Provisioning Interface Control Document (BOF – VAR)

GS–02-0790
Rev. 22

25 October 2018

Globalstar USA CAGE Code: 1WSX0

Table of Contents:

DOCUMENT CHANGE RECORD

REV	Description of Change	Date	Affected Page(s)	Author
-	Initial release of document		All	J. Lawrence
-1	Added messages from VAR to BOF to provide complete installation data for each RTU		All	J. Lawrence
-1	Changed content of message from BOF to VAR.		All	J. Lawrence
-2	Added txRetryMinSec and txRetryMaxSec to Provisioning data file. These parameters will be set in the BOF and will be echoed back in the Installation data file.		9	J. Lawrence
-2	Change name of messages in the Provisioning data file to "prov message".		9	J. Lawrence
-2	Moved definitions of txRetryMinSec and txRetryMaxSec to prov message.		12	J. Lawrence
-2	Changed name of messages in the Installation data file to "inst message".		13,14	J. Lawrence
-2	Created separate DTDs for prov message and inst message		21-24	J. Lawrence
-3	Changed prov message to prvmsg and inst message to instmsg		9,13,14, 19-24	J. Lawrence
-3	Added txRetryMinSec and txRetryMaxSec to examples in Appendices A.1 and A.2		18,19	J. Lawrence
-4	Updated DTDs and example XML files in Appendix A		18-24	J. Lawrence
-4	Added zero padding to dates, longitude, and latitude.		10, 11 15	J. Lawrence
-5	Changed provisioning login information to provide secure connection.		5	J. Lawrence
-5	Updated IP addresses for Globalstar		8	J. Lawrence
-5	Changed DTD for both provisioning and installation messages to permit empty message to be valid.		21, 22, 24	J. Lawrence
-5	Added provisioning identifier (provID) to both provisioning and installation messages for tracking and security.		8, 9, 11, 15, 19, 20, 21, 22, 24	J. Lawrence
-6	Changed names on message tags to <prvmsg>, <instmsg>, <prvResponseMsg>, and <instResponseMsg> to identify specific messages.		Throughout	J. Lawrence
-6	Added messageID and correlationID, as identifiers to all send/receive transactions.		Throughout	J. Lawrence
-6	Added deliveryTimeStamp to all Response Messages.		20-23	J. Lawrence
-6	Use Universal Unique Identifier for message tracking numbers		Throughout	J. Lawrence
-6	Connections in both directions will be https, not http		4, 6	J. Lawrence
-6	VAR IP addresses must be static		8	J. Lawrence
-7	Added SMTP and FTP as methods for delivering Provisioning Messages to the VAR.			J. Lawrence
-8	Added notice explaining the importance of adhering to the parameters in the Provisioning/Installation Messages		1	J. Lawrence
-8	Clarified that either HTTP or HTTPS can be used		Throughout	J. Lawrence
-8	Specified port 443 for HTTPS,		5	J. Lawrence
-8	Added comment that Response Messages are not used if SMTP or FTP is used to deliver Provisioning Messages.		7	J. Lawrence
-8	Added optional text stream message that can be included in Response Messages.		23-26	J. Lawrence
-8	Clarified SMTP and FTP simply package the XML message for delivery.		11	J. Lawrence
-8	Corrected use of message identifier and correlation identifier. Message identifier becomes correlation identifier in the response message.		11, 12, 23-26, 35-36	J. Lawrence

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REV	Description of Change	Date	Affected Page(s)	Author
-8	Corrected or added DOCTYPE statements in XML message examples		Throughout	J. Lawrence
-8	Revised DTDs		27-38	J. Lawrence
9	Clarified definition of txRetries to indicate this is the number of re-transmissions after the initial transmission.		16	J. Lawrence
9	Changed valid range on txRetryMinSec		16	J. Lawrence
9	Changed valid range of txRetryMaxSec		16	J. Lawrence
9	Added IP address for Alternate Back Office		10	J. Lawrence
10	Added use of "tmp." name to prevent accessing file before transfer is complete.		11	J. Lawrence
11	Corrected Range field when type is ASCII Character string		14-25	J. Lawrence
12	Updated	9-Nov-07		J. Crowley
13	Change the XML grammar to use XSD instead of DTD	1-Sept-09	All parts	W. Wang
14	Update the Provisioning BOF IP Addresses	10-Oct-09	9	W. Wang
15	Change opennc to opengroup	12-Jan-10	3, 27	J. Crowley
16	Updated IP Address Ranges	13-Apr-10	9	J. Crowley
17	Correct the sample XML for the <state>pass and fail messages. Change orientation of appendices to landscape	20-Aug-10	16, 24, 27	R.Charles / J.Crowley
18	New Logo	23-Nov-10		J.Crowley
19	Fixed "smartquotes" in xml, replacing them with standard quotes. Replaced extraneous & erroneous spaces in xml	21-Feb-12		J.Crowley, R.Charles
20	Explicitly called out that section 5.1.3 is a generic POST/Response example and not specific to Globalstar	24-Oct-12	8	R.Charles
21	Updated Section 5.1.4, IP Addresses	29-Aug-16	9	J.Crowley
22	Minor grammatical changes	25-Oct-18		J.Crowley

1. Introduction

1.1 Scope

This document describes the provisioning interfaces between the Globalstar Back Office (BOF) and a Value Added Reseller (VAR). Operationally, the VAR will establish an Internet connection to Globalstar's Provisioning System and supply information about the units to be deployed (e.g., serial number, type of unit, etc.). At the conclusion of the Provisioning Session, the Globalstar BOF creates and transmits to the VAR a Provisioning Data file containing the provisioning data for each unit (e.g., serial number, frequency, etc.).

Correct Simplex Remote Telemetry operation depends upon the parameters in the Provisioning and Installation files. The parameters specified in the Provisioning file must be accurately programmed into the designated RTU. Likewise, the values returned in the Installation file must correctly describe the installed RTU. The accuracy of this data is essential to ensure telemetry messages are delivered intact and to prevent interference with other RTUs (due to timing issues). Random transmit times shall be assigned within the time windows specified by Globalstar.

The interface described in this document is the electronic interface; information transferred via other means (telephone, facsimile, etc.) is not within the scope of this document.

- Chapter 2 describes other documents relevant to this interface.
- Chapter 3 describes the hardware interfaces between the BOF and the VAR.
- Chapter 4 explains how the VAR connects to the Globalstar web site to conduct a provisioning session.
- Chapter 5 defines the method of data transfer between the BOF and the VAR.
- Chapter 6 defines the data elements transferred from the BOF to the VAR in a Provisioning Data file.
- Chapter 7 defines the Response Message for a successful transmission.
- Appendix A contains examples of the messages used in this interface.
- Appendix B has the recommended specification for creating message-tracking identifiers.

1.2 HTTP/HTTPS, SMTP or FTP Interfaces

Messages can be transferred between the BOF and the VAR by HTTP/HTTPS, SMTP (Simple Mail Transfer Protocol), or FTP (File Transfer Protocol). The VAR can choose the method for delivering Provisioning Messages. Installation Messages must use HTTP/HTTPS. The message structure shall be independent of the delivery method using the XML packets defined in paragraphs 6 through 8.

1.2 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 Transfer Protocol
GMT	Greenwich Mean Time
HTTP	Hyper Text Transport Protocol
HTTPS	Secure Hyper Text Transport Protocol
ICD	Interface Control Document
ID	Identifier
IP	Internet Protocol
N/A	Not Applicable
PDA	Personal Digital Assistant
RTU	Remote Transmitter Unit
SMTP	Simple Mail Transfer Protocol
TBD	To Be Determined
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
UUID	Universal Unique Identifier
UTF	Unicode Transformation Format
VAR	Value Added Reseller
XML	Extended Markup Language

2. Applicable Documents

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

Reference	Title
GS-04-0928	*Globalstar Remote Simplex Remote Telemetry System – Operational Requirements Document*
---	*HTTP -1.1: RFC 2616 (www.ietf.org/rfc/rfc2616.txt)*
---	*XML 1.0: W3C (www.w3.org/TR/REC-xml)*
---	*SMTP RFC 2821 (http://www.faqs.org/rfcs/frc2821.html)*
---	*FTP RFC 959 (http://www.fisonftp.com/RFCS/rfc959.txt)*

3. Hardware Interface Description

This chapter describes the hardware interface for data transfer between the BOF and a VAR.

The BOF and the VAR shall connect by HTTP/HTTPS, SMTP, or FTP. Only one of these methods shall be used for sending Provisioning Messages.

3.1 Back Office to VAR HTTP/HTTPS Interface

If the Globalstar Back Office and the VAR connect via HTTP/HTTPS, VAR side must host a HTTP servlet which can be deployed any HTTP compatible servlet container or we server. This servlet is responsible to receive provisioning messages and response with XML document can be validated by Globalstar defined and hosted XML schema.

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

Figure-1
Back Office to VAR HTTP Interface

Globalstar
Back Office
Web Server

Globalstar
Firewall

VAR
Firewall

VAR
Web Browser
Internet Explorer or
Netscape
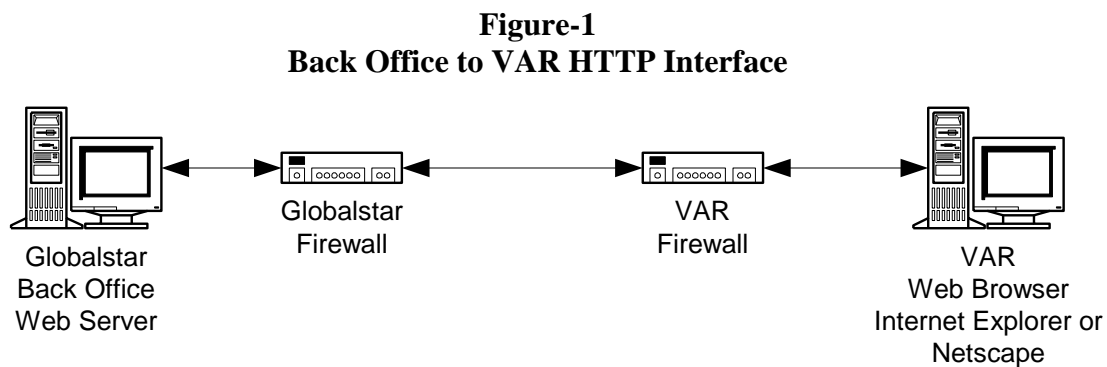
3.2 Back Office to VAR email Interface

If the Globalstar Back Office connects to the VAR by email, Globalstar and the VAR 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 VAR email Interface
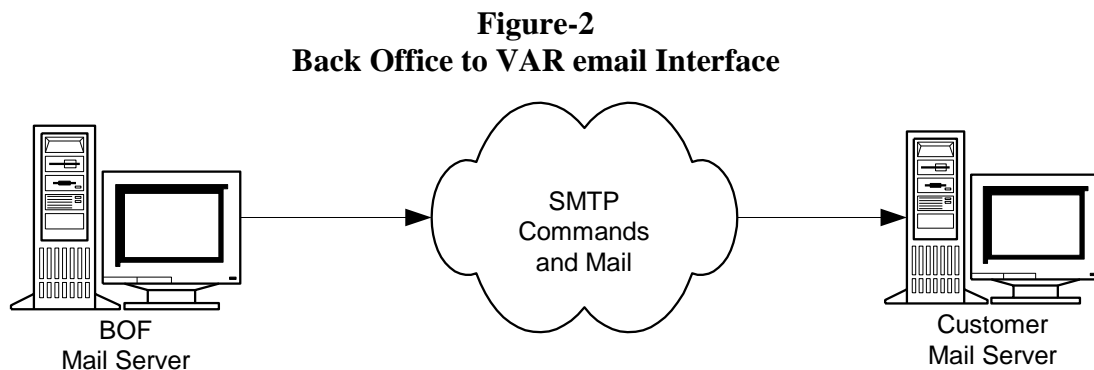
3.3 Back Office to VAR FTP Interface

If the Globalstar Back Office communicates with the VAR by FTP, Globalstar and the VAR shall establish FTP user/server relationships for the transfer of messages.

Conceptually this connection shall be as shown in Figure-3.

Figure-3
Back Office to VAR FTP Interface.
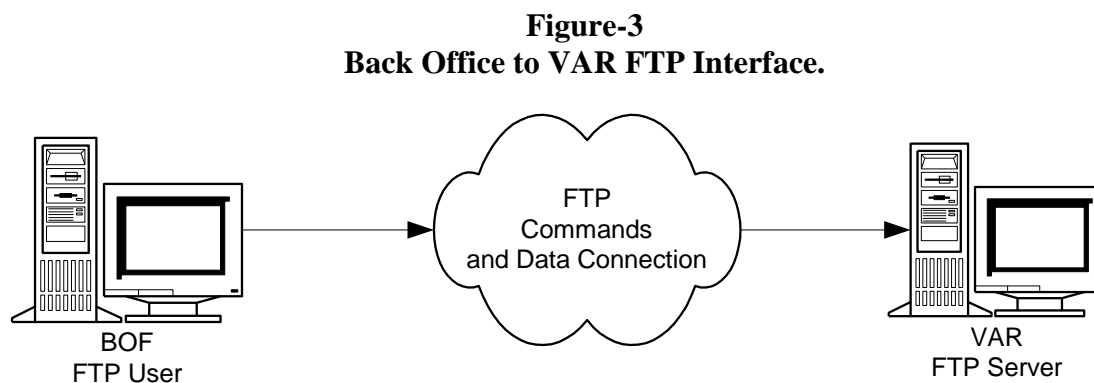
4. Provisioning Connection

A user will connect to the Globalstar web site for provisioning through the Internet. No special software is required. The user will connect to https://simplex.globalstar.com using a standard web browser (e.g., Google Chrome, Internet Explorer, Firefox, etc.). This will require that the VAR have a User ID and a password. The *Simplex Modem Provisioning User's Manual,* GS-02-0843, explains how a first-time user can obtain the User ID and password. Once the user has reached the web site, he will enter his provisioning data as described in the User's Manual.

The normal sequence of events for provisioning RTUs is that first the VAR enters initial provisioning data (ESN, URL for delivery, product type, etc.) through the web site. After the VAR submits his provisioning information, the BOF detects the new entries and automatically sends the VAR Provisioning Messages. The VAR sends a Response Message indicating receipt of the Provisioning Message. (The BOF does not currently support response messages via SMTP or FTP.).

5. XML Data Transfer Description

This chapter describes the interface used to transfer data between the BOF and the VAR.

## 5.1 HTTP/HTTPS Message Transfers

5.1.1 MESSAGE TRANSFER METHOD

Data transferred between the BOF and the VAR may use a standard HTTP/HTTPS connection and XML messages. Either HTTP or HTTPS is used as the transport mechanism since it provides access through firewalls. BOF will establish a connection, send an XML message, and after the sending BOF receives a positive response from the receiving servlet, the BOF shall terminate the connection. HTTPS is the preferred method for message transfer.

Globalstar BOF is a Java application which maps the XML input and output streams to the ports defined in Paragraph 3. The VAR will implement a servlet or web service on their web server to map the input and output XML streams.

The BOF shall send a packet of several messages during a single HTTP/HTTPS connection. Each message will have the Provisioning data for one specific RTU defined by ESN (electronic serial number). The receiving server shall send a response message to indicate that a complete message was received. If the sending server does not receive a positive indication, it will re-send the message until there is a successful transmission.

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, from this release, the XSD (XML Schema Definition) will specify the Revision of the XML message body.

5.1.2 URL CONNECTION SETUP

In accordance with the HTTP protocol, the following setup options for the connection shall be used:

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.
RequestProperty="Content-Type", "text/xml"	Uses a general request property to indicate the content is XML.

5.1.3 RESPONSE/REQUEST SPECIFICATION

The basic generic format of an HTTP POST shown below, Globalstar specific POST/Response messages can be found in more detail in Sections 6,7 and both Appendix A and B. (Note that the Request-URI, Hostname, and Content-Length will change based on destination and message.)

Syntax: Send Messages
HTTP Method: POST
Function: Send a batch of data modem messages to a destination.
Response Format: XML

Request:

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

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

Response

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

<?xml version="1.0" encoding="UTF-8"?>
<responsemsg>
      <state>   </state>
      <stateMessage>   </stateMessage>
</responsemsg>
```

The Document Type Definition (DTD) is only supported for legacy VARs. All new VARS must use XSD grammar.

5.1.4 IP ADDRESSES

Globalstar maintains redundant facilities for increased system reliability. Therefore, the connection from Globalstar to the VAR may come from one of two possible addresses. Both Globalstar servers will not be active simultaneously.

The initial IP addresses to be used are in Table-1. If any IP address changes, notification shall be via telephone or email message. Additional IP address specifications are provided in the Globalstar VAR Certification Application, GS-09-1303. Contact Globalstar via telephone or email message if you have any questions.

The VAR IP addresses shall be static.

Table-1 IP Addresses

Function	IP Address/IP Address Subnet
Globalstar primary Back Office subnet for sending Provisioning Messages to VAR (Proxy)	206.220.220.0/24
Globalstar alternate Back Office subnet for sending Provisioning Messages to VAR (Proxy)	206.220.217.0/24
Connection VAR uses for provisioning	https://simplex.globalstar.com
VAR	The VAR will provide the IP address for receiving Provisioning Data Files when the initial business agreement with Globalstar is negotiated.

5.2 Email Message Transfer Method

Messages transferred between the BOF and the VAR may use a standard SMTP connection. The BOF, acting as an SMTP client, shall establish a connection to the VAR, acting as an SMTP server. The BOF will create XML packets as defined in Paragraphs 6 through 8, attach it as the body of the email message, and send it to the designated address.

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

5.3 FTP Message Transfer Method

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

FTP Server. The BOF will create an XML packet(s) as defined in Paragraphs 6 through 8 and transmit it via FTP to the designated address.

The BOF shall send either one message or a packet of several messages during a single FTP file transfer. No response message from the VAR is expected; the BOF will assume FTP ensures the message(s) is delivered.

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 prepended with "tmp.", is provided to allow for files that are not ready for consumption. Any file that does not have the "tmp." prefix will be assumed to be a valid, completely transferred, file ready for processing.

The messageID is a unique message identifier attached to each message sent by the BOF. The messageID is defined in paragraph 5.5 and Appendix B.

The VAR shall assign a specific drop box to be used for the data message transfer.

5.4 Provisioning Data Confirmation

The BOF shall include a unique provisioning identifier (prvMessageID) as part of the provisioning information for each provisioning message sent to the VAR.

5.5 Message Tracking Identifiers

The BOF shall include a message identifier in the Provisioning Message. The Provisioning Response Message from the VAR shall return this message identifier as the correlation identifier and may optionally include a message identifier for the Provisioning Response Message. If a message identifier is included in the Provisioning Response Message, it shall be created by the VAR.

6. Provisioning Data File

a. *Name:* Provisioning File
b. *Description:* The Provisioning File contains one or more message packets. Each packet contains the provisioning information for one specific RTU.
c. *Issues:* None
d. *Source:* BOF
e. *Users:* VAR
f. *Frequency:* Aperiodic. The file is sent at the conclusion of each Provisioning Session initiated by the VAR.
g. *Priority:* High
h. *Format:* XML message

The Provisioning File has the following format:

```
<?xml version="1.0" encoding="UTF-8"?>
<prvmsgs xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="http://cody.glpconnect.com/XSD/ProvisionMessage
timeStamp="dd/MM/yyyy hh:mm:ss GMT"
prvMessageID="nnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnn">

        <prvmsg>
            •
            •
            •
        </prvmsg>
            •
            •
            •
        <prvmsg>
            •
            •
            •
        </prvmsg>

</prvmsgs>
```

Each prvmsg packet has the following format.

```
<prvmsg>
      <esn>xx-xxxx</esn>
      <provID> nnnnnnnnn </provID>
      <tStart> hh:mm:ss </tStart>
      <tEnd> hh:mm:ss </End>
      <txRetryMinSec> integer </txRetryMinSec>
      <txRetryMaxSec> integer </txRetryMaxSec>
      <txRetries> integer </txRetries>
      <rfChannel> alpha character </rfChannel>
</prvmsg>
```

The fields described above have the following properties.

xml version   **Indicates which version of XML is being used.**

Type	ASCII character string
Units	N/A
Range	N/A
Accuracy	N/A
Precision	N/A
Validity	1.0

encoding   **Encoding specifies the number of bits required to define a character; extended character sets require more than 8 bits per character.**

Type	ASCII character string
Units	N/A
Range	N/A
Accuracy	N/A
Precision	N/A
Validity	UTF-8

timeStamp   **The time stamp indicates the GMT time when the Provisioning File was created in the BOF. Time is in the format dd/MM/yyyy hh:mm:ss GMT 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 seconds. All values are zero padded.**

Type	ASCII character string
Units	N/A
Range	N/A
Accuracy	1 second
Precision	1 second
Validity	dd is day of month, 01 to 31; mm is month, 01 to 12; yyyy is year, >=2002; hh is hour of the day, 00 to 23; mm is minute, 00 to 59; ss is second, 00 to 59.

prvMessageID	**Message identifier assigned by the BOF.**	
	Type	16 bytes (ASCII representation of 32 hex characters)
	Format	Hexadecimal representation of Unique Universal Identifier as defined in Appendix B.

esn	**The electronic serial number uniquely identifies the transmitter. It is composed of a 4-digit manufacturer identifier, and a 23-bit serial number separated by a hyphen.**	
	Type	ASCII character string
	Units	N/A
	Range	N/A
	Accuracy	1
	Precision	1
	Validity	Manufacturer ID 0 to 15
		Serial number 0 to 8388607

provID	**A unique number assigned by the BOF to each ESN .**	
	Type	ASCII character string, up to nine numeric characters
	Units	N/A
	Range	0 - 999999999
	Accuracy	1
	Precision	1
	Validity	0 - 999999999

tStart	**Lower bound on window in which PDA (Personal Digital Assistant) randomly assigns a transmission time. Time is GMT in the format hh:mm:ss where hh is the hour, mm is the minute, and ss is the second. All values are zero padded. Ref:** *STU Integration Manual***.**	
	Type	ASCII character string
	Units	N/A
	Range	N/A
	Accuracy	1 second
	Precision	1 second
	Validity	hh is hour of the day, 00 to 23; mm is minutes, 00 to 59; ss is seconds, 00 to 59.

tEnd	**Upper bound on window in which PDA randomly assigns a transmission time. Time is GMT in the format hh:mm:ss where hh is the hour, mm is the minute, and ss is the second. All values are zero padded. Ref: *STU Integration Manual*.**

Type	ASCII character string
Units	N/A
Range	N/A
Accuracy	1 second
Precision	1 second
Validity	hh is hour of the day, 00 to 23; mm is minutes, 00 to 59; ss is seconds, 00 to 59.

txRetryMinSec	**The minimum interval between retransmissions in 5 second increments. txRetryMinSec and txRetryMaxSec define a window within which the re-transmission time is jittered to randomize the re-transmission time. Ref: *STU Integration Manual*.**

Type	ASCII character string
Units	seconds
Range	N/A
Accuracy	5
Precision	1
Validity	120 to 300 in steps of 5

txRetryMaxSec	**The maximum interval between retransmissions in 5 second increments. Ref: *STU Integration Manual*.**

Type	ASCII character string
Units	seconds
Range	N/A
Accuracy	5
Precision	5
Validity	125 to 600 in steps of 5

txRetries	**Number of times the data message is re-transmitted. A value of zero means the message is sent once with no repetitions. (txRetries=Number of transmissions –1)Ref: *STU Integration Manual*.**

Type	ASCII character string
Units	N/A
Range	N/A
Accuracy	1
Precision	1
Validity	0 to 10

rfChannel   **Designates which of four RF channels the RTU will transmit on. Paragraph 3.2.2.3 in *Simplex Remote Telemetry Systems Requirements Document* defines the channels.**

Type	ASCII character string
Units	N/A
Range	N/A
Accuracy	N/A
Precision	N/A
Validity	A, B, C, or D

Appendix A contains examples of Provisioning Data files.

7. Response Message

When the BOF to VAR Interface uses the HTTP/HTTPS protocol, response messages are sent to provide confirmation that the message has been received. Response messages are not sent when the interface is SMTP or FTP.

    a. *Name:* Provisioning Response Message

    b. *Description:* Upon receipt of a Provisioning Message, the VAR sends a Provisioning Response Message indicating the success or failure of the message transmission. The Provisioning Response Message echoes back the message identifier of the packet being confirmed as the correlation identifier in the Provisioning Response Message; the response also has a time stamp indicating when the message was received.   The VAR may optionally assign its own message identifier. The VAR can also include an optional text stream to provide further information, for example, to clarify the reason for a failure.

    c. *Issues:* None

    d. *Source:* VAR

    e. *Users:* BOF

    f. *Frequency:* Aperiodic.

    g. *Priority:* High

    h. *Format:* XML message

If a Provisioning Message has been successfully received, the VAR shall send the following Provisioning Response Message with the optional message identifier

```xml
<?xml version="1.0" encoding="UTF-8"?>
<prvResponseMsg xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="http://cody.glpconnect.com/XSD/ProvisionResponse_Rev
1_0.xsd" deliveryTimeStamp="dd/MM/yyyy hh:mm:ss GMT"
messageID="nnnnnnnnnnnnnnnnnnnnnnnnnnnnnn"
correlationID="mmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmm">
      <state>pass</state>
      <stateMessage>message received</stateMessage>
</prvResponseMsg>
```

If the transmission is not successful (for any reason) a "fail" response is sent in addition to a failure code. No response is sent if there is a communications failure or other unexpected error arises which prevents a response from being sent.

The fields described above have the following properties.

xml version	**Previously defined**

deliveryTimeStamp	**The delivery time stamp indicates when the message was received 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.**

Type	ASCII character string
Units	N/A
Range	N/A
Accuracy	1 second
Precision	1 second
Validity	dd is day of month, 01 to 31; MM is month, 01 to 12; yyyy is year >= 2003; hh is hour of the day, 00 to 23; mm in minutes, 00 to 59; and ss is seconds 00 to 59.

messageID	**This is a unique number assigned by the VAR. This field is optional in the Provisioning Response Message.**

Type	16 bytes (ASCII representation of 32 hex characters)
Format	Hexadecimal representation of Unique Universal Identifier as defined in Appendix B is suggested; however, any unique ASCII number is acceptable.

correlationID	**This is identical to the messageID (prvMessageID) of the message being confirmed. This field is required in the Provisioning Response Message.**

Type	16 bytes (ASCII representation of 32 hex characters)
Format	The UUID as defined in Appendix B.

State   **The processing state indicates the extent to which the message has been processed by the VAR. Currently the only states are "pass" or "fail". Other states may be added in the future.**

Type	ASCII character string
Units	N/A
Range	N/A
Accuracy	N/A
Precision	N/A
Validity	"pass" or "fail"

stateMessage   **An optional text stream that may be included in the Response Message.**

Type	ASCII character string
Units	N/A
Range	N/A
Accuracy	N/A
Precision	N/A
Validity	Any text stream

Appendix A: Sample XML Transmissions and XSD

A.1 XML Provisioning Data File with one message

The following is an example of the Provisioning Data File with one message.

```
<?xml version="1.0" encoding="UTF-8"?>
<prvmsgs xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="http://cody.glpconnect.com/XSD/ProvisionMessage_Rev1_0.xsd" timeStamp="25/08/2009
21:00:00 GMT" prvMessageID="56bdca48088610048fddba385e1cd5b8">
          <prvmsg>
               <esn>0-13146</esn>
               <provID> 123456789 </provID>
               <tStart> 10:30:00 </tStart>
               <tEnd> 12:30:00 </tEnd>
               <txRetryMinSec> 100 </txRetryMinSec>
               <txRetryMaxSec> 600 </txRetryMaxSec>
               <txRetries>3</txRetries>
               <rfChannel> A </rfChannel>
          </prvmsg>
</prvmsgs>
```

A.2 XML Provisioning Data File with multiple messages

The following is an example of the Provisioning Data File with two messages.

```
<?xml version="1.0" encoding="UTF-8"?>
<prvmsgs xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="http://cody.glpconnect.com/XSD/ProvisionMessage_Rev1_0.xsd"
timeStamp="25/08/2009 21:00:00 GMT" prvMessageID="56bdca48088610048fddba385e1cd5b8">
      <prvmsg>
            <esn>0-13146</esn>
            <provID> 123456789 </provID>
            <tStart> 10:30:00 </tStart>
            <tEnd> 12:30:00 </tEnd>
            <txRetryMinSec> 100 </txRetryMinSec>
            <txRetryMaxSec> 600 </txRetryMaxSec>
            <txRetries>3</txRetries>
            <rfChannel> A </rfChannel>
      </prvmsg>
      <prvmsg>
            <esn>0-13147</esn>
            <provID> 123546789 </provID>
            <tStart> 11:30:00 </tStart>
            <tEnd> 12:30:00 </tEnd>
            <txRetryMinSec> 100 </txRetryMinSec>
            <txRetryMaxSec> 600 </txRetryMaxSec>
            <txRetries>3</txRetries>
            <rfChannel> A </rfChannel>
      </prvmsg>
      …
</prvmsgs>
```

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

A.3.1 ACTUAL XSD

This XSD can be found on:
http://cody.glpconnect.com/XSD/ProvisionMessage_Rev1_0.xsd

```xml
<?xml version="1.0" encoding="utf-8"?>
<xs:schema attributeFormDefault="unqualified" elementFormDefault="qualified"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:element name="prvmsgs">
    <xs:complexType>
      <xs:sequence>
        <xs:element minOccurs="0" maxOccurs="unbounded" name="prvmsg">
          <xs:complexType>
            <xs:sequence>
              <xs:element minOccurs="1" maxOccurs="1" name="esn" type="xs:string"/>
              <xs:element minOccurs="1" maxOccurs="1" name="provID" type="xs:string"/>
              <xs:element minOccurs="1" maxOccurs="1" name="tStart" type="xs:string"/>
              <xs:element minOccurs="1" maxOccurs="1" name="tEnd" type="xs:string"/>
              <xs:element minOccurs="1" maxOccurs="1" name="txRetryMinSec" type="xs:string"/>
              <xs:element minOccurs="1" maxOccurs="1" name="txRetryMaxSec" type="xs:string"/>
              <xs:element minOccurs="1" maxOccurs="1" name="txRetries" type="xs:string"/>
              <xs:element minOccurs="1" maxOccurs="1" name="rfChannel" type="xs:string"/>
            </xs:sequence>
          </xs:complexType>
        </xs:element>
      </xs:sequence>
      <xs:attribute name="timeStamp" type="xs:string" use="required"/>
      <xs:attribute name="prvMessageID" type="xs:string" use="required"/>
    </xs:complexType>
  </xs:element>
</xs:schema>
```

A.3.2 ELEMENT DESCRIPTIONS

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

Table A-1 DTD Element and Attribute Definition

Element/Attribute Name	Description
prvmsgs	Root element
prvmsg	A fully contained RTU provisioning data message
timeStamp	The time that the message was generated by the BOF
prvMessageID	Message identifier assigned by the BOF
Esn	The unique ID of the RTU
provID	Unique number assigned by BOF to track and confirm installation data.
tStart	Lower end of time window for transmission
tEnd	Upper end of time window for transmission
txRetryMinSec	Minimum retransmission period
txRetryMaxSec	Maximum retransmission period
txRetries	Number of retransmissions
rfChannel	RF channel for transmission

A.3.3 NESTING DESCRIPTIONS

Table A-2 defines the element nesting.

Table A-2 XSD Element Nesting Definition

Element Name	Allowed Nested Element

prvmsgs	Prvmsg
prvmsg	Esn
	provID
	tStart
	tEnd
	txRetryMinSec
	txRetryMaxSec
	txRetries
	rfChannel

Appendix B: Response Message and XSD (XML Schema Definition)

B.1 Response Message Examples

The following is an example of a Provisioning Response Message with the optional messageID provided by the VAR.

```
<?xml version="1.0" encoding="UTF-8"?>
<prvResponseMsg xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="http://cody.glpconnect.com/XSD/ProvisionResponse_Rev1_0.xsd"
deliveryTimeStamp="25/08/2009 21:00:00 GMT" correlationID="56bdca48088610048fddba385e1cd5b8">
      <state>pass</state>
      <stateMessage>message received</stateMessage>
</prvResponseMsg>
```

The following is an example of a Provisioning Response Message when the optional messageID is not included by the VAR.

```
<?xml version="1.0" encoding="UTF-8"?>
<prvResponseMsg xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="http://cody.glpconnect.com/XSD/ProvisionResponse_Rev1_0.xsd"
deliveryTimeStamp="25/08/2009 21:00:00 GMT" correlationID="56bdca48088610048fddba385e1cd5b8">
      <state>fail</state>
      <stateMessage>database error</stateMessage>
</prvResponseMsg>
```

B.2 Provisioning Response Message XSD

B.2.1 ACTUAL XSD

This XSD can found with following URL:
http://cody.glpconnect.com/XSD/ProvisionResponse_Rev1_0.xsd

```xml
<?xml version="1.0" encoding="utf-8"?>
<xs:schema attributeFormDefault="unqualified" elementFormDefault="qualified"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:element name="prvResponseMsg">
    <xs:complexType>
      <xs:sequence>
        <xs:element minOccurs="1" maxOccurs="1" name="state">
          <xs:simpleType>
            <xs:restriction base="xs:string">
              <xs:enumeration value="pass"/>
              <xs:enumeration value="fail"/>
              <xs:enumeration value="PASS"/>
              <xs:enumeration value="FAIL"/>
            </xs:restriction>
          </xs:simpleType>
        </xs:element>
        <xs:element minOccurs="0" maxOccurs="1" name="stateMessage" type="xs:string"/>
      </xs:sequence>
      <xs:attribute name="deliveryTimeStamp" type="xs:string" use="required"/>
      <xs:attribute name="prvMessageID" type="xs:string" use="optional"/>
      <xs:attribute name="correlationID" type="xs:string" use="required"/>
    </xs:complexType>
  </xs:element>
</xs: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
prvResponseMsg	The root message tag indicates that this is a provisioning response message
deliveryTimeStamp	The time the message was received by the VAR.
messageID	This is a unique number, assigned by the VAR. This is an optional field. .
correlationID	This is identical to the messageID on the message being confirmed by the VAR. This is a required field.
State	Indicates the extent to which the message has been processed by the VAR.
stateMessage	Optional text stream that can be used to provide additional information about the message transfer.

B.2.3 NESTING DESCRIPTIONS

Table B-2 defines the element nesting.

Table B-2 DTD Element Nesting Definition

Element Name	Allowed Nested Elements
prvResponseMsg	state
	stateMessage

B.2.4 EXAMPLE PROVISION RESPONSE MESSAGE

A provisioning response message with a SUCCESS state looks as below:

```
<?xml version="1.0" encoding="utf-8"?>
<prvResponseMsg xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="http://cody.glpconnect.com/XSD/ProvisionResponse_Rev1_0.xsd"
deliveryTimeStamp="25/08/2009 21:00:00 GMT" correlationID="56bdca48088610048fddba385e1cd5b8">
  <state>pass</state>
  <stateMessage>Store Ok</stateMessage>
</prvResponseMsg>
```

A provisioning response message with a FAIL state looks as below:

```
<?xml version="1.0" encoding="utf-8"?>
<prvResponseMsg xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="http://cody.glpconnect.com/XSD/ProvisionResponse_Rev1_0.xsd"
deliveryTimeStamp="25/08/2009 21:00:00 GMT" correlationID="56bdca48088610048fddba385e1cd5b8">
  <state>fail</state>
  <stateMessage>Store provisioning information to database failed. Would like resend</stateMessage>
</prvResponseMsg>
```

Appendix C: Universal Unique Identifier

The messageID used in the message will generated as a Universal Unique Identifier (UUID). 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.

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