:getMessageCountRequest" name="getMessageCountRequest">
  </wsdl:part>
</wsdl:message>
<wsdl:message name="getMessagesRequest">
  <wsdl:part element="tns:getMessagesRequest" name="getMessagesRequest">
  </wsdl:part>
</wsdl:message>
<wsdl:message name="getMessageCountResponse">
  <wsdl:part element="tns:getMessageCountResponse" name="getMessageCountResponse">
  </wsdl:part>
</wsdl:message>
<wsdl:portType name="DataFeedService">
  <wsdl:operation name="getMessages">
    <wsdl:input message="tns:getMessagesRequest">
    </wsdl:input>
    <wsdl:output message="tns:getMessagesResponse">
    </wsdl:output>
  </wsdl:operation>
  <wsdl:operation name="getMessageCount">
    <wsdl:input message="tns:getMessageCountRequest">
    </wsdl:input>
    <wsdl:output message="tns:getMessageCountResponse">
    </wsdl:output>
  </wsdl:operation>
</wsdl:portType>
<wsdl:binding name="DataFeedServiceServiceSoapBinding" type="tns:DataFeedService">
  <soap:binding style="document" transport="http://schemas.xmlsoap.org/soap/http"/>
  <wsdl:operation name="getMessages">
    <soap:operation soapAction="" style="document"/>
    <wsdl:input>
      <soap:body use="literal"/>
    </wsdl:input>
    <wsdl:output>
      <soap:body use="literal"/>
    </wsdl:output>
  </wsdl:operation>

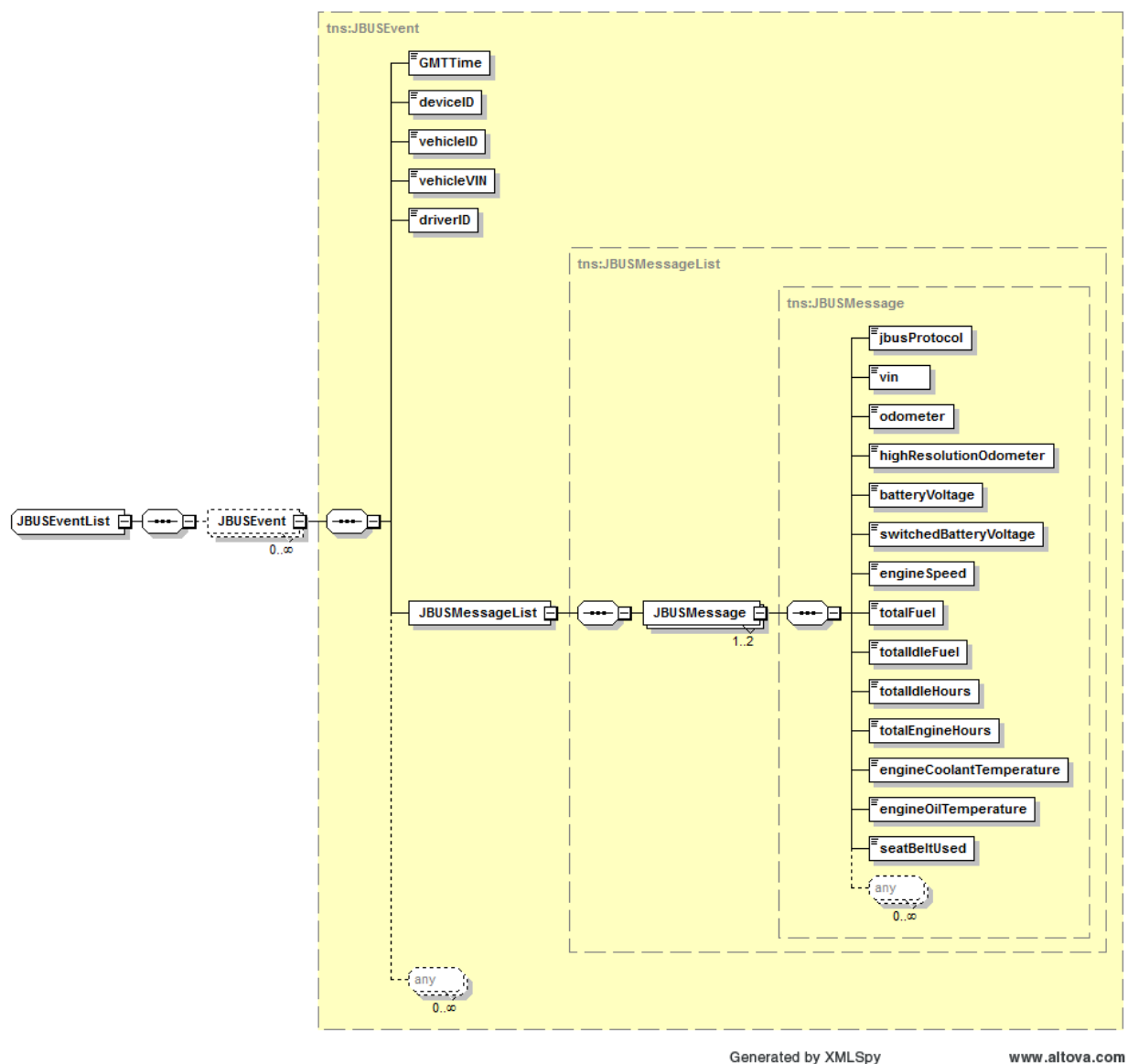
```

```
<wsdl:operation name="getMessageCount">
  <soap:operation soapAction="" style="document"/>
  <wsdl:input>
    <soap:body use="literal"/>
  </wsdl:input>
  <wsdl:output>
    <soap:body use="literal"/>
  </wsdl:output>
</wsdl:operation>
</wsdl:binding>
<wsdl:service name="DataFeedServiceService">
  <wsdl:port binding="tns:DataFeedServiceServiceSoapBinding" name="DataFeedServicePort">
    <soap:address location="http://qa.wrx-us.net/datafeedservice/1013/DataFeedService"/>
  </wsdl:port>
</wsdl:service>
</wsdl:definitions>
```

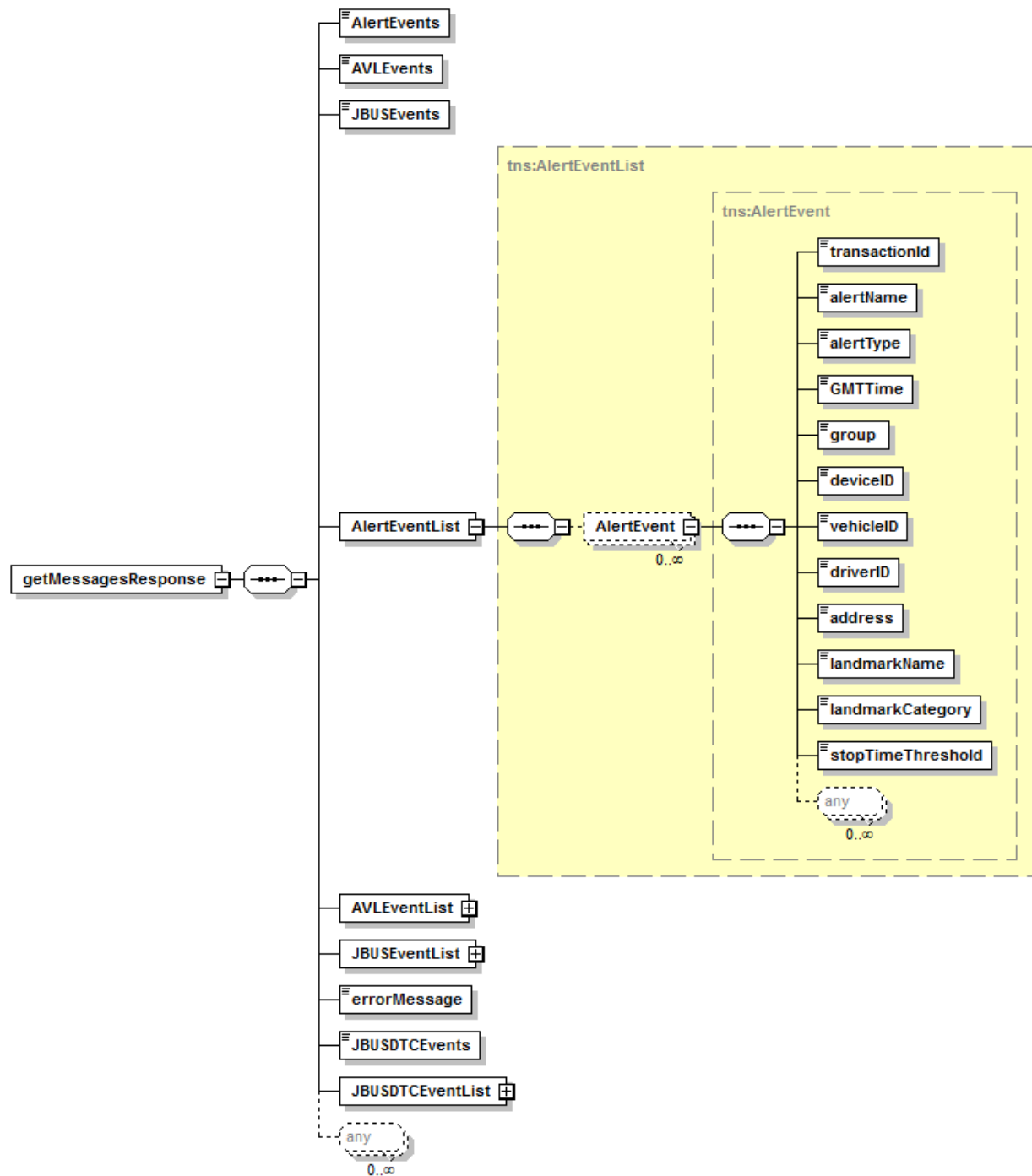
APPENDIX B: AVLEVENTS – XML OUTPUT DIAGRAM



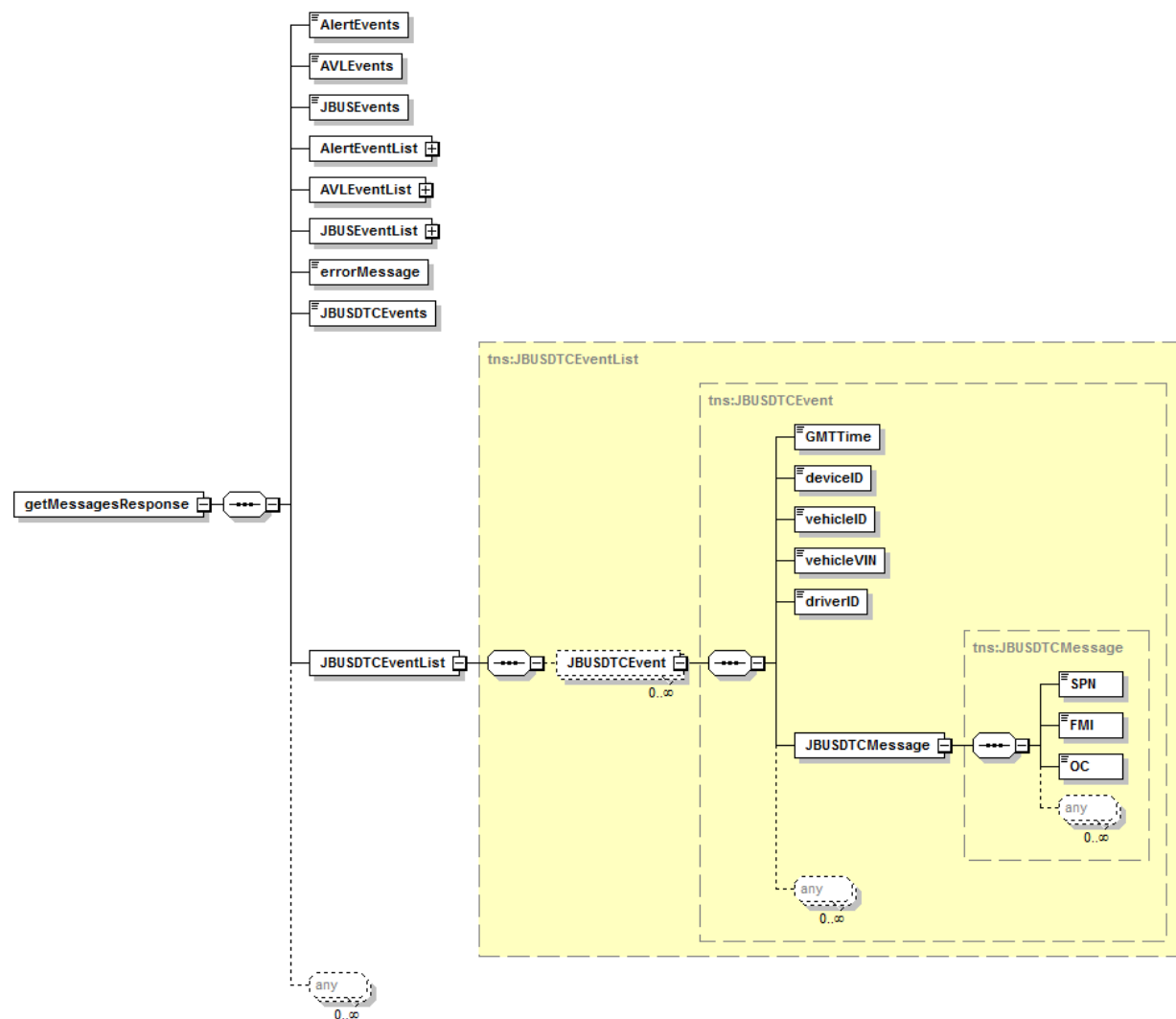
APPENDIX C: JBUSEVENTS – XML OUTPUT DIAGRAM



APPENDIX D: ALERTEVENTS – XML OUTPUT DIAGRAM



APPENDIX E: JBUSDTCEVENTS – XML OUTPUT DIAGRAM



APPENDIX F: SAMPLE WEB SERVICE CALL

```
<soapenv:Envelope xmlns:dat="http://calamp.com/DataFeedService/"
xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/">
  <soapenv:Header>
    <wsse:Security soapenv:mustUnderstand="1" xmlns:wsse="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-1.0.xsd"
xmlns:wsu="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-1.0.xsd">
      <wsse:UsernameToken wsu:Id="UsernameToken-1">
        <wsse:Username>Chase</wsse:Username>
        <wsse:Password Type="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-username-token-profile-1.0#PasswordText">password123</wsse:Password>
        <wsse:Nonce EncodingType="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-soap-message-security-1.0#Base64Binary">+QzImhlYMaV7+oLL1KGJaQ==</wsse:Nonce>
        <wsu:Created>2013-09-19T17:34:39.753Z</wsu:Created>
      </wsse:UsernameToken>
    </wsse:Security>
  </soapenv:Header>
  <soapenv:Body>
    <dat:getMessagesRequest>
      <!--Optional:-->
      <messages>1</messages>
    </dat:getMessagesRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

APPENDIX G: WSDL SAMPLE

Refer to the following WSDL link for assistance –

<http://www.wrx-us.net/datafeedservice/1013/DataFeedService?wsdl>

```
<?xml version='1.0' encoding='UTF-8'?><wsdl:definitions xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/" xmlns:tns="http://calamp.com/DataFeedService/"
xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/" name="DataFeedService"
targetNamespace="http://calamp.com/DataFeedService/">
  <wsdl:types>
    <xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
xmlns:tns="http://calamp.com/DataFeedService/" xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/"
targetNamespace="http://calamp.com/DataFeedService/">
      <xsd:element name="getMessagesRequest">
        <xsd:complexType>
          <xsd:sequence>
            <xsd:element minOccurs="0" name="messages" type="xsd:int"/>
          </xsd:sequence>
        </xsd:complexType>
      </xsd:element>
      <xsd:element name="getMessagesResponse">
        <xsd:complexType>
          <xsd:sequence>
            <xsd:element name="AlertEvents" nillable="true" type="xsd:int"/>
            <xsd:element name="AVLEvents" nillable="true" type="xsd:int"/>
            <xsd:element name="JBUSEvents" nillable="true" type="xsd:int"/>
            <xsd:element name="AlertEventList" nillable="true" type="tns:AlertEventList"/>
            <xsd:element name="AVLEventList" nillable="true" type="tns:AVLEventList"/>
            <xsd:element name="JBUSEventList" nillable="true" type="tns:JBUSEventList"/>
            <xsd:element name="errorMessage" nillable="true" type="xsd:string"/>
            <xsd:element name="JBUSDTCEvents" nillable="true" type="xsd:int"/>
            <xsd:element name="JBUSDTCEventList" nillable="true" type="tns:JBUSDTCEventList"/>
            <xsd:any maxOccurs="unbounded" minOccurs="0" processContents="skip"/>
          </xsd:sequence>
        </xsd:complexType>
      </xsd:element>
      <xsd:complexType name="AlertEventList">
        <xsd:sequence>
          <xsd:element maxOccurs="unbounded" minOccurs="0" name="AlertEvent" type="tns:AlertEvent"/>
        </xsd:sequence>
      </xsd:complexType>
      <xsd:complexType name="AVLEventList">
        <xsd:sequence>
          <xsd:element maxOccurs="unbounded" minOccurs="0" name="AVLEvent" type="tns:AVLEvent"/>
        </xsd:sequence>
      </xsd:complexType>
      <xsd:complexType name="JBUSDTCEventList">
        <xsd:sequence>
          <xsd:element maxOccurs="unbounded" minOccurs="0" name="JBUSDTCEvent"
type="tns:JBUSDTCEvent"/>
        </xsd:sequence>
      </xsd:complexType>
      <xsd:complexType name="JBUSEventList">
```

```

<xsd:sequence>
  <xsd:element maxOccurs="unbounded" minOccurs="0" name="JBUSEvent" type="tns:JBUSEvent"/>
</xsd:sequence>
</xsd:complexType>
<xsd:complexType name="AlertEvent">
  <xsd:sequence>
    <xsd:element name="transactionId" nillable="true" type="xsd:string"/>
    <xsd:element name="alertName" nillable="true" type="xsd:string"/>
    <xsd:element name="alertType" nillable="true" type="xsd:string"/>
    <xsd:element name="GMTTime" nillable="true" type="xsd:dateTime"/>
    <xsd:element name="group" nillable="true" type="xsd:string"/>
    <xsd:element name="deviceId" nillable="true" type="xsd:string"/>
    <xsd:element name="vehicleID" nillable="true" type="xsd:string"/>
    <xsd:element name="driverID" nillable="true" type="xsd:string"/>
    <xsd:element name="address" nillable="true" type="xsd:string"/>
    <xsd:element name="landmarkName" nillable="true" type="xsd:string"/>
    <xsd:element name="landmarkCategory" nillable="true" type="xsd:string"/>
    <xsd:element name="stopTimeThreshold" nillable="true" type="xsd:int"/>
    <xsd:any maxOccurs="unbounded" minOccurs="0" processContents="skip"/>
  </xsd:sequence>
</xsd:complexType>
<xsd:complexType name="AVLEvent">
  <xsd:sequence>
    <xsd:element name="deviceId" nillable="true" type="xsd:string"/>
    <xsd:element name="vehicleID" nillable="true" type="xsd:string"/>
    <xsd:element name="vehicleVIN" nillable="true" type="xsd:string"/>
    <xsd:element name="driverID" nillable="true" type="xsd:string"/>
    <xsd:element name="event" nillable="true" type="tns:event"/>
    <xsd:element name="messageSeqID" nillable="true" type="xsd:long"/>
    <xsd:element name="messageDataID" nillable="true" type="xsd:long"/>
    <xsd:any maxOccurs="unbounded" minOccurs="0" processContents="skip"/>
  </xsd:sequence>
</xsd:complexType>
<xsd:complexType name="event">
  <xsd:sequence>
    <xsd:element name="GMTTime" nillable="true" type="xsd:dateTime"/>
    <xsd:element name="timeOffset" nillable="true" type="xsd:int"/>
    <xsd:element name="eventType" nillable="true" type="xsd:string"/>
    <xsd:element name="GPS" nillable="true" type="tns:GPS"/>
    <xsd:element name="address" nillable="true" type="tns:address"/>
    <xsd:element name="telemetry" nillable="true" type="tns:telemetry"/>
    <xsd:element name="digitalIO" nillable="true" type="tns:digitalIO"/>
    <xsd:element name="speeding" nillable="true" type="tns:speeding"/>
    <xsd:any maxOccurs="unbounded" minOccurs="0" processContents="skip"/>
  </xsd:sequence>
</xsd:complexType>
<xsd:complexType name="GPS">
  <xsd:sequence>
    <xsd:element name="GPSValidity" nillable="true" type="xsd:boolean"/>
    <xsd:element name="latitude" nillable="true" type="xsd:double"/>
    <xsd:element name="longitude" nillable="true" type="xsd:double"/>
    <xsd:any maxOccurs="unbounded" minOccurs="0" processContents="skip"/>
  </xsd:sequence>
</xsd:complexType>

```

```
<xsd:complexType name="address">
  <xsd:sequence>
    <xsd:element name="street" nillable="true" type="xsd:string"/>
    <xsd:element name="crossStreet" nillable="true" type="xsd:string"/>
    <xsd:element name="city" nillable="true" type="xsd:string"/>
    <xsd:element name="state" nillable="true" type="xsd:string"/>
    <xsd:element name="zip" nillable="true" type="xsd:string"/>
    <xsd:element name="country" nillable="true" type="xsd:string"/>
    <xsd:element name="POIName" nillable="true" type="xsd:string"/>
    <xsd:element name="POIType" nillable="true" type="xsd:string"/>
    <xsd:any maxOccurs="unbounded" minOccurs="0" processContents="skip"/>
  </xsd:sequence>
</xsd:complexType>
<xsd:complexType name="telemetry">
  <xsd:sequence>
    <xsd:element name="vehicleSpeed" nillable="true" type="xsd:int"/>
    <xsd:element name="heading" nillable="true" type="xsd:int"/>
    <xsd:element name="odometer" nillable="true" type="xsd:double"/>
    <xsd:element name="engineHours" nillable="true" type="xsd:double"/>
    <xsd:element name="fuelUsage" nillable="true" type="xsd:double"/>
    <xsd:any maxOccurs="unbounded" minOccurs="0" processContents="skip"/>
  </xsd:sequence>
</xsd:complexType>
<xsd:complexType name="speeding">
  <xsd:sequence>
    <xsd:element name="speedingEventType" nillable="true" type="tns:speedingEventType"/>
    <xsd:element name="speedingDuration" nillable="true" type="xsd:int"/>
    <xsd:element name="maximumSpeed" nillable="true" type="xsd:int"/>
    <xsd:any maxOccurs="unbounded" minOccurs="0" processContents="skip"/>
  </xsd:sequence>
</xsd:complexType>
<xsd:simpleType name="speedingEventType">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="Begin"/>
    <xsd:enumeration value="End"/>
  </xsd:restriction>
</xsd:simpleType>
<xsd:complexType name="digitalIO">
  <xsd:sequence>
    <xsd:element name="pin" nillable="true" type="xsd:string"/>
    <xsd:element name="value" nillable="true" type="xsd:string"/>
    <xsd:any maxOccurs="unbounded" minOccurs="0" processContents="skip"/>
  </xsd:sequence>
</xsd:complexType>
<xsd:complexType name="JBUSEvent">
  <xsd:sequence>
    <xsd:element name="GMTTime" nillable="true" type="xsd:dateTime"/>
    <xsd:element name="deviceId" nillable="true" type="xsd:string"/>
    <xsd:element name="vehicleID" nillable="true" type="xsd:string"/>
    <xsd:element name="vehicleVIN" nillable="true" type="xsd:string"/>
    <xsd:element name="driverID" nillable="true" type="xsd:string"/>
    <xsd:element name="JBUSMessageList" nillable="true" type="tns:JBUSMessageList"/>
    <xsd:any maxOccurs="unbounded" minOccurs="0" processContents="skip"/>
  </xsd:sequence>
```

```

</xsd:complexType>
<xsd:complexType name="JBUSMessageList">
  <xsd:sequence>
    <xsd:element maxOccurs="2" name="JBUSMessage" type="tns:JBUSMessage"/>
  </xsd:sequence>
</xsd:complexType>
<xsd:complexType name="JBUSMessage">
  <xsd:sequence>
    <xsd:element maxOccurs="1" name="jbusProtocol" nillable="true" type="tns:JBusProtocol"/>
    <xsd:element name="vin" nillable="true" type="xsd:string"/>
    <xsd:element name="odometer" nillable="true" type="xsd:double"/>
    <xsd:element name="highResolutionOdometer" nillable="true" type="xsd:double"/>
    <xsd:element name="batteryVoltage" nillable="true" type="xsd:double"/>
    <xsd:element name="switchedBatteryVoltage" nillable="true" type="xsd:double"/>
    <xsd:element name="engineSpeed" nillable="true" type="xsd:double"/>
    <xsd:element name="totalFuel" nillable="true" type="xsd:double"/>
    <xsd:element name="totalIdleFuel" nillable="true" type="xsd:double"/>
    <xsd:element name="totalIdleHours" nillable="true" type="xsd:double"/>
    <xsd:element name="totalEngineHours" nillable="true" type="xsd:double"/>
    <xsd:element name="engineCoolantTemperature" nillable="true" type="xsd:int"/>
    <xsd:element name="engineOilTemperature" nillable="true" type="xsd:double"/>
    <xsd:element name="seatBeltUsed" nillable="true" type="xsd:boolean"/>
    <xsd:any maxOccurs="unbounded" minOccurs="0" processContents="skip"/>
  </xsd:sequence>
</xsd:complexType>
<xsd:simpleType name="JBusProtocol">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="1708"/>
    <xsd:enumeration value="1939"/>
  </xsd:restriction>
</xsd:simpleType>
<xsd:complexType name="JBUSDTCEvent">
  <xsd:sequence>
    <xsd:element name="GMTTime" nillable="true" type="xsd:dateTime"/>
    <xsd:element name="deviceId" nillable="true" type="xsd:string"/>
    <xsd:element name="vehicleID" nillable="true" type="xsd:string"/>
    <xsd:element name="vehicleVIN" nillable="true" type="xsd:string"/>
    <xsd:element name="driverID" nillable="true" type="xsd:string"/>
    <xsd:element name="JBUSDTCMessage" nillable="true" type="tns:JBUSDTCMessage"/>
    <xsd:any maxOccurs="unbounded" minOccurs="0" processContents="skip"/>
  </xsd:sequence>
</xsd:complexType>
<xsd:complexType name="JBUSDTCMessage">
  <xsd:sequence>
    <xsd:element maxOccurs="1" name="SPN" nillable="true" type="xsd:int"/>
    <xsd:element maxOccurs="1" name="FMI" nillable="true" type="xsd:int"/>
    <xsd:element maxOccurs="1" name="OC" nillable="true" type="xsd:int"/>
    <xsd:any maxOccurs="unbounded" minOccurs="0" processContents="skip"/>
  </xsd:sequence>
</xsd:complexType>
<xsd:element name="getMessageCountRequest">
  <xsd:complexType/>
</xsd:element>
<xsd:element name="getMessageCountResponse">

```

```
<xsd:complexType>
  <xsd:sequence>
    <xsd:element name="messageCount" nillable="true" type="xsd:long"/>
    <xsd:element name="errorMessage" nillable="true" type="xsd:string"/>
    <xsd:any maxOccurs="unbounded" minOccurs="0" processContents="skip"/>
  </xsd:sequence>
</xsd:complexType>
</xsd:element>
</xsd:schema>
</wsdl:types>
<wsdl:message name="getMessagesResponse">
  <wsdl:part element="tns:getMessagesResponse" name="getMessagesResponse">
  </wsdl:part>
</wsdl:message>
<wsdl:message name="getMessageCountRequest">
  <wsdl:part element="tns:getMessageCountRequest" name="getMessageCountRequest">
  </wsdl:part>
</wsdl:message>
<wsdl:message name="getMessagesRequest">
  <wsdl:part element="tns:getMessagesRequest" name="getMessagesRequest">
  </wsdl:part>
</wsdl:message>
<wsdl:message name="getMessageCountResponse">
  <wsdl:part element="tns:getMessageCountResponse" name="getMessageCountResponse">
  </wsdl:part>
</wsdl:message>
<wsdl:portType name="DataFeedService">
  <wsdl:operation name="getMessages">
    <wsdl:input message="tns:getMessagesRequest">
    </wsdl:input>
    <wsdl:output message="tns:getMessagesResponse">
    </wsdl:output>
  </wsdl:operation>
  <wsdl:operation name="getMessageCount">
    <wsdl:input message="tns:getMessageCountRequest">
    </wsdl:input>
    <wsdl:output message="tns:getMessageCountResponse">
    </wsdl:output>
  </wsdl:operation>
</wsdl:portType>
<wsdl:binding name="DataFeedServiceServiceSoapBinding" type="tns:DataFeedService">
  <soap:binding style="document" transport="http://schemas.xmlsoap.org/soap/http"/>
  <wsdl:operation name="getMessages">
    <soap:operation soapAction="" style="document"/>
    <wsdl:input>
      <soap:body use="literal"/>
    </wsdl:input>
    <wsdl:output>
      <soap:body use="literal"/>
    </wsdl:output>
  </wsdl:operation>
  <wsdl:operation name="getMessageCount">
    <soap:operation soapAction="" style="document"/>
    <wsdl:input>
```

```
<soap:body use="literal"/>
</wsdl:input>
<wsdl:output>
  <soap:body use="literal"/>
</wsdl:output>
</wsdl:operation>
</wsdl:binding>
<wsdl:service name="DataFeedServiceService">
  <wsdl:port binding="tns:DataFeedServiceServiceSoapBinding" name="DataFeedServicePort">
    <soap:address location="http://www.wrx-us.net/datafeedservice/1013/DataFeedService"/>
  </wsdl:port>
</wsdl:service>
</wsdl:definitions>
```

APPENDIX H: JBUS EVENTS DATA SAMPLE

JBUSMessageID	JBUSId	BatteryVoltage	EngineCoolantTemperature	EngineOilTemperature	EngineSpeed	HighResolutionOdometer	JBUSProtocol	Odometer	SeatBeltUsed	SwitchedBatteryVoltage	TotalEngineHours	TotalFuel	TotalIdleFuel	TotalIdleHours	VIN	Hourly
888	444	NULL	NULL	NULL	NULL	NULL	Item1939	NULL	NULL	NULL	7057.65	NULL	17238	411.2		Daily
882	441	NULL	NULL	NULL	NULL	NULL	Item1939	NULL	NULL	NULL	NULL	NULL	NULL	NULL	*****	VIN
880	440	NULL	NULL	NULL	NULL	NULL	Item1939	NULL	NULL	NULL	NULL	NULL	NULL	NULL	*****	VIN
878	439	NULL	NULL	NULL	NULL	NULL	Item1939	NULL	NULL	NULL	7057.1	NULL	17236	411.1		Daily
876	438	12.95	88	100	NULL	NULL	Item1939	NULL	NULL	NULL	NULL	NULL	NULL	NULL		hourly
874	437	NULL	NULL	NULL	NULL	NULL	Item1939	NULL	NULL	NULL	7056.9	NULL	17235	411.1		Daily
872	436	NULL	NULL	NULL	NULL	NULL	Item1939	NULL	NULL	NULL	7056.5	NULL	17233.5	411		Daily
870	435	NULL	NULL	NULL	NULL	NULL	Item1939	NULL	NULL	NULL	7055.95	NULL	17232.5	411		Daily
868	434	NULL	NULL	NULL	NULL	NULL	Item1939	NULL	NULL	NULL	7055.5	NULL	17231	411		Daily
866	433	14.1	90	106	NULL	NULL	Item1939	NULL	NULL	NULL	NULL	NULL	NULL	NULL		hourly
864	432	NULL	NULL	NULL	NULL	NULL	Item1939	NULL	NULL	NULL	NULL	NULL	NULL	NULL	GEDR2DLBX	VIN
862	431	14.15	90	107	NULL	NULL	Item1939	NULL	NULL	NULL	NULL	NULL	NULL	NULL		hourly
860	430	NULL	NULL	NULL	NULL	NULL	Item1939	NULL	NULL	NULL	NULL	NULL	NULL	NULL	GEDR2DLBX	VIN
858	429	NULL	NULL	NULL	NULL	NULL	Item1939	NULL	NULL	NULL	7053.35	NULL	17227.5	410.9		Daily
856	428	NULL	NULL	NULL	NULL	NULL	Item1939	NULL	NULL	NULL	7053.3	NULL	17227	410.9		Daily
854	427	NULL	NULL	NULL	NULL	NULL	Item1939	NULL	NULL	NULL	7053.15	NULL	17226.5	410.9		Daily
852	426	14.1	89	107	NULL	NULL	Item1939	NULL	NULL	NULL	NULL	NULL	NULL	NULL		hourly
850	425	NULL	NULL	NULL	NULL	NULL	Item1939	NULL	NULL	NULL	7051.45	NULL	17222	410.8		Daily
848	424	NULL	NULL	NULL	NULL	NULL	Item1939	NULL	NULL	NULL	7050.75	NULL	17217.5	410.7		Daily
846	423	NULL	NULL	NULL	NULL	NULL	Item1939	NULL	NULL	NULL	7050.6	NULL	17217	410.7		Daily
844	422	NULL	NULL	NULL	NULL	NULL	Item1939	NULL	NULL	NULL	7050.25	NULL	17216.5	410.7		Daily
842	421	NULL	NULL	NULL	NULL	NULL	Item1939	NULL	NULL	NULL	7049.85	NULL	17216	410.6		Daily
840	420	NULL	NULL	NULL	NULL	NULL	Item1939	NULL	NULL	NULL	NULL	NULL	NULL	NULL	GEDR2DLBX	VIN
838	419	NULL	NULL	NULL	NULL	NULL	Item1939	NULL	NULL	NULL	7049.45	NULL	17214.5	410.6		Daily
836	418	14.15	90	107	NULL	NULL	Item1939	NULL	NULL	NULL	NULL	NULL	NULL	NULL		hourly
834	417	NULL	NULL	NULL	NULL	NULL	Item1939	NULL	NULL	NULL	NULL	NULL	NULL	NULL	GEDR2DLBX	VIN
828	414	NULL	NULL	NULL	NULL	NULL	Item1939	NULL	NULL	NULL	9548.65	NULL	14909	509.35		Daily