SHOUT 3G USER GUIDE

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## Glossary

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<td>Advanced Encryption Standard</td>
</tr>
<tr>
<td>BIS</td>
<td>Bureau of Industry and Security</td>
</tr>
<tr>
<td>CE</td>
<td>Conformité Européenne</td>
</tr>
<tr>
<td>CEP</td>
<td>Circular Error Probability</td>
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<td>DoD</td>
<td>Department of Defense</td>
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<td>DoD EMSS</td>
<td>DoD Enhanced Mobile Satellite Services</td>
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<td>EAR</td>
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<td>FCC</td>
<td>Federal Communications Commission</td>
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<td>FDMA</td>
<td>Frequency Division Multiple Access</td>
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<tr>
<td>GMT</td>
<td>Greenwich Mean Time</td>
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<tr>
<td>GPRS</td>
<td>General Packet Radio Service</td>
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<tr>
<td>GPS</td>
<td>Global Positioning System</td>
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<td>GSM</td>
<td>Global System for Mobile Communications</td>
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<tr>
<td>HACC</td>
<td>Horizontal Accuracy</td>
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<tr>
<td>HDOP</td>
<td>Horizontal Dilution of Precision</td>
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<tr>
<td>IC</td>
<td>Industry Canada</td>
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<td>IMEI</td>
<td>International Mobile Equipment Identification</td>
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<td>LBT</td>
<td>L-Band Transceiver</td>
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<tr>
<td>LCD</td>
<td>Liquid Crystal Display</td>
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<tr>
<td>LED</td>
<td>Light Emitting Diode</td>
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<tr>
<td>LNA</td>
<td>Low Noise Amplifier</td>
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<tr>
<td>NOC</td>
<td>Network Operation Center</td>
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<td>OFAC</td>
<td>Office of Foreign Asset Controls</td>
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<td>PDA</td>
<td>Personal Digital Assistant</td>
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<tr>
<td>PMS</td>
<td>PECOS Message Structure</td>
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<tr>
<td>POP</td>
<td>Post Office Protocol</td>
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<tr>
<td>RF</td>
<td>Radio Frequency</td>
</tr>
<tr>
<td>RUDICS</td>
<td>Router-Based Unrestricted Digital Internetworking Connectivity Solution</td>
</tr>
<tr>
<td>SBAS</td>
<td>Satellite Based Augmentation System</td>
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<tr>
<td>SBD</td>
<td>Short Burst Data</td>
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<tr>
<td>SMS</td>
<td>Short Message Service</td>
</tr>
<tr>
<td>SMTP</td>
<td>Simple Mail Transfer Protocol</td>
</tr>
<tr>
<td>TBR</td>
<td>Time-Between-Reports</td>
</tr>
<tr>
<td>TDD</td>
<td>Time Division Duplex</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
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<td>-------------</td>
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<tr>
<td>TDMA</td>
<td>Time Division Multiple Access</td>
</tr>
<tr>
<td>VDOP</td>
<td>Vertical Dilution of Precision</td>
</tr>
<tr>
<td>USB</td>
<td>Universal Serial Bus</td>
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Introduction

The SHOUT 3G is a handheld satellite/cellular messaging and personal tracking device. It is designed to operate in single-mode with either the Iridium satellite network or any cellular network including AT&T and T-Mobile. It can also operate in Iridium/cellular dual-mode. It can transmit location information determined by a highly sensitive GPS receiver, inbound and outbound status, text messaging, and emergency/alert notifications.

The SHOUT 3G significantly improves service reliability over existing tracking products by allowing two-way communications and confirmation of the nature of the distress to the first responder community. This reduces false alerts, helps identify the nature of the emergency so that the correct assets can be deployed thereby reducing search and rescue costs, and provides communications feedback capability to the user to assist in rescue efforts. When using the Iridium link, the SHOUT 3G protocol is 100% backward compatible with the SHOUT, SHOUT nano, SHOUT ts and SHOUT gsm. In this document, the terms SHOUT 3G and 3G are used interchangeably.

The SHOUT 3G is designed with ultra-low power consumption electronics drawing less than 70μA during sleep. With an internal 2.15 A-Hr rechargeable Li-Ion battery and depending on the environmental conditions, it can send a position report every ten minutes for more than ten days (more than 1,600 reports). User is recommended to read Appendix C to learn about the impact of blocked antennas on the number of reports. The 3G is equipped with a high resolution color touchscreen and on-screen keyboards allowing transmission of free-text, canned messages and a combination of free-text and canned messages. The menu options are displayed as icons for quick access. The device can periodically wake up from sleep to send its position report to a command center. A 911 button is used for immediate emergency/alert notifications. Data are packaged in either standard or 256-bit AES encrypted format.

The SHOUT 3G is capable of sending position reports and text messages in PECOS Message Structure (PMS). The PMS complies with the Blue Force Tracking Data Format Specification as defined in the document PECOS 200907-001 Version 1.7. The 3G is shipped without PMS features activated and can only be enabled by NAL Research at the request of an authorized user. Functions related to PMS can be found in Appendix A.
The SHOUT 3G offers a variety of services including:

- **Normal Tracking** — The 3G can be programmed to automatically wake up and send a position report at a set interval ranging from once every minute to once every forty-five days (at one minute increment).

- **Emergency Alert** — When the emergency 911 button is pushed, the 3G immediately sends alerts to a designated monitoring center(s). The home base and user can then communicate to define further specifics of the situation and a response to the emergency.

- **Free-Text Messaging** — The 3G allows user to send free-text via three different sets of touchscreen keyboards.

- **Canned Text Messaging** — The 3G allows user to send canned (pre-defined) messages stored its memory. Sending canned messages saves bandwidth (effectively cost) because only short codes are transmitted to the server instead of the entire message body.

- **Waypoint Tracking** — The 3G lets user send and/or save waypoints for later retrieval. A waypoint is a GPS location that a user wants to identify and mark with a specific name tag for future reference.

- **Check-In** — The 3G allows a quick check-in message to be sent using a single key.

- **Man Down** — The 3G has an integrated motion sensor used to activate man down situation.

- **Geofencing** — The 3G accepts multiple fences defined as polygons (50 fences with up to 50 points each fence). The 3G can be activated based on conditions set by these fences.

- **Data Logger** — The 3G has a circular buffer and can be programmed to store up to 4,000 positions for later retrieval.

**IMPORTANT:** NAL Research can enable the SHOUT 3G for use on the Iridium DoD EMSS Gateway (only for the Iridium network and not cellular network). However, accessing the EMSS Gateway is not authorized until the SHOUT 3G is provisioned (sign up for airtime). Unauthorized attempts to access the EMSS
Gateway will result in immediate disabling of the offending device, which must then be returned to NAL Research for repair. Please see webpage https://sbd.pac.disa.mil for more information regarding DoD EMSS service provisioning.

**IMPORTANT:** User should not disassemble the 3G for repair or services. The warranty is voided if the 3G is disassembled. It should be returned to NAL Research for services by calling 703-392-1136 x203 or emailing contact@nalresearch.com.
Using the SHOUT 3G

The SHOUT 3G comprises of a touchscreen, a power/back button, a status LED, a guarded emergency button and a micro USB port. The button is used to power up the device and can also be used as a back key. The touchscreen allows easy access to the device features. The micro USB port is for charging, firmware update and parameter setting. The LED displays device status during emergency and tracking.

**IMPORTANT:** Unlike the cellular link which can be used indoor, the SHOUT 3G must have full view of the sky when the Iridium link is used.

### DEVICE DESCRIPTION

- **Power/Back Button**
- **Iridium Antenna**
- **GPS Antenna**
- **Touchscreen**
- **Micro USB Interface**
- **Cellular micro-SIM holder**
- **LED Status Display**
- **Guard Emergency Button**
- **Cellular Antenna**

ACCESSORIES

The following accessories are included with the SHOUT 3G.

- Manuals and Software
- AC Wall Adapter
- USB-to-micro USB Cable

CHARGING THE BATTERY

The SHOUT 3G is shipped with its internal Lithium-Ion battery partially charged. User should fully charge the 3G before use. There are two ways to charge the 3G. One is to use the supplied AC wall adapter. The other is to connect to a standard USB device. With the AC wall adapter, the charging time is approximately five hours. Charging time using a USB port depends on the type of USB port. USB 1.0 should be able to charge the 3G in about a day assuming the port is capable of producing an output current of 100mA. USB 2.0 can charge in about 8 hours assuming the current output of 0.5A. A common 2 Amp USB wall adapter can fully charge the device in under 3 hours. NAL Research offers 12VDC and 28VDC chargers sold as separate items. For solar charges, NAL Research recommends any of Solio®’s products (www.solio.com).

WARNING!

All batteries can cause property damage, injury or burns if a conductive material, such as jewelry or keys, touches exposed terminals. The material may complete an electrical circuit and become extremely hot. To protect against such unwanted current drain, exercise care in handling any charged battery, particularly when placing it inside your pocket, purse or other container with metal objects.

User should not disassemble the SHOUT 3G for replacing battery. It should be returned to NAL Research for services. Risk of explosion if battery is replaced with an incorrect type. Dispose of the batteries (3G) according to local, state and federal regulations or laws.

The 3G has a battery status symbol on top right corner of its touchscreen indicating the battery is being charged. A message will appear when charging is complete. The device can be safely operated and does not need to be turned off while charging. The charging cycle will complete quicker when the device is shut
down. While using the 3G, the battery symbol turns red when the remaining power is less than 20%. A warning message will appear when the remaining power is less than 10%.

**Touch Screen**

The SHOUT 3G has a resistive touchscreen. Either a finger or a stylus can be used to select options displayed on the screen. Resistive touchscreen offers consistent and durable performance in harsh environment. However, as with any touchscreen devices, user must be careful not to damage it with a sharp object. Unlike a capacitive touchscreen on most cellular phones whereby a slight tap of the finger is required, a resistive touchscreen requires a more moderate finger pressure. A resistive touchscreen drifts slowly over time and needs to be recalibrated. This can be done using the Setting > Calibrate menu.

Either a stylus or gloved finger can be used to access features on the resistive touchscreen.

**Basic Navigation**

The SHOUT 3G can be turned on by holding down the power/back button for approximately two seconds. A delay in displaying time and date is normal since the unit first has to check its internal clock against the GPS receiver. Once the device is on, user can touch any icon to access device features. *Again, user must remember to apply moderate pressure with a fingertip. Resistive screen requires a little more than a slight touch.* The back key can be pressed at any time to return to the previous screen. Frequently use icons can be configured to appear on the bottom of the Home menu using Settings > Favorites. The 3G can be turned off (completely off with no tracking or text messaging) at any time by
holding down the power/back button for approximately two seconds. The device automatically “goes to sleep” after 90 seconds of inactivity.

Some options require the use of on-screen keyboards to enter information. Three different keyboards are available in landscape orientation—lower case, upper case and number/special characters. User can toggle between keyboards with special designated keys next to the “Done” key. The keyboard screen is divided into three sections as shown in the figure below: (1) header bar, (2) text box and (3) keyboard.

The number displayed on the far right-hand side of the header bar indicates the remaining allowable number of characters that can be entered into the text box.

The keyboards are used to enter text inside the text box. The recommended hand-position is shown in the figure below utilizing two thumbs to tap the keyboard. While entering text, the position of the cursor in the text box is shown as a flashing white block. The block turns red when the maximum limit is reached (Remaining: 0). An alert will sound when the maximum number of characters is exceeded and additional text is entered.

User can hold down on any key while sliding around the keyboard. The key is not entered until the finger is lifted. The entire text box can be erased with the Clear button. Unclear reverses the process. Tap the Done button to accept entered text and return to the previous screen. Pressing the back key will return to the previous screen without all the changes—all the changes will be lost.
Entered text can be edited by tapping anywhere inside the text box. It is much easier to use a fingernail or a stylus to accurately position the cursor over the character to be edited. Holding and sliding a finger inside the text box will prompt the device to display a segment of the text in the header bar as shown in the figure below. The position of the cursor is displayed in red character. A space and enter key will appear as and , respectively.

**Using the Search Box** Some menu options have a Search box allowing user to search for specific keywords or phrases. The search parameters are defined using Settings > Search menu. Touching the Search box will bring up a keyboard to enter the search item.
For menus with options longer than the screen can display, a slider bar will appear on the right hand side. Hold and drag the slider with a fingertip causes the 3G to quickly scroll the list. A slight finger movement either up or down makes the 3G scroll one line at a time. Tapping above the slider prompts the screen to page up and tapping below the slider prompts the screen to page down. The active area or detect region of the slider bar is wider than the slider bar itself. Thus, it is possible to place a finger slightly away from the right edge of the screen to give a more comfortable feel.
The SHOUT 3G comprises of a 9603 module capable of SBD connectivity to the Iridium satellite network and a 2G/3G cellular module capable of SMS and IP connection. As a messaging and tracking device, its function is to send GPS reports and text messages to a network operating center (NOC). While deployed in the field, the 3G can also accept real-time text messages and commands from a NOC. For Iridium services, the SHOUT 3G can be provisioned by NAL Research or any certified Iridium airtime service provider including DoD DISA EMSS office. For cellular services, the SHOUT 3G accepts any cellular micro-SIM including AT&T and T-Mobile.

A NOC can be a sophisticated central monitoring center equipped with servers connected to high-speed networks. A NOC can also be as simple as a handheld mobile device, a laptop or a desktop attached to the Internet, to an Iridium transceiver or to any wireless network. A NOC is required to receive and implement the logic necessary for analyzing the 3G messages and determine the appropriate response.

Upon request, NAL Research will provide Server for Trackers software allowing user to install on their NOCs to retrieve NAL Research’s formatted GPS reports from the remote SHOUT 3G. In addition, the program will let a NOC communicate with modems attached to its serial ports, communicate with POP3/SMTP servers, communicate with Iridium SBD DirectIP servers, and/or act as a RUDICS server/client to support incoming and outgoing communications with the 3G. Under special cases and with a signed NDA, NAL Research will release our proprietary GPS report formats for developers to implement into their own tracking software.

Along with Server for Trackers software, SatTerm software is included for user to set up the SHOUT 3G operating parameters, geofences, contacts and canned messages. Most of the operating parameters can be set using the 3G on-screen menus. However, more sophisticated features such as encryption and geofence must be carried out via SatTerm and a connected computer to the 3G. For contacts and canned messages, the 3G sends only short codes instead of the message body to a NOC server. Short codes are then mapped to the real addresses and/or canned messages with a lookup table saved on the NOC server during setup. Therefore, when SatTerm is used to enter contacts and canned messages, SatTerm will synchronize short codes between the 3G and the NOC server. Email addresses, on the other hand, can be entered on the fly.
NAL Research also makes available a mapping NOC server to our customers for demonstration purposes ONLY. Application developers can call to inquire on how to setup a free demo account. NAL Research’s NOC server implements Google Earth to display tracking information. NAL Research assumes no responsibility for any claims or damages arising out of the use of our server. NAL Research makes no warranties on the performance or the availability of our server.
Home Screen

Immediately after powered up, user must press the unlock bar located on the bottom to the screen. A delay in displaying time and date is normal since the unit has to check its internal clock against the GPS receiver. A PIN is required if the device is setup with password protection. NAL Research ships the 3G without password protection. However, if PIN is factory-set, it should be 1111.

Once the correct PIN is entered after powered up, the home screen will appear. Device status symbols will be shown along the top three lines of the home screen. Some symbols will not appear until an event is initiated such as sending or receiving a message.

denotes the primary network used to transmit reports/messages. Either Iridium or GSM label will appear. To preserve battery life the Iridium transceiver and cellular module will only be turned on when transmitting a message or position report and, thus, a diagonal line is drawn over the symbol when off.
denotes: (1) the either Iridium transceiver or cellular module is on with real-time signal strength represented by the number of vertical bars and (2) SBD/SMS/IP message transmission is in progress. The signal strength can range from the lowest of zero to the highest of five bars. During transmission and with the Iridium link, the antenna must have a clear view of the sky. The SHOUT 3G cannot send messages or reports from inside a building via the Iridium network.

denotes the GPS receiver is off. The GPS receiver is always kept off to preserve battery life until time, date or position information is needed.

denotes the GPS receiver is on with real-time satellite acquisition status represented by the number of vertical bars. One bar represents valid time and date fix, two bars represent 2-D fix or dead reckoning, three bars represent 3-D fix with HDOP higher than 2.0 and four bars represent 3-D fix with HDOP less than 2.0. Although the SHOUT 3G’s GPS receiver can often obtain a location fix when the antenna is partially blocked (near buildings, in a room next to a window, etc.), it is recommended that the antenna must have a clear view of the sky to minimize acquisition time and better position accuracy.

battery indicator.

denotes the battery is being charged by an external power source.

denotes all audio alerts are off.

denotes audio alert is on.

denotes unread message(s) is in the Inbox.

denotes message(s) is in the Outbox ready to be sent or message(s) in queue failed to send.

denotes Geofences is on when the symbol is bright white. The symbol turns dimmed gray when geofence tracking is off. The geofence symbol will not appear when there are no fences saved into the device.
denotes Call Out is on when the symbol is bright white. The symbol turns dimmed gray when Call Out is off. The Call Out symbol will not appear when there are no Call Out times saved into the device.

denotes Mailbox Check is on when the symbol is bright white. The symbol turns dimmed gray when Mbox Check is off.

denotes Tracking (standard tracking, geofence tracking, etc.) is on when the symbol is bright white. When standard tracking is on, a countdown timer to the next report will appear beside the tracking symbol. The symbol turns dimmed gray when tracking is off.

denotes Man Down is on.

**DATE/TIME**

The current date and time are displayed in formats set by Settings > Time > Date option. The GPS receiver has an internal clock and, as long as the battery is not depleted and a valid position fix was previously acquired, the SHOUT 3G can recall the correct date and time. The message “Date/Time unavailable” is displayed when the 3G is unable to restore information from the GPS receiver.

**HOME ICONS**

The SHOUT 3G displays four main icons on its home screen each representing a menu option—Texting, Tracking, Utilities and Settings. Detailed descriptions of each of these menu options are included in the next section.

**FAVORITE ICONS**

The bottom of home screen has a favorite bar. Any of the menu icons can be configured to appear on the favorite bar using Settings > Favorites. This allows quick and easy access to the most frequently used options. A maximum of four favorite icons are allowed. The icons appear in the order of selection from left to right.
Quick Start

Airtime services must first be purchased for Iridium, cellular or both before use. Iridium airtime can be purchased directly from NAL Research or from any of Iridium certified airtime resellers. Any cellular SIM including prepaid SIM will work on the SHOUT 3G.

User is encouraged to read the entire manual to learn on how to operate the 3G as a messaging device. As a tracking device, user can quickly set up the 3G with just a few simple steps shown below. However, a server is required to receive tracking reports.

1. Turn the 3G on by holding down the power/back button for about two seconds.
2. Go to Tracking/Format menu to set the report format.
3. Go to Tracking/Links menu to select a network(s).
4. Go to Tracking/Rpt Rate menu to set the reporting rate and turn tracking on. The 3G is now in tracking mode and ready to send position reports. No further action is required. The unit automatically goes to “sleep” in between reports.

IMPORTANT: NAL Research can enable the SHOUT 3G for use on the Iridium DoD EMSS Gateway (only for the Iridium network and not cellular network). However, accessing the EMSS Gateway is not authorized until the SHOUT 3G is provisioned (sign up for airtime). Unauthorized attempts to access the EMSS Gateway will result in immediate disabling of the offending device, which must then be returned to NAL Research for repair. Please see webpage https://sbd.pac.disa.mil for more information regarding DoD EMSS service provisioning.
Texting Menu

**Texting**

The Texting menu allows user to compose, save, view, send canned or free-text messages, check mailbox for incoming messages and setup an automatically mailbox check frequency.

**Inbox**

The Inbox folder contains all incoming read and unread messages with the newest on top of the list. Read messages have a white opened envelope symbol next to them. Unread messages have a green closed envelope symbol next to them. A closed envelope symbol will appear on top of the screen when an unread message(s) is in the Inbox. When enabled using the Settings/Audio menu, the speaker will provide an audible alert for all new incoming messages.

**Drafts**

The Drafts folder contains draft messages saved under the Compose menu. The 3G stores the newest message on top and the oldest message on bottom of the list. Selecting a draft message takes user back to the Compose screen. If Send is selected, a Confirm and then Success screen will appear to indicate that the message has been added to the Outbox. If Inc GPS option is enabled then GPS location will be attached to a message. Messages with GPS location attached can take longer to complete since the 3G has to acquire a GPS position.

**Outbox**

The Outbox folder contains either messages waiting to be sent or messages failed to send. A message in the process of being sent has a << symbol next to it. A message failed to send has a red X symbol. And a message in queue waiting to be sent has no symbol. For each message queued in the Outbox waiting to be sent,
the 3G has a two-minute window to transmit. After which time, the message will be dequeued to avoid draining the battery.

Failed to send messages will stay in the Outbox sorted in the order of priority and then by the oldest to the newest messages. The symbol 🔄 appears on top of the screen when there is a queued or dequeued message(s) in the Outbox.

Failed messages can be deleted or resent (enqueue). However, if user decides to resend a failed message and if the failed message is successfully retransmitted, the SHOUT 3G will automatically attempt to resend as many remaining failed messages in the Outbox as possible in the following order of priority.

Category 1 (highest priority):
- Callout
- Cancel Emergency
- Geofence Arrive/Depart
- Man Down

Category 2:
- Check-In
- Queued Tracking Report

Category 3:
- Motion Start/End Report
- Statistics Report
- Test Report

Category 4 (lowest priority):
- Remote Update Response
- Poll Report
- Text Message
- Waypoint

If there are multiple items in the same category, the oldest will be sent first. The SHOUT 3G will also automatically resend failed messages in the order stated above after a successful transmission by any option involved accessing the network such as Tracking, Test Report, Waypoint, etc. To avoid draining the battery, user should carry out frequent maintenance on the Outbox and delete unwanted failed reports.
The Sent folder contains messages successfully sent to a NOC server. A message can be resent, forwarded or deleted. Resend puts a message back to the bottom of the Outbox folder’s sending queue. Forward takes user back to the Compose menu for additional information to be entered. User can then resend the message after modifying it or cancel the process. Delete permanently removes the message from the Sent folder. The 3G stores messages in the Sent folder with the newest message displayed on top of the list.

The Compose menu allows user to enter, edit and send canned messages, free-text messages or a combination of canned and free-text messages to: (1) a NOC server, (2) a pre-defined list of email addresses or/and (3) any email addresses entered via the keyboards.

SatTerm software is used to create and save predefined email addresses onto the SHOUT 3G’s contact list. During setup SatTerm requires connectivity between the 3G and a NOC server to synchronize the lookup table of short codes. As with canned messages, short codes are used to map the actual email addresses to a lookup table located at a NOC.

When the Compose menu is selected, a screen will appear with two distinct regions—“To: Server” and “Canned Message:”. Holding a finger inside the To: Server region prompts the SHOUT 3G to display two options, Choose Contacts and Enter Emails, as shown in figure below. User can slide a finger back and forth between these two options and must also remember to apply moderate pressure on the touchscreen while sliding the finger. DO NOT lift the finger until the right choice is selected. Slide the finger away to the top of the screen or bottom of the screen cancels this option.
After Choose Contacts is selected and if contacts were entered with SatTerm, a list of contacts will appear in alphabetical order. Select a single contact or multiple contacts on the list and tap Add to accept. A contact can be removed by going back to Choose Contact, unselecting the contact and tapping Add. Pressing the back key instead of Add after selecting or unselecting a contact will cancel the choice(s).
After Enter Emails is selected a keyboard will appear. Multiple email addresses can be entered separated by a comma. All email addresses including the commas must be added up to a total of 255 characters or less. The 3G keeps track of the limit and will prevent user from entering email addresses longer than allowed. Email addresses and free-text message share the same memory space with a maximum allowable length of 309 characters. Long email addresses or multiple email addresses will reduce the number of characters available for a free-text message. User is reminded that the 3G sends short codes representing the contacts listed under To; however, the 3G sends the actual email addresses listed under Emails. Any email addresses entered under Enter Emails can be removed by going back to the keyboard under the Enter Emails popup menu.

Holding a finger inside the Canned Message region prompts the 3G to display two options—Choose Can’d Msg and Enter Text. After Choose Can’d Msg is selected and if canned messages were entered with SatTerm, a list of canned messages will appear in the order they were entered with SatTerm. Tap on a canned message to prompt the 3G to display the complete canned message and tap Select to choose the message. After a canned message has been chosen, holding a finger inside the Canned Message region will show Remove Can’d Msg. Selecting Remove Can’d Msg allows user to remove the selected canned message at any time, even after free-text has been entered.
As with the contact list, SatTerm is used to create and save canned messages into the SHOUT 3G’s memory. During setup SatTerm requires connectivity between the 3G and a NOC server to synchronize the lookup table of short codes. Sending canned messages saves bandwidth and airtime cost because it is only short codes that are being transmitted instead of the entire message body. The short codes are defined by application developers and not by the 3G.

The Enter Text option lets user create free-text messages with three on-screen keyboards. If a canned message is previously selected then the entered free-text will be appended to the canned message.

After finish selecting a canned message and/or composing a free-text message, user can either Send the message or Save as Draft. If Send is selected, a Success screen will appear to indicate that the message has been added to the Outbox. The 3G must then be held with the antennas having full view of the sky if the Iridium link is used. If Inc GPS option is turned on then GPS location will be added to the message. Messages with GPS location takes longer to complete since the 3G has to acquire a GPS fix.

**Contacts**

The Contacts is an address book with a list of contacts created and saved into the SHOUT 3G’s memory using NAL Research’s SatTerm software. During setup SatTerm requires connectivity between the 3G and a NOC server to synchronize
the lookup table of short codes. As with canned messages, short codes are used to map real addresses to a lookup table located at a NOC.

Each contact is stored in a four-line format. The first line can have up to 30 characters, the second can have 50 characters, the third can have 30 characters and the fourth can have 30 characters. The information contained in each line is defined by developers and not by the 3G.

Figure below displays an example of the formatted contact defined by the NAL Research’s NOC server. The first line has the contact name, the second line has the e-mail address, the third line has the phone number and the fourth line has the home address. Upon receiving a free-text or canned message from the 3G that is referenced to a specific contact, the NAL Research’s NOC server forwards the message to the email address listed on the second line of the contact. Application developers can define their own set of rules with information contained in the contact so that their NOC servers can use to determine the appropriate response.

![Contact Example]

**CHK MBOX**

This option is available ONLY when the Iridium link is enabled.

There are three ways the SHOUT 3G can initiate a mailbox check for any pending messages at the Iridium gateway:

1. User can manually force the 3G to check the mailbox at any time using Chk Mbox menu.
2. When tracking mode is enabled, the 3G automatically checks the mailbox each time it wakes up to send a position report.

3. Using the Mbox Rate menu (see below for detailed description), the 3G can be set to automatically wake up and check the mailbox at a preset frequency. A position report will not be sent when the 3G wakes up to check the mailbox unless the mailbox check rate coincides with the tracking report rate.

The Check Mailbox menu can either be in Idle or Checking the Iridium gateway for any pending messages to be downloaded. As the messages are being downloaded, the 3G shows the number of Unread messages in the Inbox and the number of messages still Queued at the Iridium gateway to be downloaded.

**Mbox Rate**

This option is available ONLY when the Iridium link is enabled.

The Mbox Rate is used to set mailbox check rate (time between mailbox checks) and to enable mailbox check automatically. User can select either a predefined rate or a user-defined rate with an onscreen keypad. The Mailbox Check Rate menu is dimmed when mailbox check is disabled. However, even when mailbox check is disabled and the labels are dimmed, user can still enter the rate.

When mailbox check is enabled, the symbol 📨 will light up from dimmed gray to bright white on top of the screen. The 3G will check the Iridium gateway automatically for any pending messages on the next scheduled time.
mailbox check is enabled and the 3G sleeps in between checks, the status LED flashes once every five seconds. The status LED can be turned off during sleep to reduce power consumption by using Settings/LED.

**Inc GPS**

The Inc GPS option forces the SHOUT 3G to attach GPS location to Check-In and canned and free-text messages. Under default setting, these messages do not have GPS information included. Messages with GPS location attached can take longer to complete since the 3G has to acquire a GPS fix first. Depending on the validity of the stored ephemeris data, it could take an additional 29 seconds.

**Memory**

Memory is used to clear messages in all mail boxes or clear messages in each individual box—Drafts, Inbox, Outbox and Sent.
Tracking Menu

The Tracking menu for the SHOUT 3G is shown below. Some options are very complex including Geofences, cellular IP routing, and Call Out that require SatTerm to setup. For these options, user is referred to the “SatTerm for SHOUT 3G” manual.

Rpt Rate

The Rpt Rate is used to set the tracking report rate (time between tracking reports) and to enable tracking. User can select either a predefined rate or a user-defined rate with an onscreen keypad. The Reporting Rate menu is dimmed when tracking is disabled. However, even when tracking is disabled and the labels are dimmed, user can still enter the report rate.

The On/Off buttons are used to enable/disable the SHOUT 3G tracking mode. When tracking is On, the tracking symbol on top of the screen changes from dimmed gray to bright white. The 3G immediately turns the GPS receiver on to acquire a GPS fix and then attempts to transmit a position report. The next position report is sent automatically based on the reporting rate. Countdown timer to next report is displayed inside the parentheses next to the tracking symbol. When tracking is enabled and the 3G sleeps in between position reports, the status LED flashes once every five seconds. It can be turned off during sleep to reduce power consumption by using Settings/LED. The emergency 911 button can be activated at any time during tracking mode or non-tracking mode. The 3G can also be powered up at any time and be used as a texting device.
When waking up to transmit a location report and the Iridium link is used, the 3G antennas must have full view of the sky; otherwise, it will fail to send. By default, a failed report will not be resent. Using the Q Rpt menu, failed reports can be forced to stay in the Outbox awaiting to be resent (see Outbox description).

The entire reporting duration can take up to two minutes depending on the Iridium satellite visibility and the validity of the GPS ephemeris data. Ephemeris data saved on the GPS receiver is valid for approximately two hours allowing the receiver to obtain a hot-start fix. Report rate (time between reports) set to more than two hours forces the GPS receiver into either a warm-start or cold-start fix (~29 seconds). As a result, the 3G will consume more battery power and the total number of reports is reduced. User is encouraged read the Power Consumption section.

**IMPORTANT:** The SHOUT 3G will automatically resend all failed messages in the Outbox after a successful position report transmission. To avoid draining the battery unintentionally, user should carry out frequent maintenance on the Outbox and delete unwanted failed messages.

The 3G logs and saves all position reports in its circular memory. When its memory is full, the oldest report is over-written. SatTerm can be used to retrieve all position reports saved on the 3G.

The SHOUT 3G can transmit position reports in either 30-byte format or 10-byte format. Both of these formats are backward compatible with the SHOUT nano and SHOUT ts.

The 30-byte format includes UTC date, UTC time, latitude, longitude, altitude, speed, course, vertical velocity, number of satellites used to obtain 3-D fix, HDOP and VDOP. Latitude and longitude are recorded with about 0.18 meters in resolution.

The 10-byte format includes UTC time, latitude, longitude and PDOP. With UTC date omitted, the 3G relies on the NOC server to stamp the date as the report arrives. Encryption is not available with the 10-byte format. Latitude and longitude are recorded with about 1.1 meters in resolution. The 10-byte format is selected strictly for the purpose of Iridium airtime cost-saving.
The 3G can also send position reports in PECOS Message Structure (PMS). The PMS complies with the Blue Force Tracking Data Format Specification. The 3G is shipped without PMS features activated and can only be enabled by NAL Research at the request of an authorized user. Functions related to PMS can be found in Appendix A.

The Link assigns the network(s) used to transmit reports and messages. Three options are available—Iridium network only, cellular network only or both. If both networks are allowed, another menu will appear requiring user to select a primary network. The SHOUT 3G will always use the primary network to transmit reports and messages. The secondary network will only be used if the primary network is not available. Switching between primary and secondary networks is managed by the SHOUT 3G automatically. The SHOUT 3G’s default link setting is both with Iridium network as the primary link. User is reminded that some options are available only on one network but not the other.

This option is ONLY applicable to the cellular network.

Two options are available in routing reports/messages to an end-destination (or a NOC server) when using the cellular network—SMS and IP. When configured for SMS, the SMS Rt menu provides options for routing to either an SMS phone number or an email address. Phone number should be the number for a phone or a device (specific to the cellular carrier) capable of receiving SMS messages. When selecting a phone number, ‘national’ or ‘international’ must be selected to specify the format of the phone number. If the format is unknown, choose ‘national’. If email address routing is desired, a routing phone number must be
provided (e.g., T-Mobile routes SMS emails with phone number 500 and AT&T routes SMS emails with phone number 121) along with the email address. Messages and reports can also be routed to an IP address. The IP option is only configurable through SatTerm. User is referred to the “SatTerm for SHOUT 3G” manual.

**Geomfences**

In addition to “standard” tracking enabled through the Rpt Rate menu, Geofences is another tracking option tailored for specific applications. Geofence tracking works independently as a separate tracking mode or can be implemented along with standard tracking. Setting geofence parameters is complex. NAL Research recommends the use of both SatTerm and Google Maps®. However, user can also enter a sequence of latitude and longitude pairs to define a fence. User is referred to the “SatTerm for SHOUT 3G” manual.

A geofence is a set of connected latitude and longitude coordinates that defines a region or zone of interest. A geofence must be bounded by a minimum of 3 coordinates and a maximum of 50. Each fence has a unique tracking profile that triggers the SHOUT 3G to change its tracking behavior while inside a specific fence; e.g., allow the SHOUT 3G to use Iridium, cellular, both Iridium and cellular or to turn off all transmitting radio links (Iridium and cellular) for regions that require radio silence. A geofence can be configured to send special arrive/depart report upon entering and/or exiting the fence.

The Geofences menu limits user to a just few options including: (1) browsing a list of fences loaded into the device through SatTerm, (2) viewing the map of each fence and its type of notification (arrival or departure), and (3) enabling/disabling a fence. Other geofence features must be entered through SatTerm.
When a fence or fences are enabled, the Geofences symbol on top of the screen changes from dimmed gray to bright white. The 3G immediately checks the GPS receiver to see whether the device is inside an enabled fence. If the 3G is inside an enabled fence, the Geofences symbol turns green and the fence label turns green as well with the word Active attached to it. When a fence(s) is enabled and the 3G sleeps, the status LED flashes once every five seconds. It can be turned off during sleep to reduce power consumption by using Settings/LED.

Symbol turns green when the device is inside an active fence

The Brevity code is part of the PMS format. The 3G will ignore the Brevity code settings if PMS/PECOS format is not activated and not selected. Functions related to Brevity code can be found in Appendix A.

The Man Down option allows user to set the options used by the Man Down Alert feature. The Man Down Alert detects when the SHOUT 3G is motionless for a configurable amount of time and triggers up to 3 different alerts if user does not respond affirmatively to an “Are You OK?” popup menu. Once Man Down begins alerting, it can be canceled by selecting the Cancel 911 menu or selecting “Off” on this menu. The following settings are configurable through this menu:

- **Time Down Duration** – the amount of time the device must remain motionless before the “Are You OK?” menu will display. “Motionless” is defined as when the SHOUT 3G does not detect a predefined type of motion over a period of time called Time Down Duration. SatTerm software is used to enter the predefined type of motion into the SHOUT 3G.
Count Down Duration – the amount of time for user to respond to the “Are You OK?” popup menu. If the countdown expires or the user selects “No”, the selected Man Down Alerts will trigger.

Alerts – any combination of the following three alerts can be selected.

- **Locator Alert**: Configurable audio alert that sounds until the Man Down Alert is disabled. The alert type can be set from the Audio menu.
- **Start Emergency**: Starts emergency mode as if the red emergency button were pressed.
- **Send Message**: Sends a text message with a Man Down short code and GPS location information.

The **Call Out** allows the SHOUT 3G to send a scheduled daily tracking report at a defined GMT time using a specific link. Scheduled times are entered via SatTerm software and are listed under the Call Out menu. When a Call Out time is selected, the symbol will light up from dimmed gray to bright white on top of the screen.

The Call Out option could be used by customers who need the device to transmit at a specific time and/or want to generate a daily heart beat message for each link. User is referred to the “SatTerm for SHOUT 3G” manual.
**Q Rpt**

The SHOUT 3G’s default setting is to discard all tracking reports that were failed to transmit because of poor signal quality. Q Rpt allows user to force failed tracking reports to stay in the Outbox waiting to be resent at a later time. User is referred to the Outbox section on description of when failed tracking reports get resent.

**BLK Rpt**

The SHOUT 3G’s default setting is to send all tracking reports, even those with invalid GPS position. Blk Rpt gives user the option to configure the SHOUT 3G to send only tracking reports with a valid GPS position.

**DATA LOG**

The SHOUT 3G’s default setting is to log and save all position reports in its circular memory. This feature can be turned off with the Data Log menu. When the 3G’s memory is full, the oldest reports are over-written. SatTerm can be used to retrieve all position reports saved on the 3G.

**STATS**

The Stats menu has a countdown timer to the next report on top of the screen and is replaced with Off when tracking is disabled. The bottom half of the screen displays the last successful report sent by tracking or emergency notification. Check-In, Way Point, free-text and canned messages are not considered as “reports” and, therefore, will not be displayed even if a message was sent successfully.

**CANCEL 911**

After the red emergency button in the back of the 3G is pressed, user can deactivate the emergency alert by selecting the Cancel 911 option. The cancellation message is then queued in the Outbox to be transmitted. The emergency mode ends immediately. The emergency LED is turned off and the top bar turns from red back to black.

Powering the 3G off will not cancel the emergency mode. User MUST select Cancel 911 option to cancel emergency.
Utilities Menu

The Utilities menu provides six options used mainly to check for proper hardware operation and network setup.

**CHK GPS**

The Chk GPS forces the SHOUT 3G to turn on its GPS receiver and to continuously update and display GPS data in real-time. The GPS receiver remains on until user leaves this screen by pressing the back button. The Reset Ephemeris key is used to force the 3G to erase saved ephemeris in its memory and download a new set of ephemeris data. User must be careful not to deplete the battery power by staying on this option for too long.

The accuracy of the position can be monitored by observing the HACC. HACC stands for horizontal accuracy in meters. HACC is defined as the radius of a circle centered on the true value that contains the GPS measurement. Thus, a position fix with ten meters HACC accuracy indicates that it is within ten meters of the true position—the higher the HACC value, the less accurate the GPS measurement.

The Check GPS option is a good indicator of whether or not the GPS receiver has sufficient signal to initiate a Way Point or a Test Report when located in a challenging environment; e.g., in dense foliage or around urban settings with tall buildings. HACC can be monitored in real-time to make sure it converges to a small and stable value (usually less than 30 meters). At which point, it is certain that a 3-D fix can be obtained with the most current ephemeris data being...
updated and saved. User can then go back to the Utilities menu to send a test report. When the GPS receiver cannot acquire a fix, HACC gradually increases and, at some point, stops at a value of 4294967.500. It is an indication that the surrounding obstructions prevent the GPS receiver from obtaining a fix and user should move on to a different location.

**CHK IRI DIUM**

The Chk Iridium forces the SHOUT 3G to turn on its Iridium transceiver and continuously update and display signal strength in real-time. The Iridium transceiver remains on until user leaves this screen by pressing the back button. User must be careful not to deplete the battery power by staying on this option for too long.

**CHK GSM**

The Chk GSM forces the SHOUT 3G to turn on its cellular transceiver and continuously update and display signal strength in real-time; make sure the device have an active cellular SIM card. The cellular transceiver remains on until user leaves this screen by pressing the back button. User must be careful not to deplete the battery power by staying on this option for too long.

**TEST RPT**

When the Test Rpt option is selected, the SHOUT 3G immediately turns the GPS receiver on to update its location data. The location information is continuously updated and displayed in real-time whether there is a valid fix or not. Similar to the Chk GPS option, HACC can be monitored to see if a valid fix is possible. Once a valid fix is obtained, the GPS receiver is turned off and the most recent 3-D fix information is displayed on the screen. This information called test report can be forced to send to a NOC server by pressing Send. A test report has the same format as a regular position report and is treated as such by a NOC. Sending a test report will not disrupt or change the tracking reporting rate.

Test Rpt option is a good diagnostic tool used to ensure proper operation of the GPS receiver, the Iridium transceiver and the cellular transceiver. It can also be used to manage battery life by turning off tracking mode and strategically sending on-demand location reports. It can be considered as “manual tracking mode”.

**CHK-IN**

The Chk-In allows user to send a quick message with a single, easy-accessed button. When the Chk-In button is pressed, a second screen will appear requesting confirmation. Once confirmed, the SHOUT 3G sends out a reserved canned message code representing a Chk-In message. If Texting/Inc GPS option is enabled, GPS location will be attached to the Chk-In message.
messages with GPS location takes longer to complete since the 3G has to acquire a GPS fix first.

The Waypts menu is used to acquire, view, save, delete or send a waypoint to a NOC. The 3G can save up to 1,000 waypoints in its circular memory. SatTerm can be used to retrieve waypoints saved on the 3G.

A waypoint is a GPS location that user wants to identify and mark with a specific name tag for future reference. When New is selected, the SHOUT 3G immediately turns the GPS receiver on to acquire a fix. User then has the options to go back without further action, to re-acquire a new GPS fix, to label the point, or to save the waypoint. Selecting the Label option will bring up a full keyboard allowing user to enter the waypoint label. The Add option saves the waypoint into the 3G’s non-volatile memory for later retrieval. After saving a waypoint, user can also send it to a NOC server. The server differentiates waypoint report from normal tracking report by their short codes.
Settings Menu

Settings
The Settings menu allows user to view and configure the SHOUT 3G hardware settings.

Audio
The Audio option is used to change the frequency, tone, mute setting of a variety of audio alerts including incoming messages, general error, geofences and man down locator alert. In addition to the individual settings, all audio can be muted through a single setting (except the locator alert). The icon will appear on top of the screen if Mute All is on. User can test the audio volume and sound before selecting by using Preview.

Backlight
The Backlight option is used to set the period of inactivity after which the SHOUT 3G turns the LCD backlight off. Setting the backlight to Always On is recommended for night time use.

Calibrate
A resistive touchscreen drifts slowly over time and needs to be recalibrated once in a while. Calibrate option allows users to either reset the calibration back to factory settings or to recalibrate specific to the condition of the touchscreen. In case the 3G is accidently recalibrated with erroneous settings and user is unable to use the touchscreen to recalibrate or reset to factory settings, with the 3G powered off hold the power button for ~7 seconds or until the reset calibration screen comes up. DO NOT connect the 3G’s USB port to any device.

Contrast
The Contrast option is used to change the LCD brightness. Slide the contrast bar to the desired setting and press back to accept.
**FAVORITES**

The Favorites option lets users select any icon to appear on the bottom of the home screen. This allows quick and easy access to the most frequently used options. A maximum of four active favorite icons are allowed. The icons will appear in the order selected.

**GPS**

The GPS menu provides access to the Position Format and Position Model options. Position Format is used to select one of four different GPS position formats to be displayed on the LCD screen. This option is not to be confused with the Format option under Tracking, which defines the format of position report to be transmitted to a NOC.

Position Model is used to formulate the static and dynamic characteristics of the GPS receiver. By default, portable model is used; this is suitable for most applications. However, for those requiring functionality at high altitudes, speeds, or accelerations, an alternate model should be selected.

- **Portable (default setting):** Suitable for most situations; for applications with low accelerations; maximum altitude of 12 km; maximum velocity of 310 m/sec; maximum vertical velocity of 50 m/sec; sanity check type: altitude and velocity; maximum position deviation: medium.

- **Stationary:** Used in timing applications (antenna must be stationary) or other stationary applications; velocity is constrained to 0 m/s; zero dynamics assumed; maximum altitude of 9 km; maximum velocity of 10 m/sec; maximum vertical velocity of 6 m/sec; sanity check type: altitude and velocity; maximum position deviation: small.

- **Pedestrian:** Applications with low acceleration and low speed, as a pedestrian would move; assuming low accelerations; maximum altitude of 9 km; maximum velocity of 30 m/sec; maximum vertical velocity of 20 m/sec; sanity check type: altitude and velocity; maximum position deviation: small.

- **Automotive:** Used for applications that can be compared with the dynamics of a passenger car; assuming low vertical acceleration; maximum altitude of 6 km; maximum velocity of 84 m/sec; maximum vertical velocity of 15 m/sec; sanity check type: altitude and velocity; maximum position deviation: medium.
• Sea: Recommended for applications at sea; assuming zero vertical velocity; maximum altitude of 500 m; maximum velocity of 25 m/sec; maximum vertical velocity of 5 m/sec; sanity check type: altitude and velocity; maximum position deviation: medium.

• Airborne < 1g: Used for applications that have to handle a higher dynamic range than a car and higher vertical accelerations; no 2D position fixes supported; maximum altitude of 50 km; maximum velocity of 100 m/sec; maximum vertical velocity of 100 m/sec; sanity check type: altitude; maximum position deviation: large.

• Airborne < 2g: Recommended for typical airborne environment; no 2D position fixes supported; maximum altitude of 50 km; maximum velocity of 250 m/sec; maximum vertical velocity of 100 m/sec; sanity check type: altitude; maximum position deviation: large.

Airborne < 4g: Only recommended for an extreme dynamic environment; no 2D position fixes supported; maximum altitude of 50 km; maximum velocity of 500 m/sec; maximum vertical velocity 100 m/sec; sanity check type: altitude; maximum position deviation: large.

Only English is available for this firmware version.

The SHOUT 3G has a status LED on the bottom left corner to alert user of whether the device is in emergency mode, tracking mode, geofence tracking, mailbox check or call out. Except for the Emergency mode, the LED flashes once every five seconds when other modes are enabled and the device sleeps. The LED turns solid green when the Emergency mode is enabled. The LED can be turned off for either of these two cases to save battery power using the LED option.

The Reset option restores all setup parameters back to the manufacturer’s settings. When Reset is selected, a screen will appear with the current settings and user will be asked to confirm whether or not to reset these current settings back to the manufacturer’s default settings.

The Search option allows user to set the search parameters for canned messages, contact list and mailboxes.
| **Security** | The Security option is used to enable or disable the power up PIN code and Access Control List PIN code and to setup the Access Control List. The PIN code can be up to a four-digit number. The Access Control List (ACL) allows user to set which menu icons are visible. If a menu option is disabled in the ACL, it will also be removed from the favorites. |
| **Time/Date** | The Time/Date option is used to select UTC time and date formats to be displayed on the LCD screen for all menus. Local time zone can also be set. |
| **Unit Info** | The Unit Info option displays the model number, Iridium module’s IMEI number, Iridium FCC ID, Iridium IC ID, GSM FCC ID, GSM IC ID, 3G’s firmware version and 3G’s bootloader version. |
| **User Info** | The User Info option displays user information entered using SatTerm software. |
Additional Features

Emergency (911)

The emergency 911 button locates underneath a rotating guard in the back of the SHOUT 3G. It can be used at any time regardless of the tracking status (enabled or disabled) or power status (on or off). When pressed, the emergency LED immediately turns solid green to indicate that the device is in emergency mode. The device then attempts to quickly send three consecutive reports. Because these reports are sent quickly, a GPS fix may not be immediately available; however, the emergency indication flag will be set. After sending the first three emergency reports, the 3G reverts back to the default emergency time-between-reports (TBR) of two minutes. The LED can be deactivated to extend the battery life by using the Settings/LED menu. If the LCD screen is on during emergency activation, the black bar across the top of the screen will turn red. During emergency a NOC can send an acknowledgement back to the 3G.

Status LED

There is one status LED on the bottom left of the SHOUT 3G. The LED turns solid green when the 3G is in emergency mode, which can be turned off to save power using Settings/LED menu. During normal tracking, it flashes once every five
seconds when the 3G sleeps. Again, it can be turned off to save power using Settings/LED menu.

The SHOUT 3G can be powered down by holding the power On/Off button for approximately two seconds. A power down screen will appear with a message indicating tracking and messaging will be completely turned off. The screen stays on for approximately ten seconds before shutting down. User can press “Turn Off” to power down the 3G immediately, press “Lock” to go back to the power up screen, or press “Cancel” to return to the previous screen.
Appendix A: PMS Features

**Tracking**

The SHOUT 3G is capable of sending position reports in PECOS Message Structure (PMS). PMS complies with the Blue Force Tracking Data Format Specification as defined in the document PECOS 200907-001 Version 1.7. The 3G is shipped without PMS features activated and can only be enabled by NAL Research at the request of an authorized user. When PMS is enabled, the Format menu has an additional option called PECOS as shown in the figure below.

**Brevity**

With PMS enabled, user has the option to select any one of sixteen Brevity Codes (0000 through 1111) to be included in the PMS tracking reports. These codes are represented by A(z), B, C(z) and D and can be selected via the touchscreen. Each code will light up as a green dot inside the Brevity icon when selected.

**Compose**

With PMS enabled, the Compose menu does not allow user to enter an e-mail address(es) from the keyboard. The address(es) must be chosen from the contact list.

**Contacts**

With PMS enabled, the Contacts menu allows user to enter and save a contact(s) via the keyboard. The contact(s) can only have two fields—Name and IMEI number.
### Appendix B: Upgrading the Firmware

The SHOUT 3G firmware can be upgraded using a PC connected to the USB port of the device. The device drivers support Windows XP, Windows Vista and Windows 7.

1. Run the NAL USB Firmware Loader program.

![NAL USB Firmware Loader](image)

2. With a USB cable attached to a computer and the device, press the "Start Flash Mode" button.

3. Wait until it activates and then press the "Browse" button.

4. Browse and select a valid NAL device BIN file. NAL Research makes the BIN file available upon request.

5. Once the BIN file is loaded, press the "Program" button.

6. Wait for the programming to complete.

7. A message box will pop up indicating the loading is complete.

8. The new firmware is now loaded on the device. It may take a few moments for the memory to initialize after the upgrade.
Appendix C: Power Consumption

The SHOUT 3G has an internal 2.15 A-Hr Li-Ion rechargeable battery. When both the Iridium/cellular and GPS antennas have clear view of the sky and the battery is fully charged, the 3G is capable of sending more than 1,600 tracking reports with the following settings: (1) report rate of less than two hours, and (2) mailbox check rate and the report rate are the same. If the Iridium antenna is blocked or an overhead Iridium satellite is not available (or cellular antenna is blocked by metallic structures), the Iridium/cellular transceiver can potentially stay on for a significant amount of time (depending on TTKT setting) attempting to send a report. This can greatly reduce the expected number of reports transmitted on a single battery charge. In a poor signal environment there is a tradeoff between battery life and the chance that a report will be transmitted for a given report cycle; the user may want to do some testing to determine the best TTKT for their application.

The 3G saves valid ephemeris data after each 3-D fix. The data is used to reduce acquisition time in the next reporting cycle from cold-start to hot-start. If the ephemeris data is older than about two hours (that is, time between reports is set for more than two hours), the GPS receiver will go through cold-start each time it wakes up to send a report. As a result, the 3G configured for report rate of more than ~two hours can be expected to transmit only ~800 tracking reports.

**IMPORTANT:** Data presented here are only estimates and are highly dependent on the operating environment and Iridium antenna installed. Data are based on multiple measurements made with Shout-3G devices configured with the supplied Iridium antenna, placed on the roof of NAL Research’s facility with little to no blockage/shading.
Appendix D: Design Specifications

**Mechanical Specifications**

- Dimensions: 4.97” x 2.51” x 0.88” (126 mm x 64 mm x 22 mm)
- Weight: ~8.6 oz (244 g)
- Enclosure: Hard anodized aluminum housing/EMI shielding
- Connector: micro USB, Micro SIM reader
- Antennas: Iridium, Cellular, and GPS
- Key: One button power button
- Emergency:Guarded button
- LED: One status LED
- Screen: 3.0” TFT 400 x 240

**Electrical Specifications**

- USB Input Voltage: 5.0VDC
- Max USB Current sink: 1.5A @ 5.0VDC
- Battery Type: Lithium Ion
- Battery Capacity: 2.15 A-Hr
- Recharge Cycles: 500 cycles
- Power Consumption: See Appendix C

**Iridium Transceiver**

- Operating Frequency: 1616 to 1626 MHz
- Duplexing Method: TDD
- Multiplexing Method: TDMA/FDMA
- Link Margin Downlink: 13 dB average (free space)
- Link Margin Uplink: 7 dB average (free space)

**Cellular Transceiver**

- Receiver Type: u-blox LISA-U230, 3.75G
- Input/Output Impedance: 50 Ω
- Supported Bands: UMTS/HSPA: I, II, IV, V, VI, VIII (2100, 1900, 1700, 850, 800, 900 MHz)
  GSM/GPRS/EDGE: quad band (850/900/1800/1900 MHz)
GSM/GPRS power Class:  
Class 4 (33 dBm) for GSM/EGSM (850/900 MHz)  
Class 1 (30 dBm) for DCS/PCS (1800/1900 MHz)  

GPRS data rate:  
up to 85.6 kbps down/up (multi-slot class 12)  

EDGE power class:  
E2 (27 dBm) for 850/900 MHz bands  
E2 (26 dBm) for 1800/1900 MHz bands  

EDGE data rate:  
up to 236.8 kbps down/up (multi-slot class 12)  

WCDMA/HSPA power class:  
Class 3 (24 dBm)  

HSUPA cat 6 data rate:  
up to 5.76 Mbps up  

HSDPA cat 14 data rate:  
up to 21.1 Mbps down  

WCDMA PS data rate:  
up to 384 kbps down/up  

**GPS Receiver**  

GPS Receiver:  
MAX-6Q  

Receiver Type:  
L1, C/A, 50-channel  

Update Rate:  
5 Hz  

Accuracy:  
2.5 m CEP (position)  
2.0 m CEP (SBAS)  

Acquisition:  
26 seconds cold-start  
<1 second hot-start  

Sensitivity:  
–161 dBm (tracking)  
–160 dBm (hot-starts)  
–148 dBm (cold-starts)  

**Environmental Specifications**  

Operating Temperature:  
–4°F to +140°F (–20°C to +60°C)  

Charge Temperature:  
32°F to +113°F (0°C to +45°C)  

Operating Humidity:  
≤ 75% RH  

Storage Temperature:  
–4°F to +95°F (–20°C to +35°C)  

Storage Humidity:  
≤ 93% RH
Appendix E: Standard Compliance

The SHOUT 3G has an internal Iridium 9603 transceiver and u-blox LISA-U230 module. The 9603 is tested to the regulatory and technical certifications shown below. It is assigned to the FCC Identifier Q639603. The LISA-U230 is assigned to the FCC Identifier XPYLISAU230.

<table>
<thead>
<tr>
<th>Regulatory Approvals</th>
<th>Radio Tests</th>
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<tbody>
<tr>
<td>FCC</td>
<td>FCC CFR47 Parts 2, 15, and 25</td>
<td>ETSI EN 301 489-1 V1.8.1 (2008-04)</td>
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<td>EN61000-4-3 : 2002 Part 4.3</td>
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<td>EN61000-4-4 : 2004</td>
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<td>EN61000-4-6 : 1996/A1 : 2001 Part 4.6</td>
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<td>EN55022:2006</td>
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Appendix F: Export Compliance

The SHOUT 3G is controlled by the export laws and regulations of the United States of America (US). It is the policy of NAL Research to fully comply with all U.S. export and economic sanction laws and regulations. The export of NAL Research products, services, hardware, software and technology must be made only in accordance with the laws, regulations and licensing requirements of the U.S. Government. NAL Research customers must also comply with these laws and regulations. Failure to comply can result in the imposition of fines and penalties, the loss of export privileges, and termination of your contractual agreements with NAL Research.

The export and re-export of NAL Research products and services are subject to regulation by the Export Administration Regulations (15 CFR 730-744), as administered by the U.S. Department of Commerce, Bureau of Industry and Security (“BIS”). See: [http://www.bxa.doc.gov](http://www.bxa.doc.gov) for further information on BIS and the Export Administration Regulations (EAR). Additional export restrictions are administered by the U.S. Department of the Treasury’s Office of Foreign Asset Controls (“OFAC”). See: [http://www.ustreas.gov/ofac](http://www.ustreas.gov/ofac) for further information on OFAC and its requirements.