



Globalstar Back Office-to-Customer Interface Control Document

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IMPORTANT:

This document and its related reference documents contain technical information and descriptions of the Globalstar system and customer fulfillment process that reflect the status of the system and processes as of the date of issue. The content of this document and its related reference documents are subject to change without notice and no warranty or representation, expressed or implied, is made with respect to its content.

DOCUMENT CHANGE RECORD

| REV | Description of Change | Date | Author |
|-----|---|-------------|----------------------|
| 18 | New Logo | 23-Nov-2010 | J.Crowley |
| 19 | Fixed XML examples by replacing smartquotes with standard quotes, and removing extra erroneous spaces | 21-Feb-2012 | J.Crowley, R.Charles |
| 20 | Added Provisioning Response example | 07-Mar-2012 | R.Charles |
| 21 | Typo corrections | 11-Dec-2013 | R.Charles |
| 22 | SMTP route clarifications. Removed messageID from Provisioning route example as it is not supported. | 12-Mar-2015 | R.Charles |
| 23 | Updated site references | 23-Apr-2015 | R.Charles |
| 24 | Updated unixTime definition to reflect that it is actually GPS time. | 06-Nov-2015 | R.Charles |
| 25 | Updated IP addresses Removed Active Mode FTP | 31-Aug-2022 | R.Charles |
| 26 | Specified max timeout | 25-Jul-2023 | R.Charles |
| 27 | Added SSL certificate specifications Updated formatting | 15-May-2024 | R.Charles |
| 28 | Add new ackMessages definition. | 20-Jan-2025 | E. Silva |

1. Introduction

1.1 Scope

This document identifies and describes the hardware and software interfaces between the Globalstar Back Office (BOF) and Customer. The BOF-Customer interface described in this document is the electronic interface.

- Chapter 2 describes other documents relevant to this interface.
- Chapter 3 describes the hardware interfaces between the BOF and the Customer.
- Chapter 4 summarizes the message transfer methods and management.
- Chapter 5 describes the data elements transferred from the BOF to the Customer.
- Chapter 6 describes the data elements transferred from the Customer to the BOF.
- Appendix A contains examples of the messages and XSD
- Appendix B contains the examples of the response messages and XSD

1.2 HTTP/HTTPS, SMTP, or FTP Interfaces

Messages can be transferred between the BOF and the Customer by HTTP/HTTPS, or File Transport Protocol (FTP). **SMTP is only available for Provisioning messages and demo accounts.**

1.3 Acronyms

The following acronyms and abbreviations are applicable to the document.

| Acronym/Abbreviation | Description |
|-----------------------------|---|
| ASCII | American Standard Code of Information Interface |
| BOF | Back Office |
| DTD | Document Type Definition |
| XSD | XML Schema Definition |
| ESN | Electronic Serial Number |
| FTP | File Transport Protocol |
| GOCC | Ground Operations Control Center |
| GWID | Gateway Identifier |
| HTTP | hyper text transport protocol |
| HTTPS | secure hyper text transport protocol |
| ICD | Interface Control Document |
| ID | Identifier |
| LSB | Least Significant Bit |
| MSB | Most Significant Bit |
| N/A | Not Applicable |
| SMTP | Simple Mail Transport Protocol |
| TBR | To Be Resolved |
| UUID | Universal Unique Identifier |
| XML | Extended Markup Language |
| UMN | Unique Message Number |

2. Applicable Documents

The following documents of latest revision contain material relevant to this document.

| Reference | Title |
|------------------|--|
| GS-01-0768 | <i>Simplex Remote Telemetry Systems Requirements Document</i> |
| --- | <i>HTTP -1.1: RFC 2616 (www.ietf.org/rfc/rfc2616.txt)</i> |
| --- | <i>XML 1.0: W3C (www.w3.org/TR/REC-xml)</i> |
| --- | <i>UUID (www.opengroup.org/onlinepubs/9629399/apdxa.htm)</i> |
| --- | <i>SMTP RFC 2821 (http://www.faqs.org/rfcs/rfc2821.html)</i> |

3. Hardware Interface Description

This chapter describes the hardware interface between the BOF and Customer.

The BOF and the Customer shall connect by HTTP/HTTPS, SMTP (Provisioning/Demo only), or FTP. Only one of these methods shall be used for the interface.

3.1 Back Office to VAR HTTP/HTTPS Interface

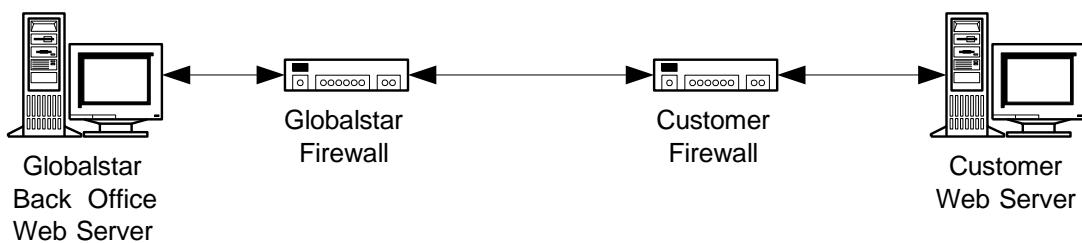
If the Globalstar Back Office connects to the Customer via HTTP or HTTPS, then hardware on each side of the interface shall support standard Internet connections. Specifically, Globalstar shall connect to customer through HTTP/HTTPS connection to the customer, which should be any HTTP/HTTS compatible web server.

The default port shall be used for HTTP connection unless otherwise specified by the customer. This also holds true for HTTPS connections, the default port will be used unless otherwise noted.

The maximum timeout the Back Office will wait for a response from the customer side is 15 seconds. This is true for both HTTP/S and FTP connections.

Conceptually the connection shall be as shown in Figure-1.

Figure-1
Back Office to Customer HTTP/HTTPS Interface

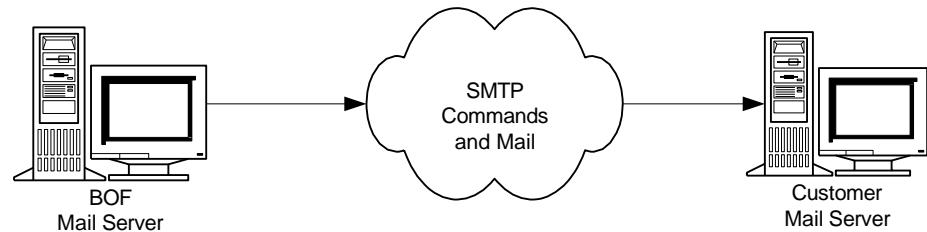


3.2 Back Office to VAR email Interface (Provisioning Only)

If the Globalstar Back Office connects to the Customer by email, Globalstar and the Customer shall establish Simple Mail Transfer Protocol (SMTP) client/server relationships for the transfer of messages.

Conceptually this connection shall be as shown in Figure-2

Figure-2
Back Office to Customer email Interface

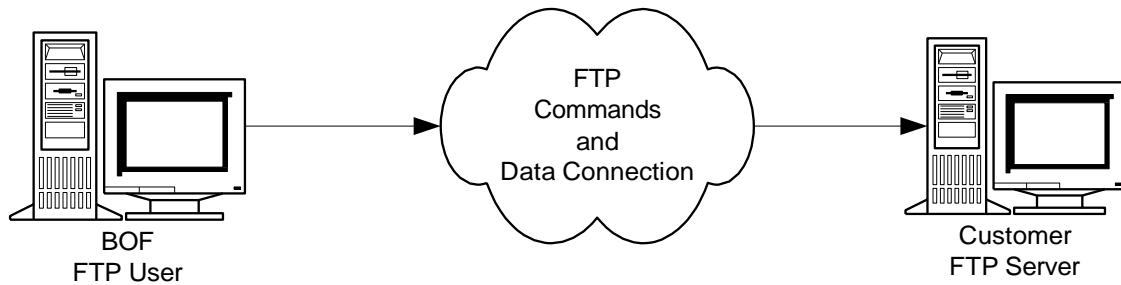


3.3 Back Office to VAR FTP Interface

If the Globalstar Back Office communicates with the Customer by FTP, Globalstar and the Customer shall establish FTP user/server relationships for the transfer of messages. SFTP is not supported at this time.

Conceptually this connection shall be as shown in Figure-3

Figure-3
Back Office to Customer FTP Interface



4. Software Interface Description

This chapter describes the interface used to transfer data between the BOF and Customer. The data elements that are exchanged between the two are described in Chapters 5 and 6.

4.1 HTTP/HTTPS Message Transfers

4.1.1 SSL Certificate

- Self-signed certificates are not supported.
- Certificates must come from a recognized Certificate Authority.
- Certificates must be valid.

4.1.2 HTTP/HTTPS MESSAGE TRANSFER METHOD

Messages transferred between the BOF and Customer may use a standard HTTP/HTTPS connection. HTTP is used as the transport mechanism since it provides access through firewalls. The BOF web server will establish a connection, send an XML message, and after the BOF receives a response from the Customer web server, the BOF web server shall terminate the connection. HTTPS is the preferred method for message transfer if security is concern to VAR.

The BOF shall send either one message or a packet of several messages during a single HTTP connection. Customer will send a response message to indicate that a complete message was received. If the BOF does not receive a valid response, the BOF will move the VAR to offline status. It will then begin to “ping” the offline VAR by sending empty messages until it receives the correct response. Once a valid response is received, the route will be placed back online and message delivery will resume.

The HTTP/XML interface will use the standard HTTP/1.1 web protocol and XML content to send and receive data. For XML responses, the appropriate HTTP status code and appropriate XML entity body are required.

Changes to the ICD are possible in the future. To ensure proper operation between client and server, the XSD (XML Schema Definition) will specify the Revision of the XML message body.

4.1.3 URL CONNECTION SETUP

In accordance with the HTTP protocol, the BOF shall use the following flags when setting the connection:

UseCaches = false Indicates that no cache should be used at the client side.

DoOutput = true By setting the DoOutput flag to true, the URL connection can be used for output.

4.1.4 RESPONSE/REQUEST SPECIFICATION

The basic format of the HTTP POST to the customer is defined below: (note that the Request-URI, Hostname, and Content-Length will change based on Customer and message.)

Syntax: Send Messages

HTTP Method: POST

Function: Send a batch of data modem messages to a customer.

Response Format: XML

Make sure to use the correct Accept and Content-Type headers as text/xml. The application/xml is not supported.

Request:

```
POST <Customer-Request-URI> HTTP/1.1
Host <Customer-hostname>
Accept: text/xml
Content-Type: text/xml
Content-Length: 123xxx

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

Response

```
HTTP/1.1 200 OK
Content-Type: text/xml
Content-Length: xxxxx

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

Response (prvResponseMsg)

HTTP/1.1 200 OK

Content-Type: text/xml

Content-Length: xxxxx

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

Sample messages are in Appendix A.

4.1.5 IP ADDRESSES

Globalstar maintains redundant facilities for increased system reliability. Therefore, the connection from Globalstar to Customer may come from one of four possible IP addresses.

The initial IP addresses to be used are in Table-1. The VAR Certification Application, GS-09-1303, may identify additional IP addresses or address ranges, which need to have access through the VAR firewall. If there are any questions regarding IP addresses, contact Globalstar VAR Support at varsupport@globalstar.com.

Table-1 IP Addresses

| Location | IP Address |
|-----------------------------------|---|
| Globalstar Datacenter Back Office | 3.228.87.237 34.231.245.76 3.135.136.171 3.133.245.206 |

4.2 Email Message Transfer Method

This delivery method is only supported for Provisioning messages and demo accounts.

Messages transferred between the BOF and the Customer may use a standard SMTP connection. The BOF, acting as an SMTP client, shall establish a connection to the Customer, acting as an SMTP server.

The BOF shall send either one message or a packet of several messages in a single email message. No response message from the Customer is expected; the BOF will assume the message(s) is delivered.

4.3 FTP Message Transfer Method

Messages transferred between the BOF and the Customer may use a standard FTP connection. The BOF, acting as an FTP User, shall establish a connection to the Customer, acting as an FTP Server.

Active FTP servers are NOT supported. Only Passive mode FTP servers are supported, and the server ports must be below 65,000.

The BOF shall send either one message or a packet of several messages during a single FTP file transfer. No XML response message from the Customer is expected; the BOF will assume FTP is successful upon receipt of a standard transfer complete response from the FTP server.

The naming convention used for files transferred by the BOF to the customer shall be one of the following forms:

<messageID>.xml

or

tmp.<any>

The first form is used as the standard name for the file.

The second form, the filename pre-pended with “tmp.”, is provided to allow for files that are not ready for consumption. **Do not process any file that begins with “tmp.”.** Any file that does not have the “tmp.” prefix will be assumed to be ready for processing.

The messageID is a unique message identifier attached to each message sent by the BOF. The messageID is defined in paragraph 5.2.

The BOF will not execute a change of directory. The ‘home’ directory of the user provided is where messages will be delivered.

5. BOF Data Element Descriptions

5.1 BOF-Customer Interface Summary

This chapter describes the information the BOF may transfer to Customer. A description is given for each BOF data element that is transferred or referenced through this interface. From Revision 13, BOF will support multiple formats of messages to serve the previously described scenarios.

The description of each data element contains the following information:

- a. *Name*: A unique identifier for each data element.
- b. *Description*: A textual description of what each element is or represents.
- c. *Issues*: Questions or open issues regarding this data element
- d. *Source*: The BOF is the source for the data element.
- e. *Users*: Customer is the user of the data element.
- f. *Frequency*: The period at which the data element is transferred or available.
Indicates whether the transfer is automatic, as with reports at a fixed interval or in response to an event, or is in response to a request or poll.
- g. *Priority*: The priority of the data element in terms of the following levels:
 - Emergency
 - High
 - Normal
 - Background
- h. *Format*: The data representation or format for the data element should show fields and size.

The following information may apply to the data element or to fields within the data element.

- *Type*: The data type, for example, integer, real, ASCII
- *Units*: The units of measure required for the data element, such as seconds, meters, kilohertz
- *Range*: The allowable range of values for the data element
- *Accuracy*: The correctness required of the data element
- *Precision*: The number of significant digits required
- *Validity*: Verification checks performed on a field of the data element

Information is transferred from the BOF to Customer in XML messages. The messages are not encrypted.

Unless defined otherwise, all data is transmitted in ASCII.

5.2 STU Message Packet

5.2.1 STU MESSAGE PACKET FOR GENERAL CUSTOMER VARS (NOT SPOT)

The XML schema for the STU message is listed in **Appendix A**.

Note: XML examples found in the following section(s) are indented for readability. Hard returns and extra spaces are not acceptable inside message responses.

For general customer VAR's, each message package looks like below:

```
<?xml version="1.0" encoding="UTF-8"?>
<stuMessages xmlns:xsi= http:// www.w3.org/ 2001/ XMLSchema-instance
    xsi:noNamespaceSchemaLocation="http://cody.glpconnect.com/XSD/StuMessage_Rev
1_0.xsd"
    timeStamp="27/08/2009 21:00:00 GMT"
    messageID="56bdca48088610048fddba385e1cd5b8">
        <stuMessage>
            <esn>xx-xxxxxx</esn>
            <unixTime>xxxxxx</unixTime>
            <gps>N</gps>
            <payload length="9" source="pc"
encoding="hex">0xAAEDFBBCAFEEABACAD</payload>
        </stuMessage>
        <stuMessage>
            <esn></esn>
            <unixTime></unixTime>
            <gps></gps>
            <payload></payload>
        </stuMessage>
    </stuMessages>
```

In addition to the regular “stuMessage” the backoffice may also transmit “ackMessage” element that will provide forward message confirmations.

These confirmation can be :

- ACK – Message acknowledgement was received from the UT
- NACK – Backoffice expired the forward message in mailbox
- DACK – Message deletion was acknowledged by the UT
- COMMAND-ACK – Command Message acknowledgment was received from UT
- COMMAND-COMPLETE – Command Message completed on the UT
- COMMAND-FAILED – Command Message failed on the UT

The “ackMessage” message looks like below:

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

```
<stuMessages xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="http://cody.glpconnect.com/XSD/StuMessage_Rev2_0_0-
TW.xsd" timeStamp="27/08/2009 21:00:00 GMT"
messageID="d9de0098877110068768fe98ae421d05">
  <ackMessage>
    <esn>xx-xxxxx</esn>
    <unixTime>xxxxxx</unixTime>
    <fmsgid>x</fmsgid>
    <fmsgkey>xxxxxxxxxxxxxxxxxxxxx</fmsgkey>
    <acktype>ACK</acktype>
  </ackMessage>
</stuMessages>
```

5.2.2 STU MESSAGE PACKET FOR SPOT VARS

For SPOT VAR, the message will include an additional element, ‘umn’ in the message body as below:

```
<?xml version="1.0" encoding="UTF-8"?>
<stuMessages xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:noNamespaceSchemaLocation="http://cody.glpconnect.com/XSD/StuMessage_Rev
1_0.xsd"
  timeStamp="27/08/2009 21:00:00 GMT"
  messageID="56bdca48088610048fddba385e1cd5b8">
  <stuMessage>
    <esn>xx-xxxxx</esn>
    <unixTime>xxxxxx</unixTime>
    <gps> N </gps>
    <payload length="9" source="pc"
encoding="hex">0xAAEDFBBCAFEEABACAD</payload>
  </stuMessage>
  <stuMessage>
    <esn></esn>
    <unixTime></unixTime>
    <gps></gps>
    <payload></payload>
  </stuMessage>
</stuMessages>
```

The XML schema for the STU message is listed in [Appendix A](#).

6. Customer Data Element Descriptions

6.1 Customer to BOF Interface Summary

This chapter describes the information Customer may transfer to the BOF. A description is given for each Customer data element that is transferred or referenced through this interface. From Revision 13, which corresponds to the changes made in BOF 2.5 release, customer response will be in two different formats:

- For existing VAR's, the response should continue to contain the 'SYSTEM' tag to indicate the DTD URL for the response validation,
- For SPOT VAR and new VAR's to be provisioned after BOF 2.5 release (October-2009), the response should contain the schema information to validate the customer response.

The description of each data element contains the following information:

- a. *Name*: A unique identifier for each data element.
- b. *Description*: A textual description of what each element is or represents.
- c. *Issues*: Questions or open issues regarding this data element

- d. *Source*: The Customer is the source for the data element.
- e. *Users*: The BOF is the user of the data element.
- f. *Frequency*: The period at which the data element is transferred or available.
Indicates whether the transfer is automatic, as with reports at a fixed interval or in response to an event, or is in response to a request or poll.
- g. *Priority*: The priority of the data element in terms of the following levels:
 Emergency
 High
 Normal
 Background
- h. *Format*: The data representation or format for the data element should show fields and size.

The following information may apply to the data element or to fields within the data element.

- *Type*: The data type, for example, integer, real, ASCII
- *Units*: The units of measure required for the data element, such as seconds, meters, kilohertz
- *Range*: The allowable range of values for the data element
- *Accuracy*: The correctness required of the data element
- *Precision*: The number of significant digits required
- *Validity*: Verification checks performed on a field of the data element

Information is transferred from Customer to the BOF in XML messages. The messages are not encrypted.

6.2 Response Message

- a. *Name*: Response Message
- b. *Description*: In response to a Message Packet, the customer responds with an indication of the success or failure of the message transmission and processing from the customer end point. The customer can include an optional text stream to provide further information; for example, to clarify the reason for a failure. The Response Message echoes back the message identifier of the packet being confirmed as a Correlation Identifier. In addition, there is an optional field for the customer to assign his own message identifier.

The Response message is only sent when the BOF to Customer Interface is using the HTTP/HTTPS protocol; Response messages are not currently supported when the interface is SMTP or FTP.

- c. *Issues*: None
- d. *Source*: Customer when using HTTP interface
- e. *Users*: BOF
- f. *Frequency*: A periodic in response to Message Packets.
- g. *Priority*: High

h. *Format:* XML message

If a STU message is received/processed successfully, following response should be sent back to the BOF:

```
<?xml version="1.0" encoding="UTF-8"?>
<stuResponseMsg xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:noNamespaceSchemaLocation="http://cody.glpconnect.com/XSD/StuResponse_Re
v1_0.xsd"
    deliveryTimeStamp="02/03/2012 17:38:06 GMT"
    messageID="64e3e958082d100482a2f57ac319b9b8"
    correlationID="1655cb98076b100481c2ddcf8b1ab8">
    <state>pass</state>
    <stateMessage>20 messages received and stored successfully
    </stateMessage>
</stuResponseMsg>
```

If a PROVISIONING message is received/processed successfully, following response should be sent back to the BOF

```
<?xml version="1.0" encoding="UTF-8"?>
<prvResponseMsg xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:noNamespaceSchemaLocation="http://cody.glpconnect.com/XSD/ProvisionRespo
nse_Rev1_0.xsd"
    deliveryTimeStamp="02/03/2012 17:38:06 GMT"
    correlationID="56bdca48088610048fddba385e1cd5b8">
    <state>PASS</state>
    <stateMessage> /</stateMessage>
</prvResponseMsg>
```

If the transmission is not successful (for any reason), a “fail” response is sent in addition to an optional failure message. No response is sent if there is a communications failure or other unexpected error arises which prevents a response from being sent. (**Note: If you send a FAIL during route certification, the testing will not complete.**)

The fields described above have the following properties.

xml version **Previously defined.**

deliveryTimeStamp **The delivery time stamp indicates when the message was received by the customer in GMT time reference. Time is in the format**

dd/MM/yyyy hh:mm:ss where dd is the day of the month, MM is the month, yyyy is the year, hh is the hour, mm is the minute, and ss is the seconds. All values are zero padded.

| | |
|------------------|--|
| <i>Type</i> | ASCII character string |
| <i>Units</i> | N/A |
| <i>Range</i> | N/A |
| <i>Accuracy</i> | 1 second |
| <i>Precision</i> | 1 second |
| <i>Validity</i> | <i>dd</i> is day of month, 01 to 31; <i>MM</i> is month, 01 to 12; <i>yyyy</i> is year, >= 2001; <i>hh</i> is hour of the day, 00 to 23; <i>mm</i> is minutes, 00 to 59, and <i>ss</i> is seconds, 00 to 59. |

messageID

This is a unique number optionally assigned by the Customer.

| | | |
|----------------------|--|---|
| | <i>Type</i> | 16 bytes (32 hex characters) |
| | <i>Format</i> | UUID as defined in Appendix C is recommended; however, any unique ASCII number is acceptable. |
| correlationID | Identical to the messageID of the messaged being confirmed. | |
| | <i>Format</i> Previously defined | |
| state | The state indicates the extent to which the message has been processed by the Customer. At this time the only state is “pass” or “fail”. Other states may be added in the future. | |
| | <i>Type</i> | ASCII character string |
| | <i>Units</i> | N/A |
| | <i>Range</i> | N/A |
| | <i>Accuracy</i> | N/A |
| | <i>Precision</i> | N/A |
| | <i>Validity</i> | “pass” or “fail” |
| stateMessage | Optional text stream that may be included in Response Message. | |
| | <i>Type</i> | ASCII character string |
| | <i>Units</i> | N/A |
| | <i>Range</i> | N/A |
| | <i>Accuracy</i> | N/A |
| | <i>Precision</i> | N/A |
| | <i>Validity</i> | Any text stream. |

Appendix B contains sample response messages.

Appendix A: Sample XML Transmissions and XSD

A.1 XML Transmission with one message

```

<?xml version="1.0" encoding="utf-8"?>
<stuMessages xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:noNamespaceSchemaLocation="http://cody.glpconnect.com/XSD/StuMessage_Rev
1_0.xsd"
  timeStamp="27/08/2009 21:00:00 GMT"
  messageID="56bdca48088610048fddba385e1cd5b8">
  <stuMessage>
    <esn>0-99990</esn>
    <unixTime>1034268516</unixTime>
    <gps>N</gps>
    <payload length="9" source="pc"
encoding="hex">0xC0560D72DA4AB2445A</payload>
  </stuMessage>
</stuMessages>

```

A.2 XML Transmission with multiple messages (it can be a mix of stuMessage and ackMessage)

```
<?xml version="1.0" encoding="utf-8"?>
<stuMessages xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:noNamespaceSchemaLocation="http://cody.glpconnect.com/XSD/StuMessage_Rev
1_0.xsd"
  timeStamp="27/08/2009 21:00:00 GMT"
  messageID="56bdca48088610048fddba385e1cd5b8">
  <stuMessage>
    <esn>0-99990</esn>
    <unixTime>1034268516</unixTime>
    <gps>N</gps>
    <payload length="9" source="pc"
encoding="hex">0xC0560D72DA4AB2445A</payload>
  </stuMessage>
  <ackMessage>
    <esn>123456789</esn>
    <unixTime>1704891234</unixTime>
    <fmmsgid>1234567891234567891324568798</fmmsgid>
    <fmmsgkey>2</fmmsgkey>
    <acktype>ACK</acktype>
  </ackMessage>
  <stuMessage>
    <esn>0-99991</esn>
    <unixTime>1034268521</unixTime>
    <gps>N</gps>
    <payload length="9" source="pc"
encoding="hex">0xA14AA1DBDB818F9759</payload>
  </stuMessage>
  <!-- and continue here... -->
</stuMessages>
```

A.3 Data Modem Message XSD (XML Schema Definition)

A.3.1 ACTUAL XSD

This schema can be found with following:

http://cody.glpconnect.com/XSD/StuMessage_Rev2_0_0-TW.xsd

```
<?xml version="1.0" encoding="utf-8" ?>
<xss:schema attributeFormDefault="unqualified" elementFormDefault="qualified"
  xmlns:xss="http://www.w3.org/2001/XMLSchema">
  <xss:element name="stuMessages">
```

```

<xs:complexType>
  <xs:choice minOccurs="0" maxOccurs="unbounded">
    <xs:element name="ackMessage">
      <xs:complexType>
        <xs:sequence>
          <xs:element minOccurs="1" maxOccurs="1" name="esn" type="xs:string"
/>
          <xs:element minOccurs="0" maxOccurs="1" name="uid" type="xs:string"
/>
          <xs:element minOccurs="1" maxOccurs="1" name="unixTime"
type="xs:string" />
          <xs:element minOccurs="0" maxOccurs="1" name="configurationID"
type="xs:string" />
          <xs:element minOccurs="0" maxOccurs="1" name="fmmsgid"
type="xs:string" />
          <xs:element minOccurs="0" maxOccurs="1" name="fmmsgkey"
type="xs:string" />
          <xs:element minOccurs="1" maxOccurs="1" name="acktype"
type="xs:string" />
        </xs:sequence>
      </xs:complexType>
    </xs:element>
    <xs:element name="stuMessage">
      <xs:complexType>
        <xs:sequence>
          <xs:element minOccurs="1" maxOccurs="1" name="esn" type="xs:string"
/>
          <xs:element minOccurs="0" maxOccurs="1" name="uid" type="xs:string"
/>
          <xs:element minOccurs="1" maxOccurs="1" name="unixTime"
type="xs:string" />
          <xs:element minOccurs="1" maxOccurs="1" name="gps" type="xs:string"
/>
        <xs:element minOccurs="0" maxOccurs="1" name="umn">
          <xs:simpleType>
            <xs:restriction base="xs:int">
              <xs:minInclusive value="0" />
              <xs:maxInclusive value="15" />
            </xs:restriction>
          </xs:simpleType>
        </xs:element>
        <xs:element minOccurs="0" maxOccurs="1" name="gwa" type="xs:string"
/>
        <xs:element minOccurs="1" maxOccurs="1" name="payload">
          <xs:complexType>

```

```
<xs:simpleContent>
  <xs:extension base="xs:string">
    <xs:attribute name="length" type="xs:int" use="required" />
    <xs:attribute name="source" type="xs:string" use="required"
/>
  <xs:attribute name="encoding" type="xs:string" use="required"
/>
</xs:extension>
</xs:simpleContent>
</xs:complexType>
</xs:element>
</xs:sequence>
</xs:complexType>
</xs:element>
</xs:choice>
<xs:attribute name="timeStamp" type="xs:string" use="required" />
<xs:attribute name="messageID" type="xs:string" use="required" />
</xs:complexType>
</xs:element>
</xs:schema>
```

A.3.2 XSD ELEMENT DESCRIPTIONS

Table A-1 defines the elements and attributes for a STU message

Table A-1 STU Message Element and Attribute Definition

| Element/Attribute Name | Description |
|--------------------------------|--|
| /stuMessages | Root element |
| /stuMessages/stuMessage | A fully contained data modem message |
| .../stuMessage/esn | The electronic serial number of originating modem |
| .../stuMessage/uid | The unique ID of the originating modem |
| .../stuMessage/unixTime | The time that the message was generated by the modem. This is actually GPS time which is 18 seconds ahead. |
| .../stuMessage/gps | Deprecated and should be ignored unless specifically told not to |
| .../stuMessage/payload | The data payload from the modem |
| .../stuMessage/timestamp | The time the XML file was created by the BOF |
| .../stuMessage/messageID | Message identifier assigned by the BOF |
| | |
| /stuMessages/ackMessage | A fully contained acknowledgement message |
| .../ackMessage/esn | The electronic serial number of originating modem |
| .../ackMessage/uid | The unique ID of the originating modem |
| .../ackMessage/unixTime | The time that the message was generated by the modem. This is actually GPS time which is 18 seconds ahead. |
| .../ackMessage/fmsgid | ID of the forward message related to this acknowledgement. |
| .../ackMessage/fmsgkey | The unique ID of the forward message |
| .../ackMessage/configurationId | ID of the configuration in case the command was correlated with a device configuration command. |
| .../ackMessage/acktype | The acknowledgement event type |

Appendix B: Sample Response Message and XSD

B.1 Sample XML Response Messages

- Data Response

```
<?xml version="1.0" encoding="UTF-8"?>
<stuResponseMsg xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:noNamespaceSchemaLocation="http://cody.glpconnect.com/XSD/StuResponse_Re
v1_0.xsd"
  deliveryTimeStamp="25/08/2009 21:00:00 GMT" messageID="8675309"
  correlationID="56bdca48088610048fddba385e1cd5b8">
  <state>pass</state>
  <stateMessage>Store OK</stateMessage>
</stuResponseMsg>
```

- Provisioning Response (messageID forbidden in provisioning response)

```
<?xml version="1.0" encoding="UTF-8"?>
<prvResponseMsg xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:noNamespaceSchemaLocation="http://cody.glpconnect.com/XSD/ProvisionRespo
nse_Rev1_0.xsd"
  deliveryTimeStamp="02/03/2012 17:38:06 GMT"
  correlationID="56bdca48088610048fddba385e1cd5b8">
  <state>PASS</state>
  <stateMessage>Store OK</stateMessage>
</prvResponseMsg>
```

B.2 Response Message XSD (XML Schema Definition)

B.2.1 ACTUAL XSD

This XSD can be found in following URL:

http://cody.glpconnect.com/XSD/StuResponse_Rev1_0.xsd

```
<?xml version="1.0" encoding="utf-8"?>
<xss:schema attributeFormDefault="unqualified" elementFormDefault="qualified"
  xmlns:xss="http://www.w3.org/2001/XMLSchema">
  <xss:element name="stuResponseMsg">
    <xss:complexType>
      <xss:sequence>
        <xss:element minOccurs="1" maxOccurs="1" name="state">
          <xss:simpleType>
            <xss:restriction base="xss:string">
              <xss:enumeration value="pass" />
              <xss:enumeration value="fail" />
              <xss:enumeration value="PASS" />
              <xss:enumeration value="FAIL" />
            </xss:restriction>
          </xss:simpleType>
        </xss:element>
        <xss:element minOccurs="0" maxOccurs="1" name="stateMessage"
          type="xss:string" />
      </xss:sequence>
      <xss:attribute name="deliveryTimeStamp" type="xss:string" use="required" />
      <xss:attribute name="messageID" type="xss:string" use="optional" />
      <xss:attribute name="correlationID" type="xss:string" use="required" />
    </xss:complexType>
  </xss:element>
</xss:schema>
```

B.2.2 ELEMENT DESCRIPTIONS

Table B-1 defines the elements and attributes in the XSD.

Table B-1 XSD Element and Attribute Definition

| Element/Attribute Name | Description |
|------------------------|--|
| deliveryTimeStamp | Mandatory The time the message was received by the customer. |

| | |
|---------------|--|
| messageID | Mandatory This is a unique number assigned by the Customer, associated with the messageID of the incoming message. This is an optional field. |
| correlationID | Mandatory This is identical to the messageID on the message being confirmed by the customer side. |
| State | Mandatory Indicates the extent to which the customer has processed the message. |
| stateMessage | Optional Text stream that can be used, particularly if the state is “fail”, to provide additional information. |

Appendix C Unique Universal Identifier

The messageID used in the message will be generated as a Unique Universal Identifier (UUID). The UUID adheres to the standard DCE specification (<http://www.opengroup.org/onlinepubs/9629399/apdx.htm>). Because the BOF is implemented in Java, the following exceptions with resolutions are noted:

- Java only supports time resolution to the millisecond
- Java's clock begins at 1/1/1970
- Java does not support a mechanism to obtain the MAC address

These issues are addressed as follows:

Millisecond resolution

The messageID generator will keep track of the last system time recorded and compare to the current time in a synchronized section. If the time signature is the same, it will treat it as if it were a clock rollback and increment the clock-synch sequence number appropriately as per the DCE specification.

Clock begins at 1/1/1970

Calculations will be made to adjust the clock to begin at 8/15/1582 as per the DCE specification.

Java does not support MAC address

The messageID will look for MAC address to be specified in a System property. To minimize the amount of time required in generating a value, the MAC address is initialized once and then stored as static attributes of the messageID. The static nature of these attributes means they are only stored once despite the number of instances created.