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SHOUT sp USER GUIDE

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POWERED *by* IRIDIUM™

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Revision History

Revision	Date	Description	Author
A	4/7/20	Initial version	A. Schiltz, P. Kormendi, L. Perfetti, R. Raulli
B	7/7/20	PTT Options Described	R. Raulli
B.1	5/24/22	Added FCC notifications	A. Schiltz

Reference Documents

The latest revision of these documents are available from the NAL Research website at (http://www.nalresearch.com/Downloads.html).

Reference	Title	Revision / Date
[1]	Security Requirements for Cryptographic Modules, FIPS PUB 140-2, US Department of Commerce, National Institute of Standards and Technology,	May 25th, 2001
[2]	Security Requirements for Cryptographic Modules, Annex A: Approved Security Functions for FIPS PUB 140-2, US Department of Commerce, National Institute of Standards and Technology	February 19th, 2003
[3]	PECOS Message Definition Specification, 200907-001	Version 1.7 July 29, 2009

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Glossary

ACL	Access Control List
AES	Advanced Encryption Standard
BIS	Bureau of Industry and Security
CE	Conformité Européenne
CEP	Circular Error Probability
DoD	Department of Defense
DoD EMSS	DoD Enhanced Mobile Satellite Services
EAR	Export Administration Regulations
ETSI	European Telecommunications Standards Institute
FCC	Federal Communications Commission
FDMA	Frequency Division Multiple Access
GPS	Global Positioning System
HACC	Horizontal Accuracy
HDOP	Horizontal Dilution of Precision
IC	Industry Canada
IMEI	International Mobile Equipment Identification
LBT	L-Band Transceiver
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LNA	Low Noise Amplifier
NOC	Network Operation Center
OFAC	Office of Foreign Asset Controls
PMS	PECOS Message Structure
POP	Post Office Protocol
RF	Radio Frequency
RUDICS	Router-Based Unrestricted Digital Internetworking Connectivity Solution
SBAS	Satellite Based Augmentation System
SBD	Short Burst Data
SMS	Short Message Service
SMTP	Simple Mail Transfer Protocol
TDD	Time Division Duplex
TDMA	Time Division Multiple Access
UTC	Coordinated Universal Time
USB	Universal Serial Bus
VDOP	Vertical Dilution of Precision

Introduction

The SHOUT sp is an Android-powered smartphone coupled with Iridium®-based voice service and tracking / messaging capability of the SHOUT family of products. NAL Research built the SHOUT sp specifically for use with the Iridium network. It features Iridium's short burst data (SBD), SMS, voice calls, push-to-talk (PTT). In future release AES-256 voice encryption and low power tracking will be added as software upgrades.

The SHOUT sp features a high-resolution color touchscreen with an on-screen keyboard and the NAL Research SHOUT app. The included app supports transmission of tracking reports and a combination of freeform text and canned messages. A guarded *Emergency* button is used for immediate emergency/alert notifications.

The SHOUT sp offers a variety of services including:

- **Normal Tracking** – Programmed to automatically wake up and send a position report at a set interval ranging from continuous to once every seven days.
- **Emergency Alert** – Sends alerts to a designated monitoring center using an *Emergency* button. The monitoring center and the user may then communicate to define further specifics of the emergency.
- **Canned Text Messaging** — Allows the user to send canned (pre-defined) messages stored in device memory. Sending canned messages saves bandwidth (and airtime cost) because only short codes are transmitted to the server instead of the entire message body.
- **Waypoint Tracking** — Lets the 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** — Allows a quick check-in message to be sent.
- **Integrated Camera with Flash** – Included is a 5 megapixel camera for taking images.
- **Push-to-Talk** – Full push-to-talk capability with a single button on the side of the device using Iridium's Commercial PTT service. This function is made available when the PTT App is launched and running.
- **Low Power Tracking** – Allows tracking with the Android framework powered off to maximize battery life and the number of reports.
- **AES-256 Voice Encryption** – (FUTURE RELEASE) Encryption of circuit-switched voice calls.

The SHOUT sp reporting formats are 100% compatible with the SHOUT, SHOUT nano and SHOUT ts when using the Iridium link.

The SHOUT sp main application menu options are displayed as icons for quick access. The device can periodically wake up from sleep to send its position report to a network operation center (NOC). An *Emergency* button is used for immediate emergency/alert notifications. Data are packaged in either unencrypted or 256-bit AES encrypted format. The 256-bit AES encryption algorithms for data implemented in the SHOUT sp comply with NIST FIPS140-2 (see documents *Security Requirements for Cryptographic Modules, FIPS PUB 140-2, US Department of Commerce, National Institute of Standards and Technology, May 25th, 2001* [1] and *Security Requirements for Cryptographic Modules, Annex A: Approved Security Functions for FIPS PUB 140-2, US Department of Commerce, National Institute of Standards and Technology, February 19th, 2003 [2]*).

The SHOUT sp 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 [3]. Functions related to PMS can be found in Appendix A.

IMPORTANT: The SHOUT sp is capable of operation on the Iridium DoD EMSS Gateway when it is equipped with a DISA EMSS Iridium SIM card. However, accessing the EMSS Gateway is not authorized until the SHOUT sp 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 the webpage https://emss.pac.disa.mil for more information regarding DoD EMSS SIM cards and service provisioning.

IMPORTANT: The user should not disassemble the SHOUT sp for repair or services. The warranty is voided if the SHOUT sp is disassembled. It should be returned to NAL Research for service. Contact NAL Research Tech Support by dialing 888 SHOUT NR (888-746-8867) or emailing support@nalresearch.com.

Using the SHOUT sp

Device Description

The SHOUT sp user interface comprises a touchscreen, a power button, a status LED, a guarded emergency button, and a USB Micro-B port. The touchscreen allows easy access to the device features. The USB Micro-B port is for battery charging, updating firmware and parameter setting. The LED displays emergency and tracking mode status.

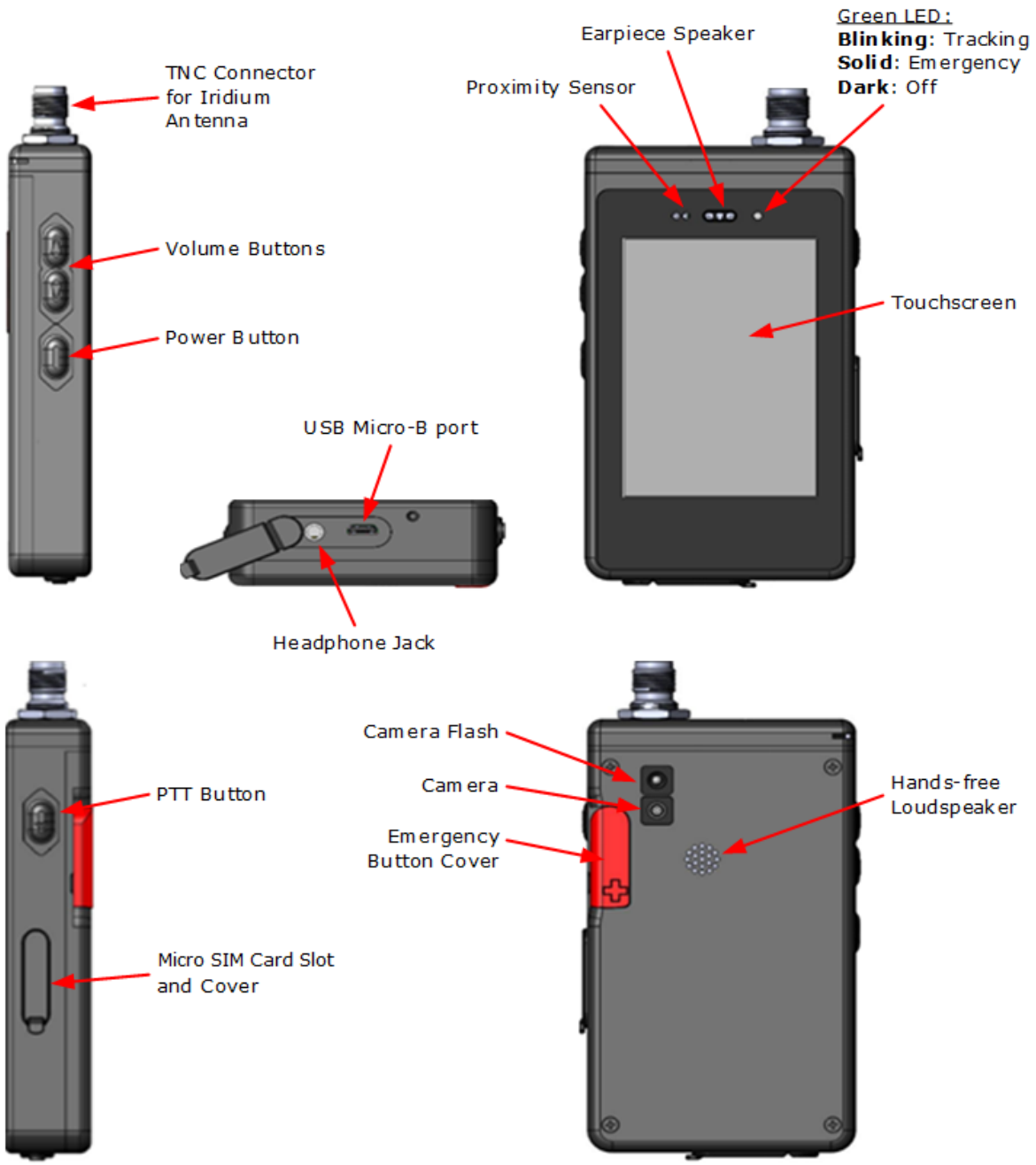


Figure 1: SHOUT sp Views and Features

Accessories

The following accessories are included with the SHOUT sp.

Manuals and Software | AC Wall Adapter | USB-A to-USB Micro-B Cable

Figure 2: SHOUT sp Accessories

Manuals and software updates are available on the NAL Research website at http://www.nalresearch.com/Downloads.html.

Charging the Battery

The SHOUT sp is shipped with its internal Lithium-Ion battery partially charged. The user should fully charge the SHOUT sp before use. There are two ways to charge the SHOUT sp. 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 SHOUT sp in about a day assuming the port is capable of producing an output current of 100mA. USB 2.0 can charge in about twelve hours assuming the current output of 500 mA. NAL Research offers 12VDC and 115V AC chargers sold as separate items.

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.

The user should not disassemble the SHOUT sp to replace the battery. It should be returned to NAL Research for service. Risk of explosion if the battery is replaced with an incorrect type. Dispose of the batteries according to local, state and federal regulations or laws.

The SHOUT sp has a battery icon at the top right of its screen indicating the battery is being charged. 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.

IMPORTANT: The SHOUT sp must be kept in environments between 0°C (32°F) and 45°C (113°F) when charging.

Power On / Off & Awaken, Reboot

The SHOUT sp can be turned on by pressing the Power Button on the side of the chassis (see Figure 1) for approximately 2 to 3 seconds. The initialization process is as follows: the LED will rapidly blink for 20 seconds and stop blinking for the next 10 seconds. The NAL splash screen will display signifying a successful boot, afterwards you will be presented with the Android home screen. Swipe up on the screen to access the device features. The device display can be configured to automatically sleep from 15 seconds to 30 minutes of inactivity through Android Settings –> Display -> Sleep.

The SHOUT sp can be awakened by pressing the Power Button for approximately 1 second.

The SHOUT sp can be completely turned off, with no tracking or text messaging at any time, by pressing the Power Button for approximately 2 seconds and pressing the *Power Off* button that displays on the screen.

If needed, the SHOUT sp can be rebooted by pressing the Power Button for approximately 10 seconds.

Touchscreen

The SHOUT sp has a capacitive touchscreen. Capacitive touchscreens are not affected by dust or grease. These screens have high resolution and high response speed. It detects touches by fingers only. It does not detect input by a gloved hand.

Basic Navigation

The *Back Arrow* button at the bottom of the display can be pressed at any time to return to the previous screen. Icons can be moved to appear anywhere on the screen by pressing, holding and dragging them to their new destination. The new destinations can be either a new home screen page or the Favorite Bar at the bottom of the screen.

Figure 3: Back Arrow Button

Network Operating Center (NOC)

The SHOUT sp contains an Iridium 9523 L-band transceiver module capable of SBD connectivity to the Iridium satellite network. When used as a messaging and tracking device, its function is to send GPS reports and text messages to a network operation center (NOC). While deployed in the field, the SHOUT sp can also accept real-time text messages and commands from a NOC. For Iridium services, the SHOUT sp can be provisioned by NAL Research or any certified Iridium airtime service provider including DoD DISA EMSS office.

A NOC can be a sophisticated central monitoring center equipped with servers connected to high-speed networks or a NOC can 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 SHOUT sp messages and determine the appropriate response.

Server for Tracker Software

Upon request, NAL Research can provide *Server for Trackers* software allowing user installation on their NOCs for the retrieval of NAL Research's formatted GPS reports from the remote SHOUT sp. 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 SHOUT sp. 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.

NAL VUE

NAL Vue from NAL Research is a subscription-based NOC service which delivers maximum situational awareness to assist with timely and effective decisions-making. As a device agnostic system, NAL Vue integrates all of the user's global trackable assets into a single, secure web-based platform. The supervisor can visualize device position, velocity and heading, exchange messages with your team in the field over satellite or cell channels. NAL Vue is a mature product operated on redundant servers at a Tier II data center.

Home Screen

Home Screen

The SHOUT sp uses the standard Android Framework to render its display screens and to provide a familiar user experience on a powerful industry standard interface. Immediately after device power up, the user must Swipe Up from the bottom of the screen to unlock the device. A PIN is required if the device is setup with password protection. NAL Research ships the SHOUT sp without password protection. However, if the PIN is factory-set, it should be 1111.

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

Figure 4: SHOUT sp Home Screen

Status Symbols

Battery indicator (Lightning Bolt). Denotes the battery is being charged by an external power source.

Battery indicator (gray and white). Indicates the remaining battery power level.

Missing Sim Card Indicator. Illustrates that a Micro SIM card has not been inserted into the device. If the device has a Micro SIM card inserted, then no symbol will appear on the screen.

Wi-Fi Indicator. Denotes Wi-Fi signal when the SHOUT sp is connected to a Wi-Fi hotspot.

Network Indicator. Indicates the Iridium transceiver's real-time signal strength.

Note: *During transmission the antenna must have a clear view of the sky. The SHOUT sp cannot typically send messages or reports from inside a building.*

Clock. The current time is displayed in formats set by the Settings -> Display -> Time Zone option. The choices are UTC or Android Time Zone.

PTT. The PTT indicator is present when the SHOUT sp is in push-to-talk [PTT] mode. The icon is not present when the PTT App is not running and the device is in Telephony Mode.

Favorite Icons

The bottom of home screen has a Favorite Bar. Any of the application icons can be moved to the Favorite Bar by pressing, holding and dragging them to the bar. A maximum of four favorite icons are allowed.

Quick Start

Iridium airtime services must first be purchased before use. Iridium airtime may be purchased directly from NAL Research, or from any Iridium certified airtime reseller. The SHOUT sp can make Iridium Satellite phone calls when there is an active Iridium Global SIM card inserted, or an activated DISA EMSS SIM card.

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

1. Turn on the SHOUT sp by pressing the power button for 2 to 3 seconds.
2. The LED will blink rapidly for 10 seconds while the SHOUT sp initiates its boot sequence.
3. Press the Power button to wake the SHOUT sp and display the home screen.
4. Swipe Up to unlock the SHOUT sp. (Enter a PIN if required.)
5. Tap the Shout icon.
6. Tap the Settings icon.
7. Locate and Tap *Tracking* in the settings list.
8. Scroll down and tap *Remote Message Format* in the Tracking list.
9. Tap the desired remote message format to select it from the list.
10. Tap the *Back Arrow* button at the bottom of the display, two times to return to the home screen.
11. Tap the Tracking icon
12. Tap Report Rate icon Select Tracking *On*
13. Enter the *Report Rate* in minutes.
14. Press the *Update* button to accept the changes.
15. The SHOUT sp 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.

SHOUT sp Display

Home Screen

The Android preloaded Apps screen is accessed by pressing the Applications Menu icon (highlighted with yellow) located in the favorite bar at the bottom of the SHOUT sp home screen.

Figure 5: Android App Screen Button

This following screen as shown in Figure 6 contains all of the default apps available on the SHOUT sp as well as any apps loaded by the user.

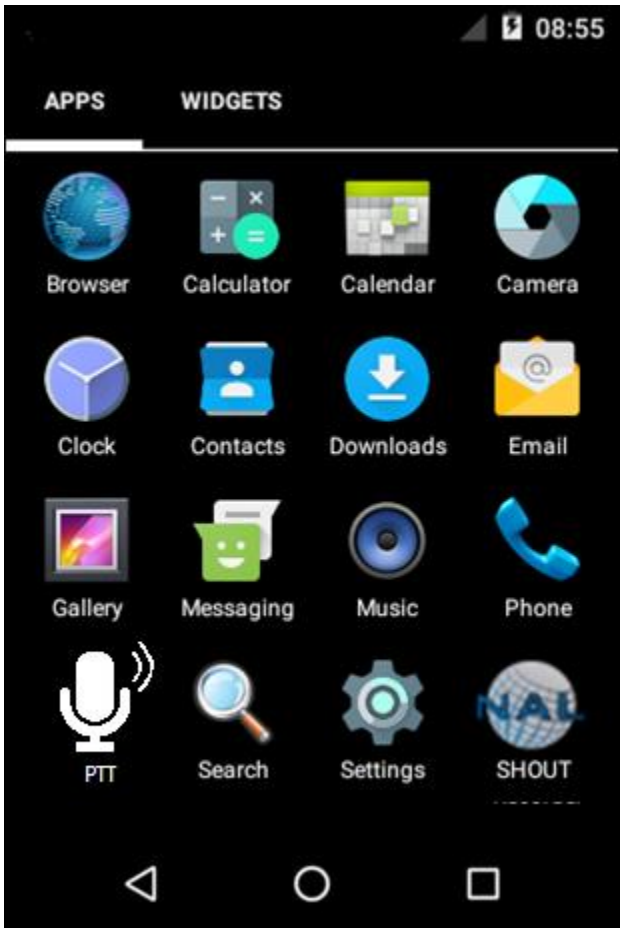
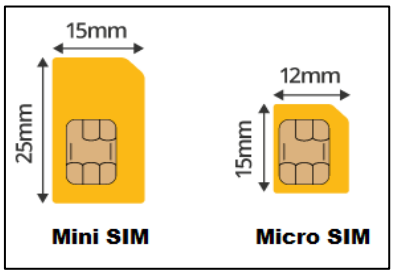


Figure 6: Preloaded Android Apps

Making a Phone Call

Phone calls can be made by tapping the *Phone* icon on the Android App Screen, or by tapping the phone icon of a desired contact.

IMPORTANT: In order to make a phone call an activated Micro SIM Card must be installed in the Micro SIM Card Slot. If a SIM card is not installed you may have to cut the Mini SIM, that was shipped with your device, to Micro SIM specifications. For help in changing your Mini SIM to a Micro SIM, contact NAL Research Customer Support by dialing 888 SHOUT NR (888-746-8867) or emailing support@nalresearch.com.



From the Android Keypad

Tapping the phone icon on the Android App Screen displays the Android phone keypad. To make a call from the SHOUT sp the user must first dial the country code then the area code, and then the phone number. **(Country code for the US is +1 or 001)**. To start a call with a **'+'** sign, Press and Hold the **'0'** key on the Android phone keypad as seen in Figure 7 below. The plus sign will display in the phone number field. Complete the phone number by tapping the keypad number keys. Tap the call icon to dial the phone when the complete phone number has been entered, as shown in Figure 8.

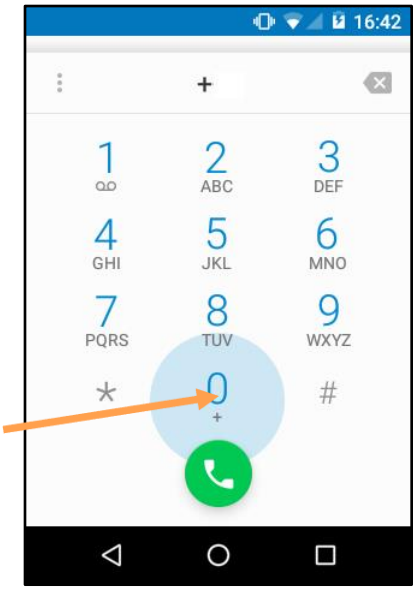


Figure 7: Android Phone Keypad

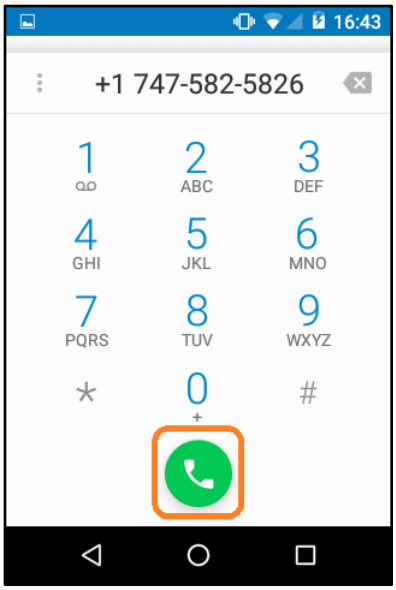


Figure 8: Call Icon

From Android Contacts

Tapping the Contact icon on the Android App Screen displays the Contacts screen as seen without any contacts in Figure 9. Press the *Create a New Contact* button to display the *Add new contact* screen as shown in Figure 10.

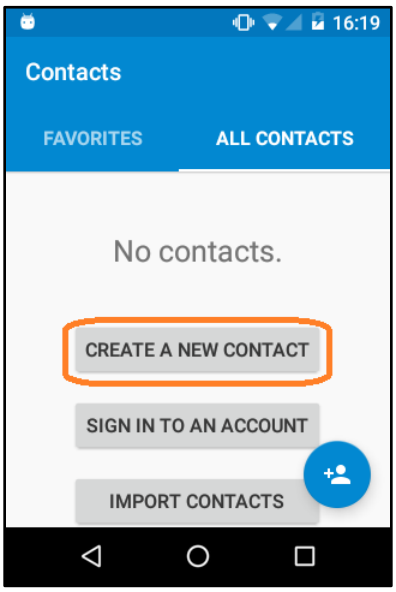


Figure 9: Create a New Contact

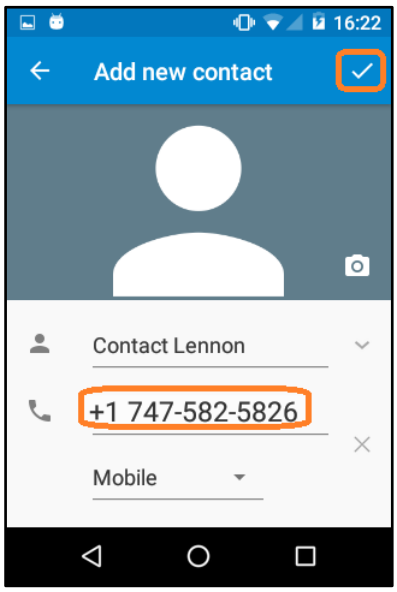


Figure 10: Contact Info.

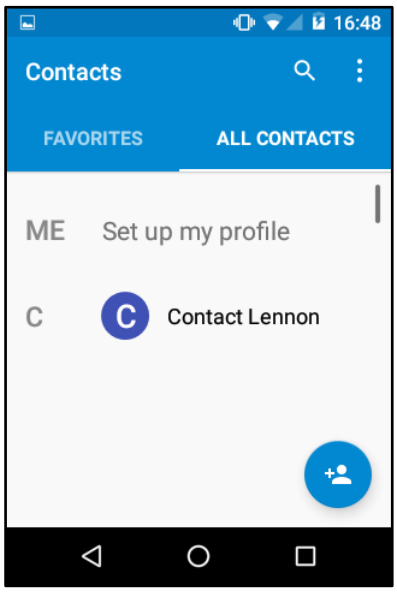


Figure 11: Contact Info.

Enter the Contact Name and Phone number and other details as needed. To start the contact's phone number with a '**+**' sign, press and Hold the '**0**' key on the Android phone keypad. When the user has finished entering contact information they may press the check mark as seen at the top right of Figure 10 to save the contact.

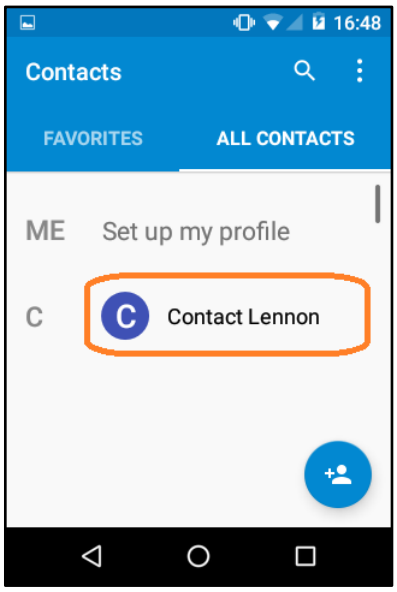


Figure 12: Create List

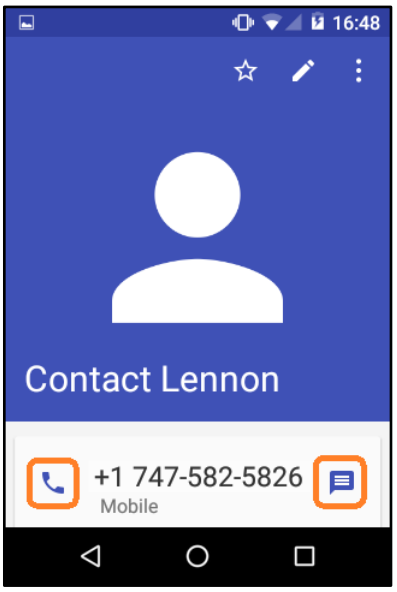


Figure 13: Contact Information

To initiate a call from the contact list the user must tap the desired contact name in the list. This will display the message options as seen in Figure 13. Tap the phone icon on the left to call the contact or tap the text bubble icon on the right to initiate an SMS text message to the contact.

NAL SHOUT App

The main menu of the SHOUT app provides access to the four submenus of the application: Texting, Tracking, Utilities, and Settings. At the bottom of the screen is text indicating the connection status of the application. If it has successfully connected to the SHOUT sp the text will read "Connected". When not connected, the text will read either "Not Connected" or "Incompatible with SHOUT sp + <version number>". The *Incompatible* message indicates that there is a mismatch between the app and device software versions. Updating both the latest available software will correct the issue.

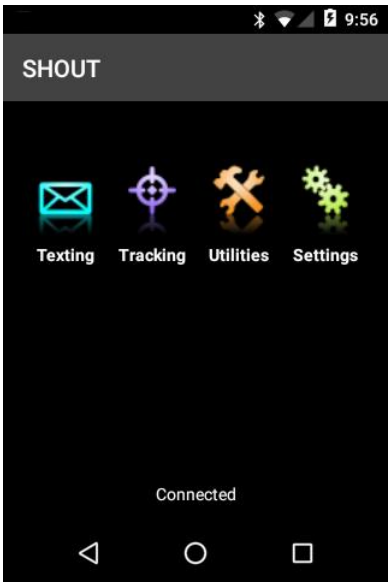


Figure 14: Tracking App Main Menu

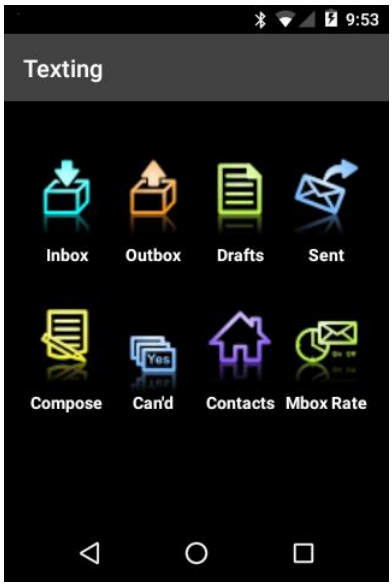


Figure 15: Texting Menu

Texting Menu

Texting

The Texting menu allows the user to check the mailbox for incoming, outgoing and sent messages, to compose new messages and to view saved draft messages, to add and view canned text messages and contacts, as well as setup an automatic mailbox check rate.

Inbox

Text message formats can be chosen under the Settings Menu, within the Texting options labeled *Text Message Format*. Please see page 38 of this manual for more detail. Figure 16 depicts the SHOUT sp Inbox with incoming read and unread messages. The newest messages appear on top of the list. Tapping a message will show the message details with the complete text of the message and a delete button.

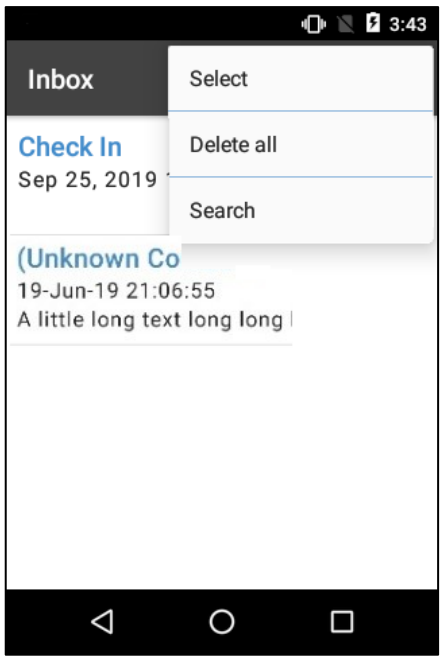


Figure 16: Inbox

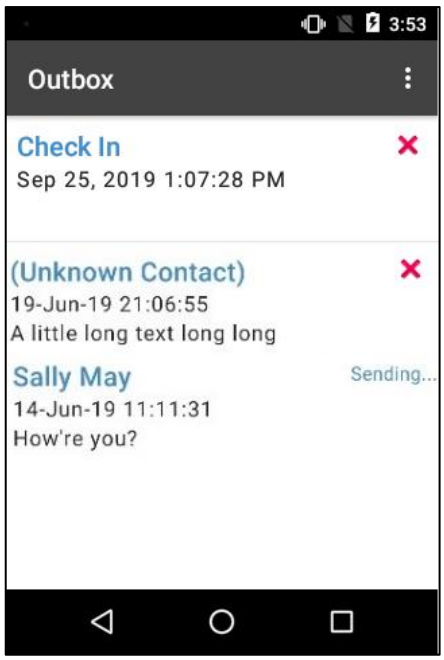


Figure 17: Outbox

Outbox

Figure 17 shows the SHOUT sp Outbox with messages being sent and messages which failed to send. They are sorted in the order of priority, and then by the oldest to the newest messages. A message *in the process* of being sent has "Sending…" on the right side of the list entry. A message that has *failed* to send is marked with a red X symbol. For each message queued in the Outbox waiting to be sent, the device has a two-minute window to transmit. After which time, the message will be de-queued, and marked with the red X, to avoid draining the battery.

Tapping a message will show the message details with the complete text of the message and a delete button. Tapping the red **X** gives the option to delete or retry. Failed messages will remain in the Outbox. If the user decides to retry a failed message and if the failed message is successfully retransmitted, the SHOUT sp will automatically attempt to retry all other failed messages in the Outbox.

Messages in the Outbox are send in order of priority. Within priority categories, the oldest messages are sent first

Category 1 (highest priority):

- Callout
- Cancel Emergency

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

Drafts

The Drafts screen in Figure 18 contains draft messages saved under the Compose function. The newest messages are shown on top of the list. Selecting a draft message takes the user back to the Compose screen.

Sent

The Sent screen, similarly contains messages successfully sent by the Iridium modem. Selecting a message will show the message details screen with the complete text of the message and a delete button. Messages are shown in the Sent screen with the newest message displayed on top of the list.

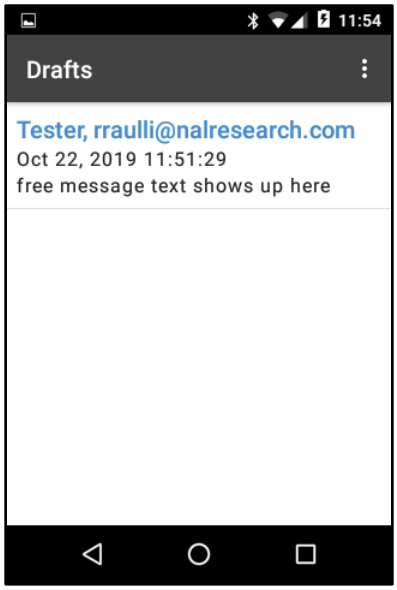


Figure 18: Drafts

Compose

The Compose screen allows the 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) a user entered email address. When the Compose icon is tapped, a Compose screen will appear with three text entry fields and a Canned Message button as shown in Figure 19. After the *Contacts* field is entered by tapping into it, a list of contacts will appear in alphabetical order as shown in Figure 21. Select a single contact or multiple contacts from the list and press the DONE button to accept. A contact can be

removed by going back to the Contacts screen and unchecking the box to the right of the contact.

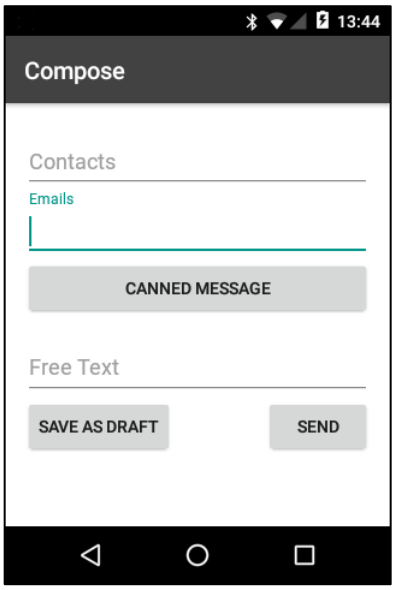


Figure 19: Empty Compose Screen

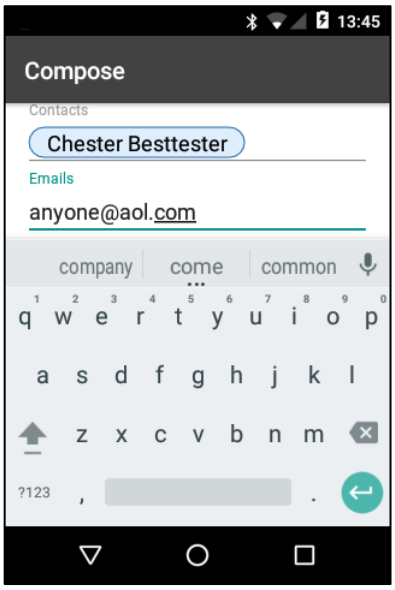


Figure 20: Compose Enter Email Option

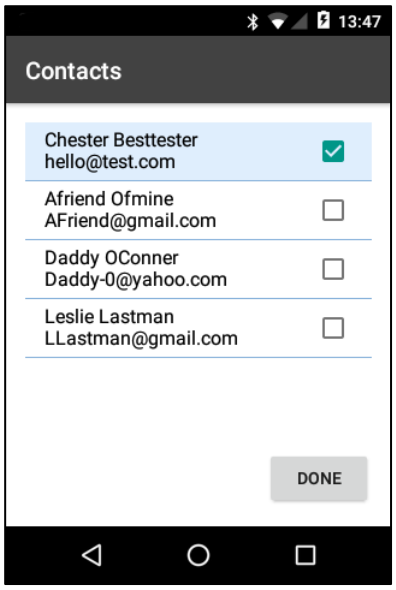


Figure 21: Compose Contact Select Option

After the Emails field is pressed, a keyboard will appear. Multiple email addresses can be entered separated by a comma. The list of email addresses, including commas, may not exceed 255 characters. 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.

Pressing the Canned Message button takes the user to a canned message selection screen. The Canned Messages appear in the index order. Tap on a canned message to choose the message. After a canned message has been chosen the message text is shown on the compose screen between the Canned Message button and the Free Text label. Pressing the Canned Message button again will bring the user back to the Canned Messages. From here, the user can remove the Canned Message or select a different one.

Entering the Free Text field brings up the on-screen keyboard for text message entry. After selecting a canned message and/or composing a free-text message, the user can either Send the message or Save as Draft.

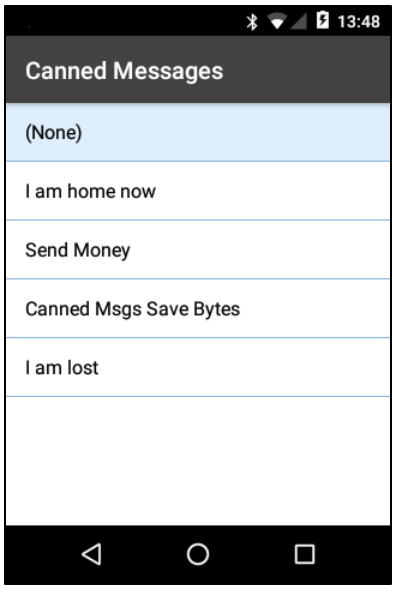


Figure 22: Compose Canned Message Select

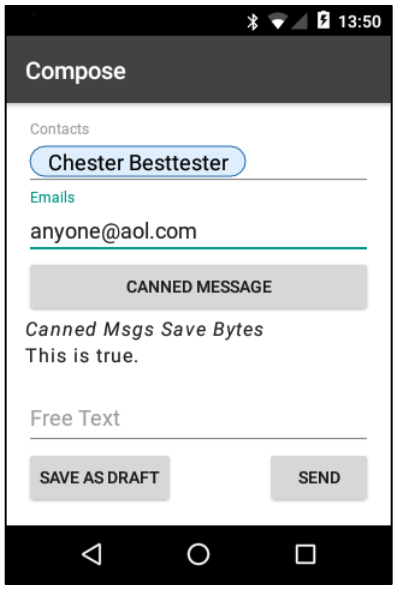


Figure 23: Compose Message Example

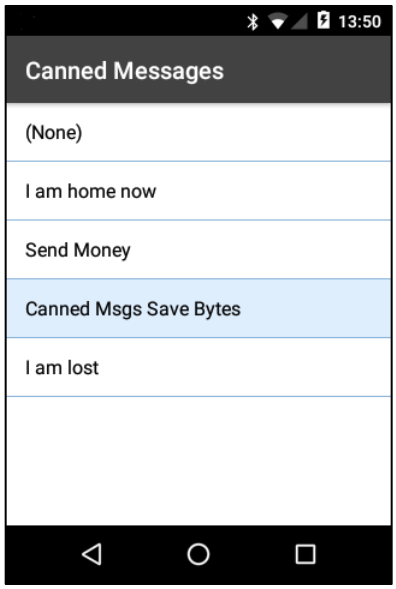


Figure 24: View Canned Messages

Can'd Msgs

The Canned Messages are displayed upon tapping the Can'd Msgs icon. Figure 25 below illustrates a Canned Messages screen with four canned messages. The user can select a canned message to view or edit by tapping the message itself. They can reorder canned messages by dragging the hamburger icon to the right of each item, or they can press the Add button to add a new canned message as shown in Figure 26.

When adding a new canned message, the user must enter a 2-digit code (30-99) in the Code field, a message label in the Label field and the message text in the Text field. Canned messages are transmitted using just the canned message code and the message text. To ensure the recipient understands the message, the canned message code should be synchronized between the sender and recipient.

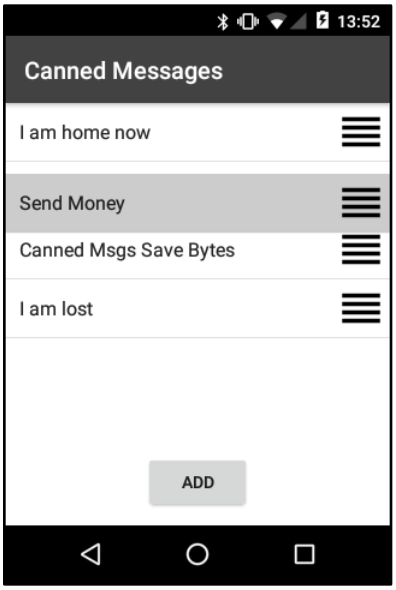


Figure 25: Reordering Canned Messages

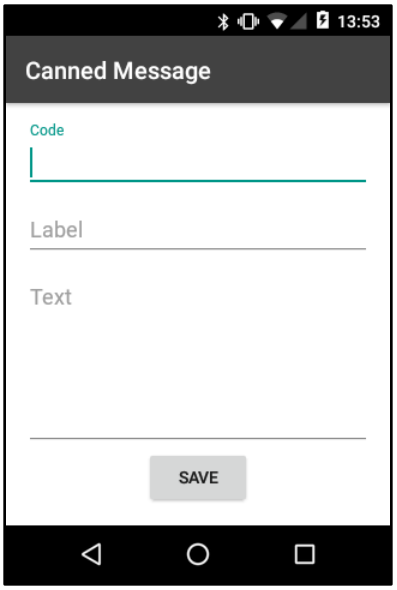


Figure 26: New Canned Message

Contacts

The Contacts are displayed by tapping the Contacts icon. Figure 27 below illustrates a Contacts screen with four contacts. The user can select a contact to view or edit by tapping the contact itself as shown in Figure 28. Contacts are displayed in alphabetical order. Create a new contact by pressing the ADD button. Information about each contact is contained in six fields: Code, Name, Group, Email, Phone, and Location as seen in Figure 29. The code field is transmitted to the NOC for routing the message to the destination. Therefore, the Code value should be synchronized with the NOC so that messages are routed correctly.

Note: *When PECOS text messaging format is used, the Phone number field for each contact should contain the destination IMEI number.*

Note: *Depending upon some app settings the user may need to scroll down to see the ADD, SAVE and DELETE buttons.*

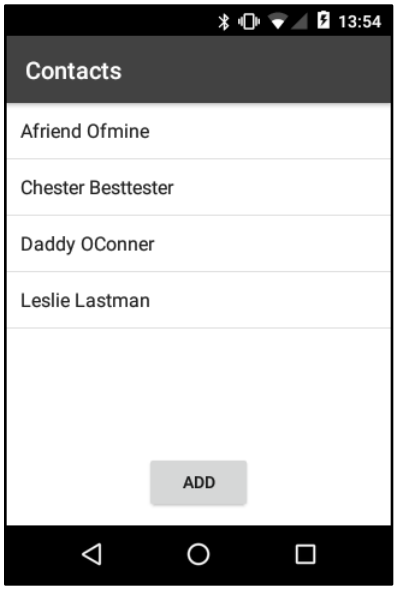


Figure 27: Contact List Display

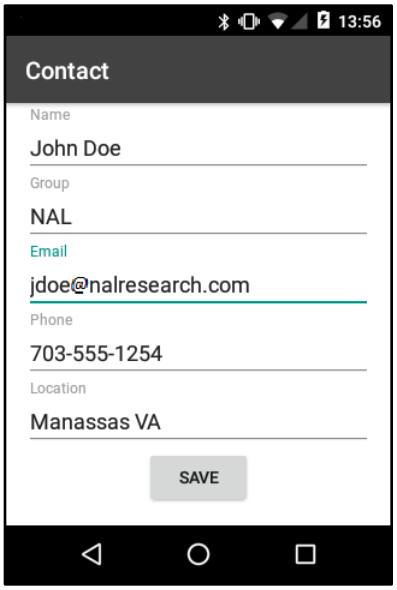


Figure 28: Edit Contact

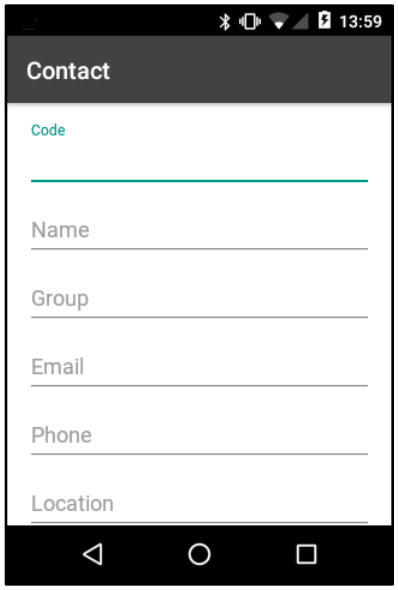


Figure 29: New Contact

Mbox Rate

The Mailbox Check is used to enable or disable mailbox checking. The Mailbox Check Rate is used to schedule mailbox checks. The user enters a Mailbox Check Rate in minutes between (0–10080) in the *minutes* field. The selected rate will trigger the time for the app to initiate a check of the mailbox. This function will only work when connected to the Iridium Network.

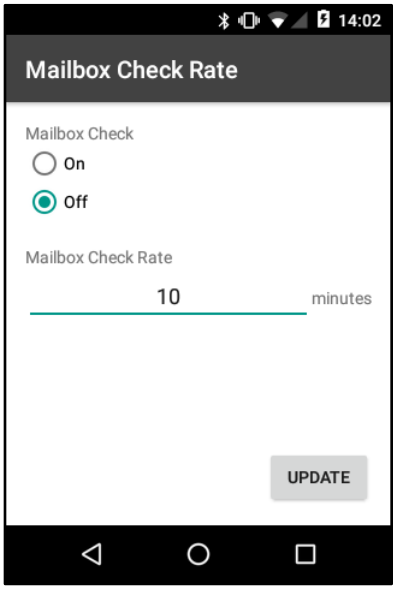


Figure 30: Mailbox Check Rate

Tracking Menu

Tracking

The Tracking menu for the SHOUT App is shown in Figure 31. There are several different functions used to interact with tracking. The Call Out function requires the user to load parameters from a configuration file with preconfigured times to send Call Out messages each day.

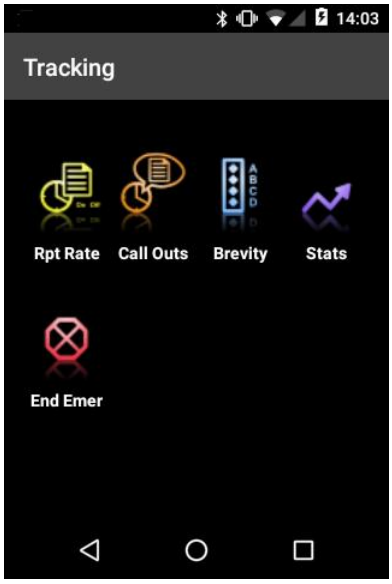


Figure 31: Tracking Menu

The Rpt Rate (Reporting Rate) screen is used to enable tracking and to set the tracking report rate (time between tracking reports). The user can select either a predefined rate or a user defined rate.

The On/Off radio buttons are used to enable/disable tracking mode. When tracking is On as shown in Figure 32, the LED on the SHOUT sp will blink green in 1 second intervals. The device immediately turns on the GPS receiver 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.

Rpt Rate

When waking up to transmit a location report, the Iridium network is used so the device must have an unobstructed view of the sky; otherwise, it will fail to send. By default, a failed report will not be re-sent. Tracking Profile settings such as; *Report Flood*, *Time Between Reports*, and *Max Queued Reports* impact the SHOUT app reporting and are detailed in the Settings Menu Section on page 39 of this manual.

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. A Report rate (*Time Between Reports*) set to more than two hours (120 Minutes) forces the GPS receiver into either a warm-start or cold-start fix (~29 seconds). As a result, the device will consume more battery power and the total number of reports is reduced.

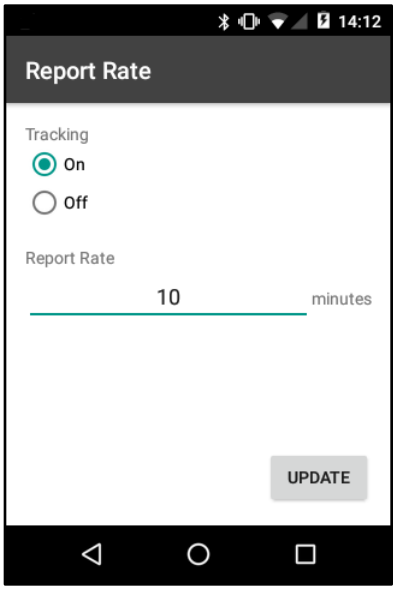


Figure 32: Reporting Rate Enabled

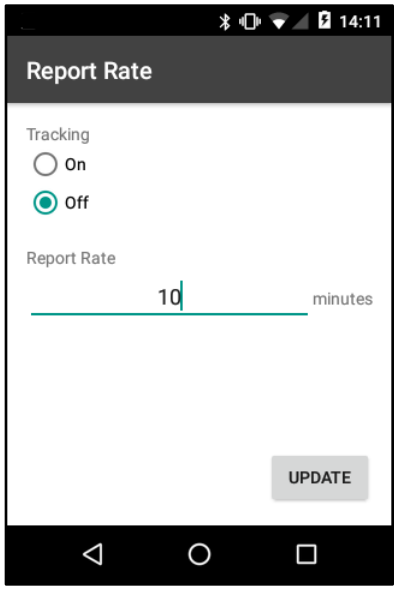


Figure 33: Reporting Rate Disabled

Remote message format can be set under the Settings menu, within the Tracking option labeled *Remote Message Format*. For more information on reporting formats please see the Settings Menu section on page 44 of this manual.

Encryption is also available for any of the supported formats. With encryption enabled the minimum bytes for 10-byte format increase to a 16-byte format. For 30-byte format, the minimum byte count is increased to 32. Encryption options are maintained in the Settings Menu. For more information about encryption, please see the Settings Menu section on page 37 of this manual.

Call Outs

The Call Outs screen allows for sending a scheduled daily tracking report at a defined UTC time. Scheduled times are entered via a Configuration File and are listed on the *Call Outs* screen. The Call Out function is useful for users who need the device to transmit at a specific time and/or want to generate a periodic heart beat message.

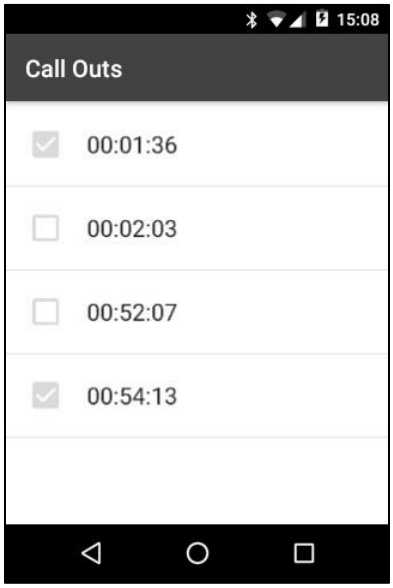


Figure 34: Call Outs

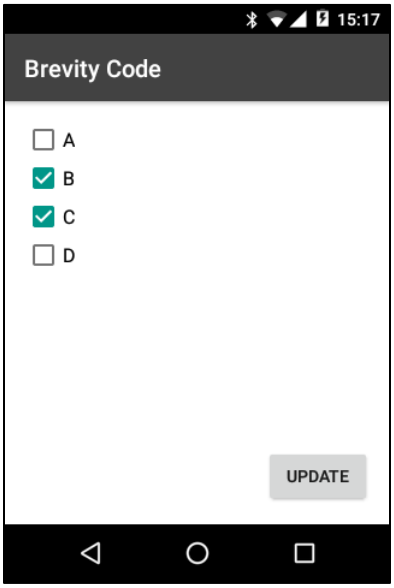


Figure 35: Brevity Code

Brevity

The Brevity code is part of the PECOS format. The device will ignore the Brevity code settings if PECOS format is not enabled and not selected. With PECOS enabled, the 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, B, C and D and can be selected via checkboxes to select a specific Brevity Code. Please see the Brevity section of the Settings Menu on page 43 of this manual or more information.

Stats

The Statistics screen provides details regarding overall tracking performance since the last report was sent and the *CLEAR STATS* button was pressed, as seen in Figure 36. The Stats screen has a countdown *TIME TO NEXT* report timer at the top that displays *Off* when tracking is disabled. The middle of the Statistics screen displays the last successful report sent by tracking.

Note: *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. The bottom section of the Statistics screen displays tracking stats since the last time the CLEAR STATS button was pressed.*

End Emer

Emergency mode is activated by the user rotating the Emergency Button Cover (see Figure 1) outward and pressing the exposed Emergency button. The user can deactivate the emergency alert by tapping the End Emer (End Emergency) icon. A prompt requiring the user to confirm ending the emergency will display. The End Emergency message is then queued in the Outbox to be transmitted. Emergency mode can also be deactivated by pressing and holding the Emergency button for two seconds.

When the End Emergency has been issued the LED will switch from a solid green to its previous state. Either blinking in 1 second intervals if Tracking was enabled, or dark if tracking is turned off.

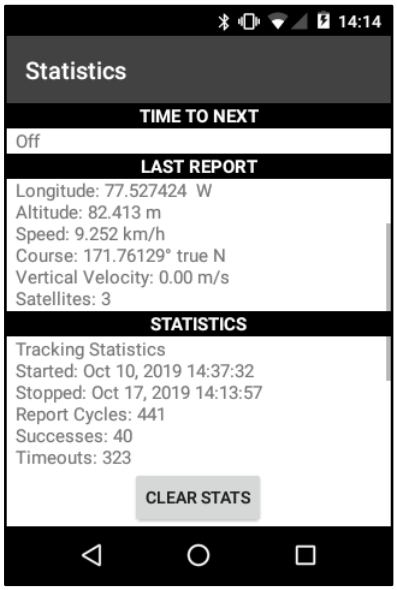


Figure 36: Statistics

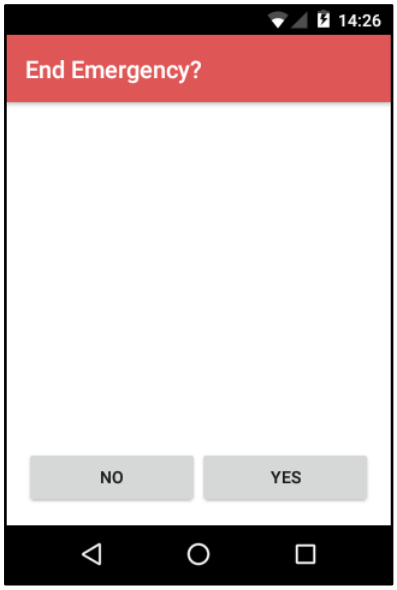


Figure 37: Cancel Emergency

Utilities Menu

Utilities

The Utilities menu provides five functions used to check for proper hardware operation and network setup. These utilities are useful when trying to troubleshoot certain problems with the device.

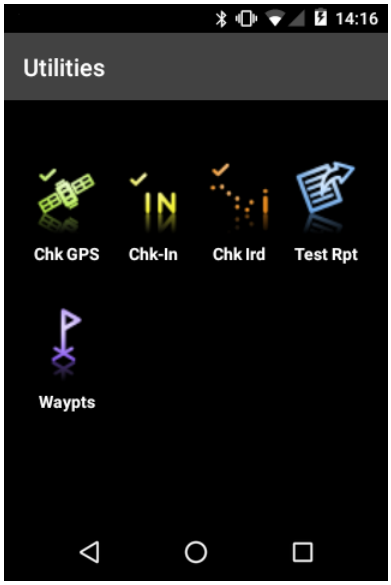


Figure 38: Utilities Menu

Chk GPS

The Chk GPS (Check GPS) function forces the device to turn on its GPS receiver and to continuously update and display GPS data in real-time. The GPS receiver remains on until the user leaves this screen by tapping the Back arrow. The RESET EPHEMERIS button is used to erase the saved ephemeris in its memory, download a new set of ephemeris data, and then reboot the GPS receiver. The rebooting of the GPS receiver initiates a cold start which takes approximately 35 seconds in order to acquire the GPS position. The user must be careful not to deplete the battery power by staying on this option for too long.

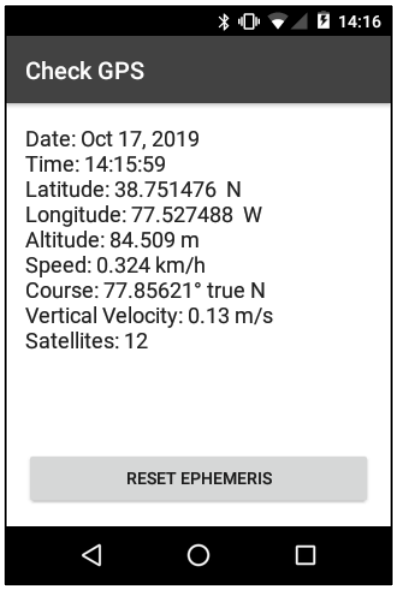


Figure 39: Check GPS

The Check GPS function is a good indicator of whether or not the GPS receiver has sufficient signal to initiate a Way Point or Test Report when located in a challenging environment; e.g., in dense foliage or around urban settings with tall buildings. Satellites are monitored in real-time to make sure there are at least 4 in range, at

which point, it is certain that a 3-D fix can be obtained. A higher count of Satellites generally results in a better position. The user can then go back to the Utilities menu to send a test report.

Chk-In

The Chk-In (Check-In) function allows the user to send a quick message. When the Check-In? *YES* button is pressed, the device sends out a reserved canned message code representing a Chk-In message. If the *Include GPS* option is enabled as a setting of Texting, the GPS location will be attached to the Chk-In message. Please see page 38 of this manual for more details about including GPS in a message.

The Outbox screen is displayed for the user to view or cancel the message. Tap the Back Arrow to return to the Utilities menu.

***Note**: Chk-In messages with GPS locations take longer to complete since the device has to acquire a GPS fix first.*

Figure 40: Check-In

Figure 41: Check Iridium

Chk Iridium

The Chk Iridium function forces the device to turn on its Iridium transceiver and continuously update and display signal strength in real-time. The Iridium transceiver remains on until the user leaves this screen by tapping the Back Arrow. The user must be careful not to deplete the battery power by staying on this option for too long.

Test Rpt

When the Test Rpt (Test Report) function is selected, the device 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 function, Horizontal Accuracy (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 will be sent to a NOC server in a position report message referred to as a test report 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.

The Test Rpt function is a good diagnostic tool used to ensure proper operation of the GPS receiver, the Iridium transceiver, and reception at the NOC. It can also be used to manage battery life by turning off tracking mode and strategically sending on-demand location reports. This is considered *Manual Tracking Mode*.

After pressing the *SEND* button, The Outbox screen is displayed for the user to view or cancel the message. Tap the Back Arrow to return to the Utilities menu.

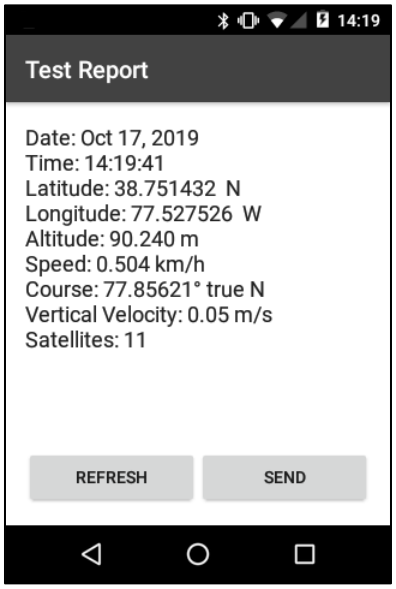


Figure 42: Test Report

Waypts

The Waypts (Waypoints) submenu is used to acquire, view, save, delete, delete all, or send a waypoint to a NOC. The SHOUT sp can save thousands of waypoints in memory.

A waypoint is a GPS location that the user wants to identify and mark with a specific label name for future reference. When the NEW button is pressed, the device immediately turns on the GPS receiver to acquire a fix. The user then has the following options as seen in Figure 44; to go back without further action, REFRESH the GPS fix, enter a label, or save the waypoint by pressing the ADD button.

Waypoint labels may be left blank and can be modified at any time. Waypoints are saved into the device's non-volatile memory for later retrieval. After saving a waypoint, the user can select it from the list and send it to a NOC server by pressing the SEND button. The server differentiates a waypoint report from normal tracking report by their Short Code of '6'.

After pressing the *SEND* button, The Outbox screen is displayed. The user can view or delete the message. Tap the Back Arrow to return to the Waypoints screen.

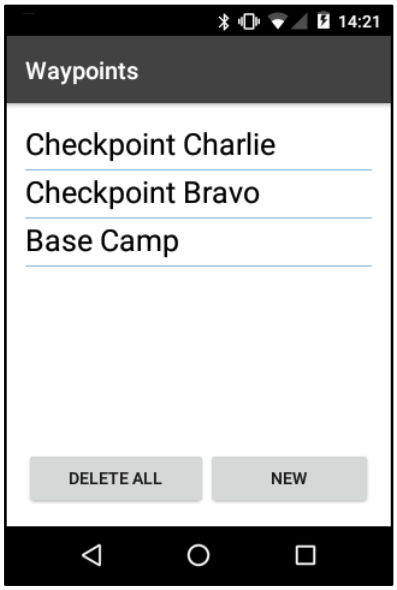


Figure 43: Waypoints

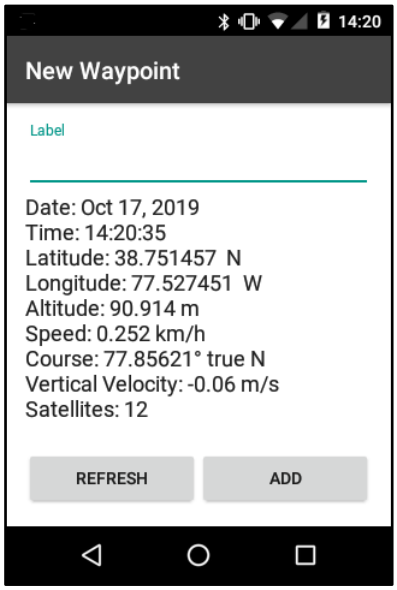


Figure 44: New Waypoint

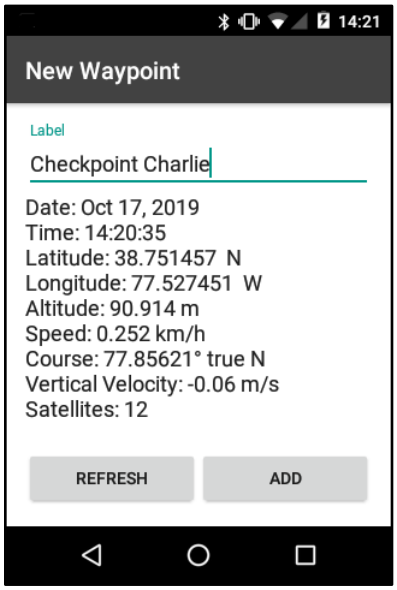


Figure 45: Waypoint Selected

Settings Menu

Settings The Settings menu allows the user to view and customize the SHOUT app settings.

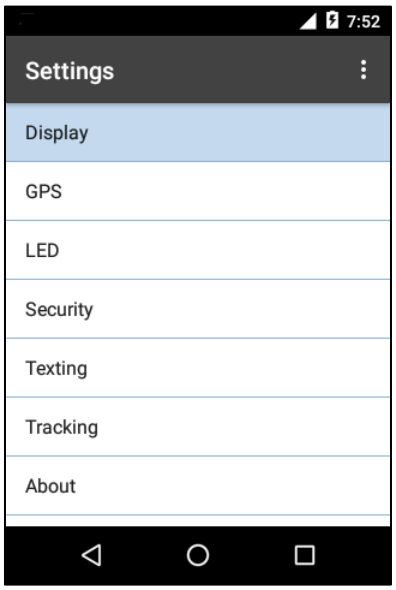


Figure 46: Settings

Display The Display settings submenu allows configuration of the user's display preferences.

Position Format

Choose one of four different GPS display formats when the app outputs GPS data.

Time Zone

Determine the display of the local time zone, measured in hours offset from UTC or the Android device's Time Zone (as set in Android settings).

Figure 47: Position Format

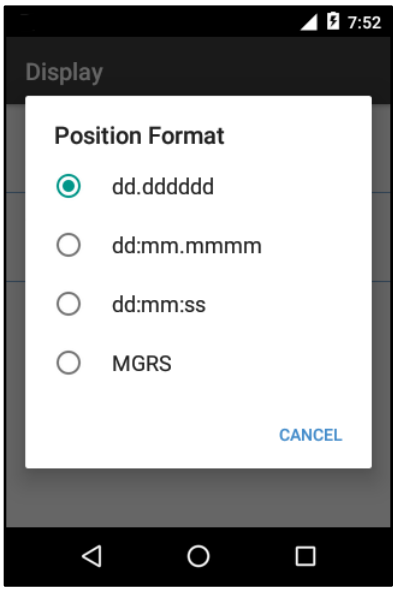


Figure 48: Display Menu

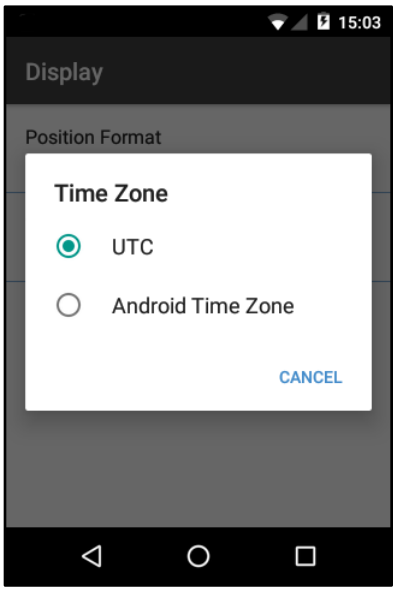


Figure 49: Time Zone

GPS

The GPS settings submenu provides access to the *Invalid Course Value* and *Position Model* options.

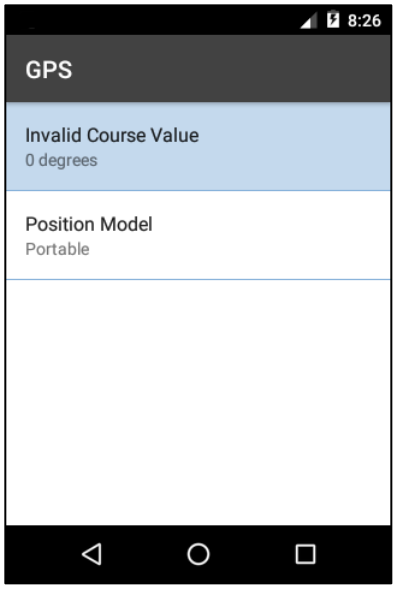


Figure 50: GPS

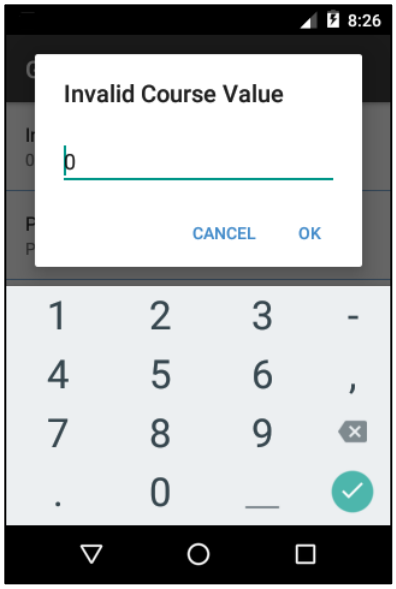


Figure 51: Invalid Course Value

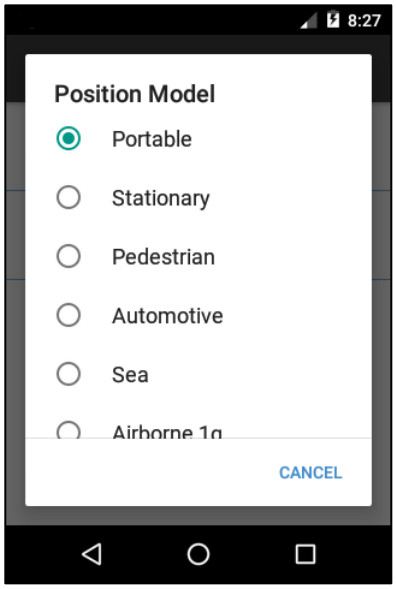


Figure 52: Position Model

Invalid Course Value

This value is sent in GPS reports to indicate an invalid course when the GPS receiver is unable to determine the course. The value should be left at the default of zero unless a different value is required for server compatibility.

Position Model

This model is used to formulate the static and dynamic characteristics of the GPS receiver to optimize GPS location performance. By default, the 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.

See the Position Model Reference Table on the next page for details.

POSITION MODEL REFERENCE TABLE

	Use Case	Max ALT	Max Velocity	Max Vert. Velocity	Sanity Check	Max Pos Deviation
Portable (default setting)	Suitable for most situations. For applications with low accelerations.	12 km	310 m/sec	50 m/sec	ALT & Velocity	Medium
Stationary	Antenna must be stationary, or other stationary applications. Velocity is constrained to 0 m/s. Zero dynamics assumed.	9 km	0 m/sec	6 m/sec	ALT & Velocity	Small
Pedestrian	Low acceleration and low speed, as a pedestrian would move.	9 km	30 m/sec	20 m/sec	ALT & Velocity	Small
Automotive	Dynamics of a passenger car. Low vertical acceleration.	6 km	84 m/sec	15 m/sec	ALT & Velocity	Medium
Sea	Applications at sea, assuming zero vertical velocity.	500 m	25 m/sec	5 m/sec	ALT & Velocity	Medium
Airborne 1g	Higher dynamic range than a car and higher vertical accelerations. No 2D position fixes supported.	50 km	100 m/sec	100 m/sec	Altitude	Large
Airborne 2g	Typical airborne environment; no 2D position fixes supported.	50 km	250 m/sec	100 m/sec	Altitude	Large
Airborne 4g	Only recommended for an extreme dynamic environment; no 2D position fixes supported	50 km	500 m/sec	100 m/sec	Altitude	Large

LED

The LED setting screen controls whether the LED is enabled or disabled. See Figure 1 on page 8 for the LED location on the SHOUT sp device.

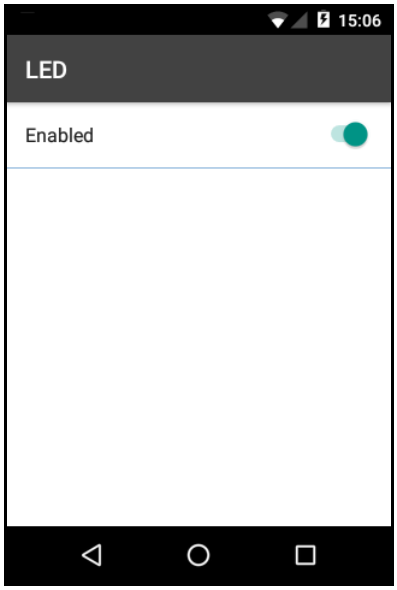


Figure 53: LED Option Screen

The LED is dark when the SHOUT app has the LED disabled or tracking mode is turned off.

The LED blinks once every second if the SHOUT app is in tracking mode. The LED is on steadily if the SHOUT app is also in emergency mode.

Security

The Security Settings submenu provides access to configure the Encryption and Access Control List functions.

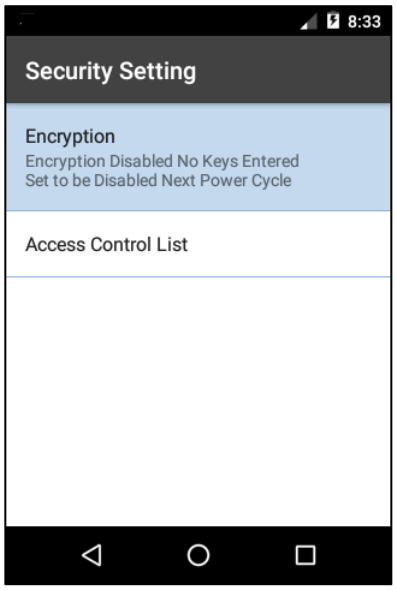


Figure 54: Security Setting Menu

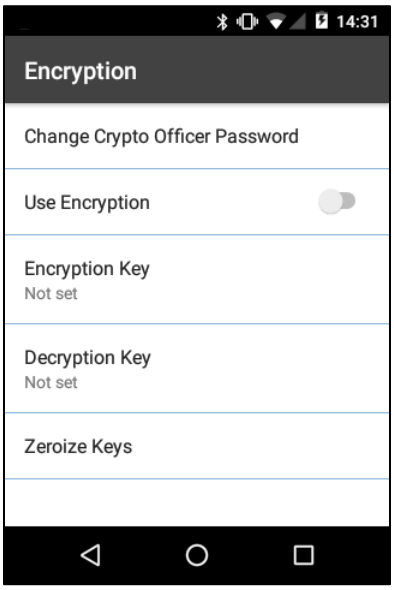


Figure 55: Encryption

Encryption

The SHOUT sp can send and receive data in AES 256-bit encrypted format. The Encryption settings menu provides a user interface to setup a crypto officer password, change the crypto keys, and enable/disable encryption.

First time setup of the Crypto Officer password must be done before any encryption properties can be configured. To setup the Crypto Officer password, Press *Encryption* under the Security Settings menu. The user will be prompted to enter the *New Password* and to confirm the password entry as seen in Figure 56. When the new password is confirmed, press the *OK* button to allow entry of the Encryption Key. Subsequent entry into the Security Settings Menu will require entry of the Crypto Officer Password.

The *Encryption Key* must be set in order to use encryption. The *Decryption Key* is optional but is required to receive encrypted data. After an encryption key has been set, the *Use Encryption* option may be enabled.

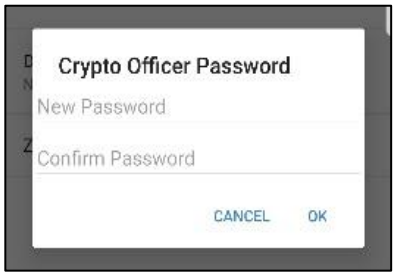


Figure 56: Crypto Officer Password

Figure 57: Encryption Key

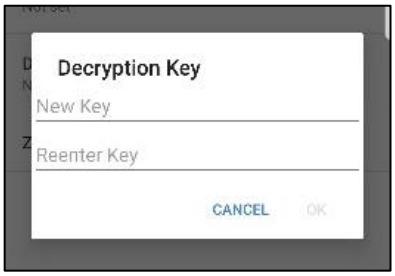


Figure 58: Decryption Key

The *Zeroize Keys* option, as shown above in Figure 55, will remove both the encryption key and decryption key and also disable the *Use Encryption* option.

Access Control List

The Access Control List (ACL) controls which functions to show in the menus. A checked item indicates the function is available, whereas an unchecked item indicates a hidden function. The list of options is organized by Settings, Tracking Profile Settings, Manage Data, and Operations. Access to this menu may be restricted by setting an ACL Pin through uploading a configuration file. See Figure 82 on page 49 for more details about uploading a file.

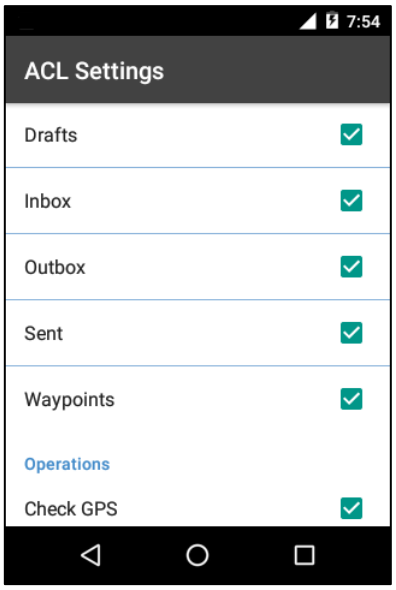


Figure 59: ACL Settings

Texting

The Texting settings submenu provides options to configure texting functions.

Mailbox Check and Mailbox Check Rate options

The *Mailbox Check* is used to enable or disable mailbox checking. The *Mailbox Check Rate* is used to schedule mailbox checks. Either the user enters a custom *Mailbox Check Rate* in minutes between (0–10080) or they may select from radio set options ranging from 1 minute to 7 Days. The selected rate will trigger the time for the app to initiate a check of the mailbox. This option will only work when connected to the Iridium Network.

Include GPS

The *Include GPS* option enables the device to attach the GPS location to Check-In, Canned messages, 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 device has to acquire a GPS fix first. Depending on the validity of the stored ephemeris data, it could take an additional 29 seconds.

Text Message Format

This option allows the user to select either the *PECOS* or *NAL Version 6* text message formats used in outgoing text messages.

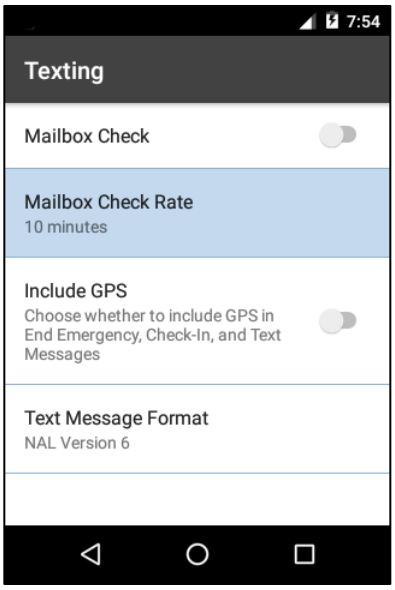


Figure 60: Texting

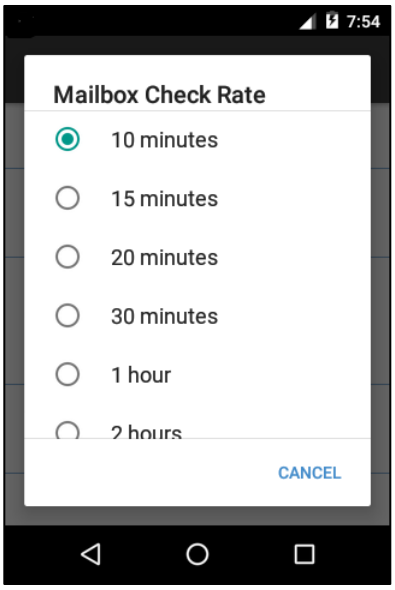


Figure 61: Mailbox Check Rate

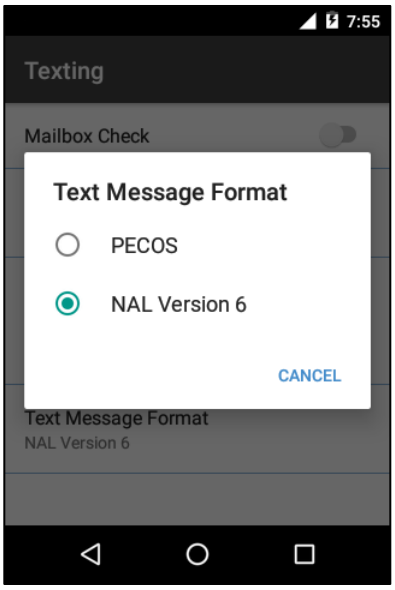


Figure 62: Text Message Format

Tracking

The Tracking settings submenu provides options to configure Tracking functions.

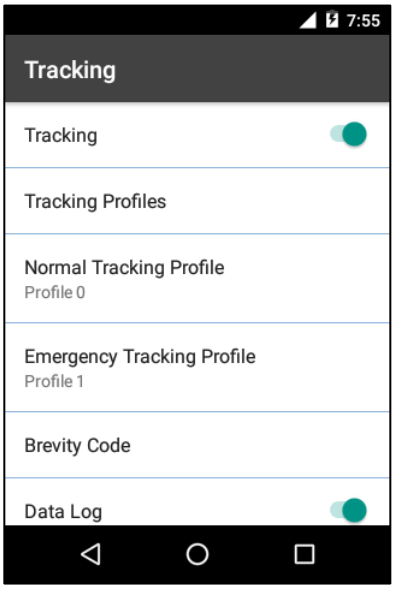


Figure 63: Tracking (Pt. 1)

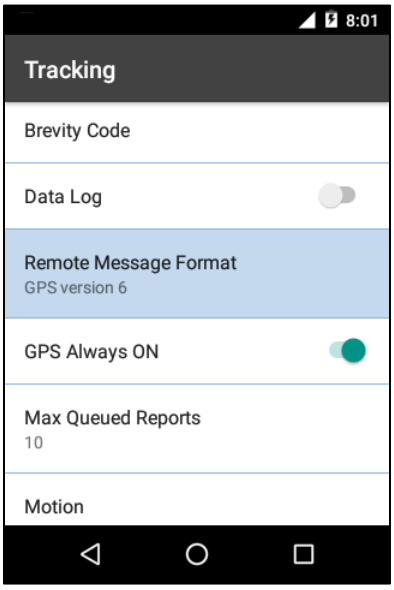


Figure 64: Tracking (Pt. 2)

Tracking

This option enables/disables tracking.

Tracking Profile

Tapping this option accesses a submenu for configuring the tracking profiles. There are twelve stored tracking profiles numbered from 0 to 11. These profiles contain parameters that dictate how the SHOUT app operates when tracking. Tracking utilizes one of these stored profiles based on the current operating state. For

example, under normal, non-emergency operation the profile in use is set by the Normal Tracking Profile. While, under emergency operation, the profile assigned to the Emergency Tracking Profile is used instead.

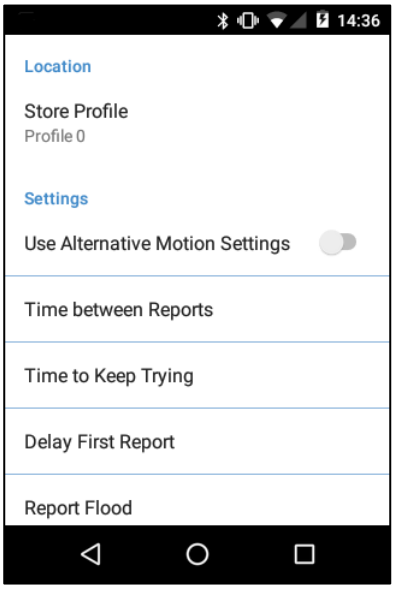


Figure 65: Tracking Profiles (Part 1)

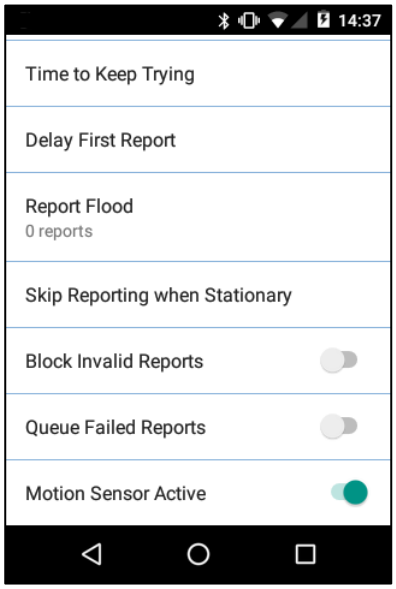


Figure 66: Tracking Profiles (Part 2)

The following settings can be configured on a per profile basis:

- <u>Use Alternate Motion Settings</u>
  When motion of the SHOUT sp is being detected and the setting *Use Alternative Motion Settings* is enabled, the SHOUT app with switch from the Standard settings to Motion settings of the values for *Time Between Reports*, *Time To Keep Trying*, and *Delayed First Report*.

- <u>Time Between Reports</u>
  This parameter sets the interval between tracking report cycles. The interval can range from 0 and 10080 minutes (168 hours or 7 days). There is a Standard and Motion value for this setting. The motion value applies when the *Use Alternate Motion Settings* option is enabled and the SHOUT sp device has detected motion.

- <u>Time To Keep Trying</u>
  This parameter sets the duration in which the SHOUT sp attempts to retry sending a tracking report. During a report cycle, the SHOUT sp will attempt to acquire a valid GPS fix and Iridium signal. Once the GPS fix and signal strength requirements are met, the device will send a report. If the report fails to send, the SHOUT sp will retry until the specified *Time to Keep Trying* window expires.

There is a Standard and Motion value for this setting. The Motion value applies when the *Use Alternate Motion Settings* option is enabled and the SHOUT sp device has detected motion.

- <u>Delay First Report</u>

  When enabled, this setting prevents the transmission of the first tracking report. This applies when tracking is turned on from off or if there is a mode change. A mode change occurs when motion is detected or when emergency mode is enabled/disabled. There is a Standard and Motion value for this setting. The Motion value applies when the *Use Alternate Motion Settings* option is enabled and the SHOUT sp device has detected motion.

  An example of how this parameter might be useful is to avoid unwanted transmissions which may accumulate airtime costs. If tracking mode is restarting repeatedly because of frequent power cycling, reports will be transmitted each time. Enabling *Delay First Report* would delay that first report and reduce the airtime usage.

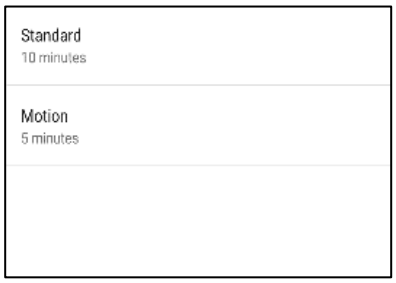


Figure 67: Time between Reports

Figure 68: Time to Keep Trying

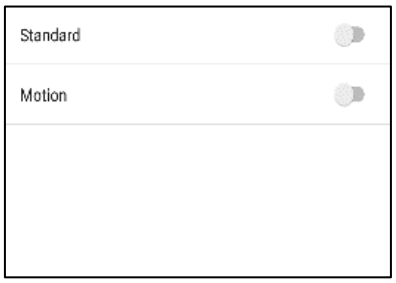


Figure 69: Delay First Report

- <u>Report Flood</u>

  This parameter as seen in Figure 70 sets the number of tracking reports that are to be transmitted continuously when first entering Tracking mode and when the tracking mode changes (for example, from Normal to Emergency). After the specified tracking reports have been transmitted, the pre-programmed reporting interval will take effect. In the Emergency tracking mode, the report flood will be ended prematurely when an emergency acknowledgement is received.

- <u>Skip Reporting when Stationary</u>

  This function as seen in Figure 71 and Figure 72 limits the SHOUT sp from sending tracking reports when it has not moved out of a specified *Radius*. The 3 *Modes* for this function are; *Off*, *On*, and *On, Excluding Cycles to Skip*. When the *Mode* is *On*, the device is bound to a sphere with a specified *Radius*. While

the unit remains in the sphere, reporting skips a specified number of *Cycles to Skip*. When the *Cycles to Skip* value is reached, the app will report for a specified number of *Send While Stationary* reporting cycles. The process is repeated until the device leaves the sphere. Upon leaving the bounding sphere, a new boundary will be created at the current location of the unit and the app will report for the specified *Send While Stationary* cycles.

If the mode *On, Excluding Cycles to Skip* is selected, then the *Cycles to Skip* parameter is disregarded and the app will report for a specified number of *Send While Stationary* cycles each time a new sphere is established.

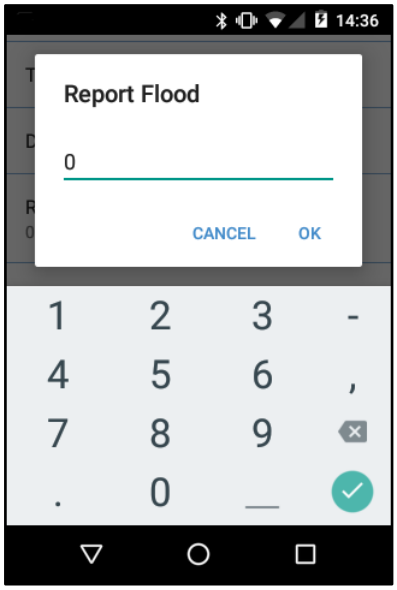


Figure 70: Report Flood

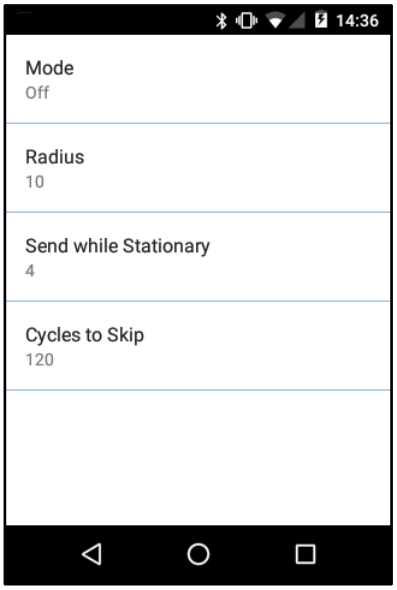


Figure 71: Skip Reporting When Stationary Menu

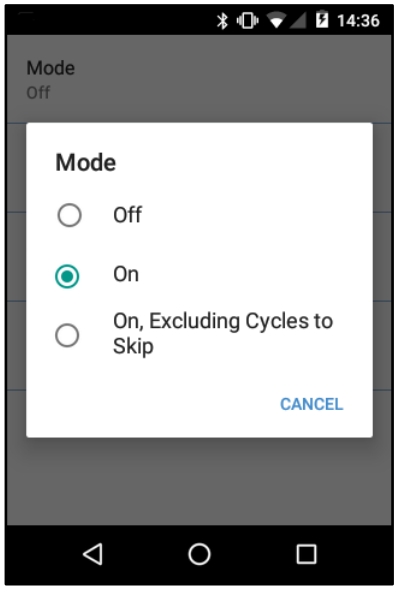


Figure 72: Skip Reporting When Stationary Mode

- <u>Block Invalid Reports</u>

  The default setting is to send all tracking reports, even those with invalid GPS position. When this setting is enabled, only tracking reports with a valid GPS position fix are transmitted. This can be useful in filtering out possibly misleading GPS data points. The invalid GPS position could be a 2D position with error exceeding 25 meters, a previously acquired position, or something highly inaccurate.

- <u>Queue Failed Reports</u>

  By default, the SHOUT sp will discard all tracking reports that acquired a good GPS position but failed to transmit. A tracking report that cannot be sent before the specified *Time to Keep Trying* value is considered a *failed report*. Queue

Failed Reports allows the user to add these failed reports to the Outbox to be re-sent at a later time.

- Motion Sensor Active
  When this option is *On* and the Tracking Profile Setting *Use Alternative Motion Settings* is *On*, the app will switch to the Motion profile settings when motion of the SHOUT sp is detected.

Normal Tracking Profile

This option sets the stored tracking profile to be used in Normal tracking mode.

Emergency Tracking Profile

This option sets the stored tracking profile to be used in Emergency tracking mode.

Brevity Code

The *Brevity* option selects which brevity code is included in PECOS formatted tracking reports (see Appendix A: PMS Features). The device will ignore the Brevity settings if PECOS format is not selected. With PECOS enabled, the user has the option to select any one of sixteen brevity codes (0000 through 1111) to be included in the PECOS tracking reports. These codes are represented by A, B, C and D and can be selected via checkboxes to select a specific brevity code. A represents the least significant bit. For example, 'A' selected would yield the binary value 0001 while 'A' and 'C' selected would yield the value 0101.

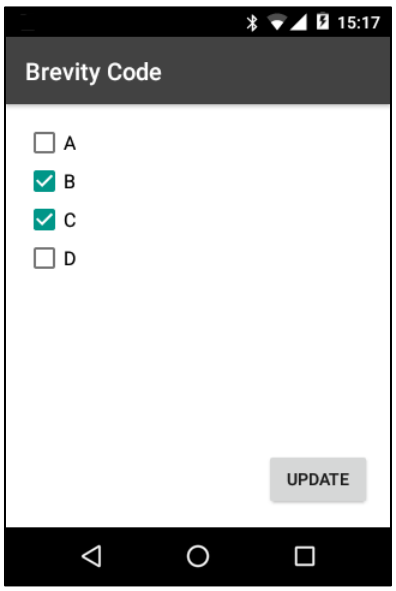


Figure 73: Brevity Code

Data Log

The default setting is to log and save all position reports in memory. When the memory is full, the oldest reports are over-written.

Remote Message Format

This option sets the format of the messages that will be sent from the SHOUT sp to a recipient. Currently available message formats are:

GPS Version 3	Legacy format for compatibility.
GPS Version 4	Legacy format for compatibility.
GPS Version 5	Legacy format for compatibility.
PECOS P3	
PECOS P4	
GPS Version 6	Used for NAL 30-byte message format. Includes position, velocity, figures of merit, motion and emergency flags, messaging short code and text fields.
10 Byte Version 0	Useful for minimizing SBD data usage. Includes time of day, latitude, longitude, PDOP.

The 10-byte GPS format includes UTC time, latitude, longitude and PDOP. With UTC date omitted, the device relies on the NOC server to stamp the date as the report arrives. Latitude and longitude are recorded within ~1.1 meters in resolution. The 10-byte format is selected strictly for the purpose of Iridium airtime cost-saving. The PECOS Message Structure complies with the Blue Force Tracking Data Format Specification. [3]

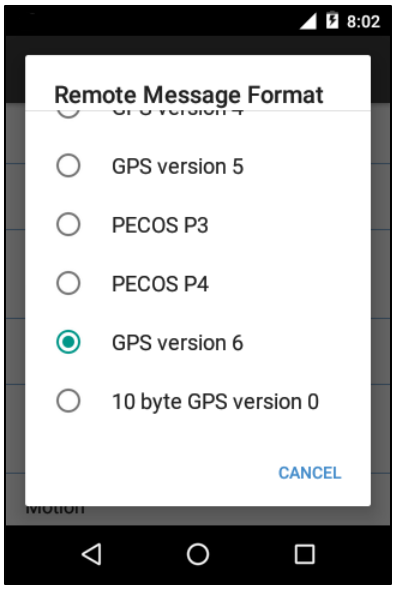


Figure 74: Remote Message Format

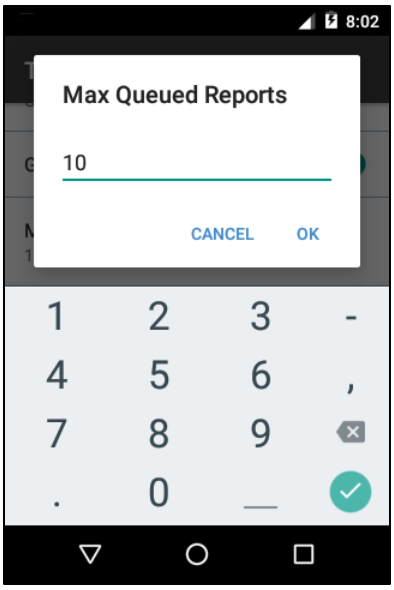


Figure 75: Max Queued Reports

GPS Always On

This option forces the GPS receiver to remain ON in between reports allowing the SHOUT sp to have immediate location information (GPS hot start assuming the SHOUT sp always has full view of the sky) each time it is ready to transmit a tracking report. When power consumption is not critical, enabling this option is recommended for faster GPS acquisition and more accurate location information.

Max Queued Reports

This option sets the maximum number of reports that can be queued on the SHOUT sp for re-transmit. This setting applies only if either Queue Failed Reports or Queue Restricted Reports are enabled.

Motion

The SHOUT sp has a built-in sensor that can reliably detect motion. The Motion setting, shown below in Figure 78, offers users a way to detect different motion characteristics without having to interpret the raw motion sensor signals.

When motion detection is enabled, the device will monitor the motion sensor to detect when the device is in motion. To detect the start of motion, an algorithm involving the motion detection windows is used. This algorithm declares motion detected when a certain number of contiguous windows are each satisfied by a minimum number of pulses from the motion sensor. Figure 76 below is an example of Motion detection with the Window Count configured to three, Window Duration

configured for 1 minute, and Sensitivity configured to 2 pulses per motion detection window.

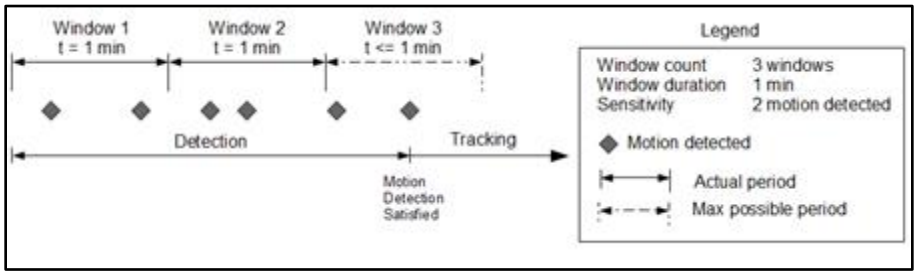


Figure 76: Motion Detection Configuration Example

Once motion has been detected using the motion detection algorithm, the device will be considered in motion and report formats that support motion indication will have the motion indicator set. While in motion, the device will switch to a different algorithm for detecting the end of motion. The device will be considered motionless if there is a certain duration of calm. The definition of calm for this algorithm differs depending on whether the device is awake or sleeping. While awake, a single pulse will reset the calm timer whereas while sleeping, the same algorithm used for detecting the start of motion is used to detect motion that will reset the calm timer. An example of this algorithm is shown in Figure 77.

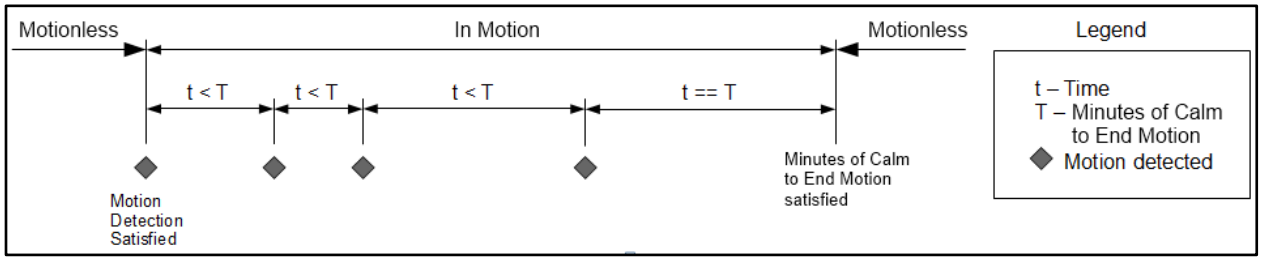


Figure 77: End of Motion Configuration Example

- <u>Motion Detect</u>

  Window Count: This parameter specifies the number of contiguous windows for the motion detection algorithm. If set to zero, then a single pulse from the motion sensor will satisfy the motion detection algorithm.

  Sensitivity: This setting specifies the minimum number of motion sensor pulses that must be detected in order to satisfy a single motion detection window for the motion detection algorithm.

  Window Duration: This setting specifies the duration of each motion detection window for the motion detection algorithm.

- Minutes of Calm to End Motion

  This setting specifies the duration of calm needed in order for the device to return to the motionless state.

- Motion Sensor Reporting

  This setting determines whether to send a report when motion starts and/or when motion ends. If the *Report on Motion Start* option is enabled, a version 6 report with Short Code 20 will be transmitted when motion is detected. If the *Report on Motion Stop* option is enabled, a version 6 report with Short Code 21 will be transmitted when motion ends.

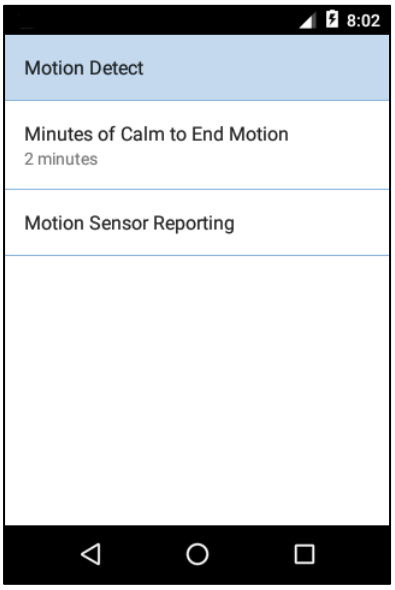


Figure 78: Motion

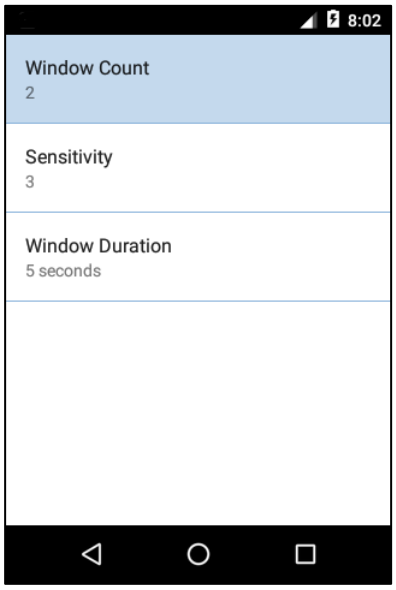


Figure 79: Motion Detect

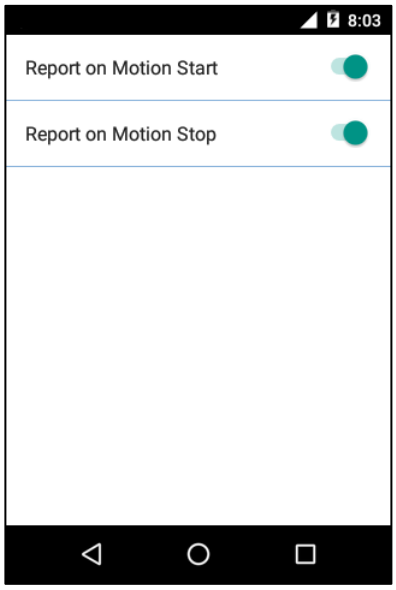


Figure 80: Motion Sensor Reporting

Remote Update Time Check

This enables a time check for incoming remote updates. When enabled, remote updates with a timestamp less than or equal to the last remote update time are not applied.

Successful Send Required

This option restricts the SHOUT sp from changing to a lower priority tracking mode based on whether or not a tracking report has been transmitted. The tracking mode priority is Emergency first, followed by Normal. When set to *Disabled. Tracking mode will switch immediately*, a change to the tracking mode takes effect immediately (i.e. Emergency to Normal). When set to *Must attempt one report before switching*, the mode change will be delayed until at least one tracking cycle

is complete. When set to '*Must successfully send one report before switching'*, the mode change will be blocked until a tracking report is transmitted successfully.

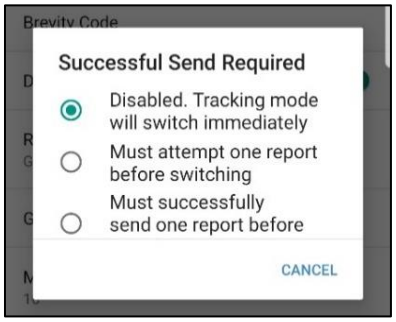


Figure 81: Successful Send Required

Configure from File

The settings available in the menus, and some that are not, can be loaded using a configuration file. The Configure from File feature is accessed by the Menu Overflow Button (three vertical dots) on the Settings Menu.

1. With a USB cable attached to a computer and the SHOUT sp, copy the config file from the PC to the Downloads folder of the SHOUT sp.
2. When the file has finished copying, press the Menu Overflow Button,
3. Tap the Configure from File option.
4. Navigate to the Downloads folder and select the configuration XML file.
5. Tap OK to confirm 'Configure from file?.
6. The results of the process are displayed when the configuration has completed. If there were any faults in the process, a summary will be displayed.

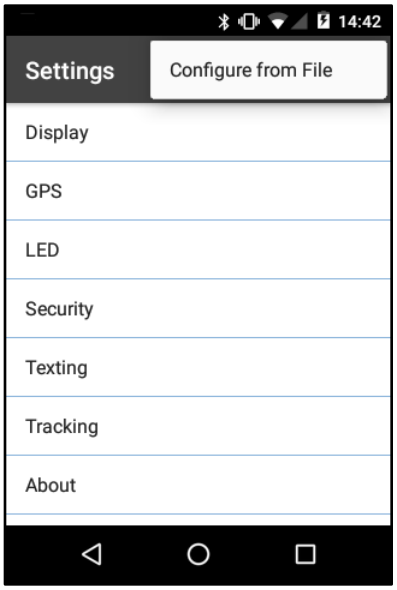


Figure 82: Configure From File

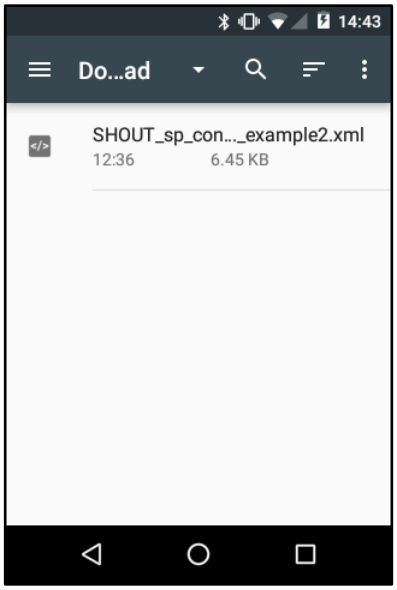


Figure 83: Select File

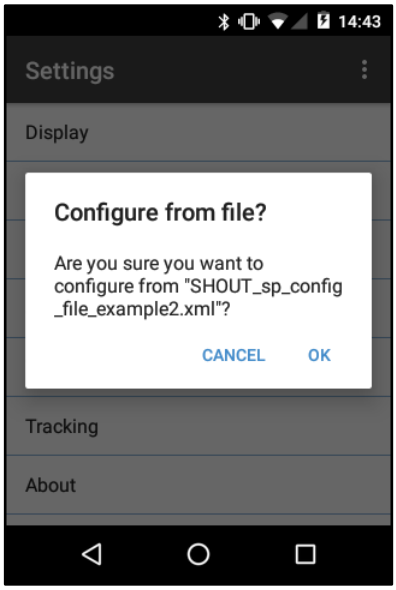


Figure 84: Confirm Selection

NAL Push-to-Talk [PTT] App

The SHOUT sp comes with a preinstalled NAL PTT App. The app enables PTT communications between devices within preconfigured PTT Talkgroups. The preconfigured talkgroups are maintained by the **Iridium – Push-to-Talk Command Center**, which is available as a subscription service by Iridium Communications, Inc. Each SHOUT sp can be a member of up to 15 talkgroups arranged in numbered slots (1-15) and may have a 'Primary Talkgroup' assigned for special communication activities.

When the PTT App is running the user may scan talkgroups, listen to talkgroups, and communicate to selected talkgroups with the push of a button.

The PTT App has several device configurable options available in the PTT Options menu. These include a Talk Timer, Location Sharing, Scan Period, Distance Formatting and whether to Enable the LED or not. Each are discussed in detail on the following pages.

At the top of the screen, the text 'PTT' is displayed when the PTT mode has been activated. The 'PTT' notification icon is visible from any screen currently being viewed by the user. The device will operate in Telephony mode for telephone calls and in PTT mode for push-to-talk functions. Only one mode will function at a time.

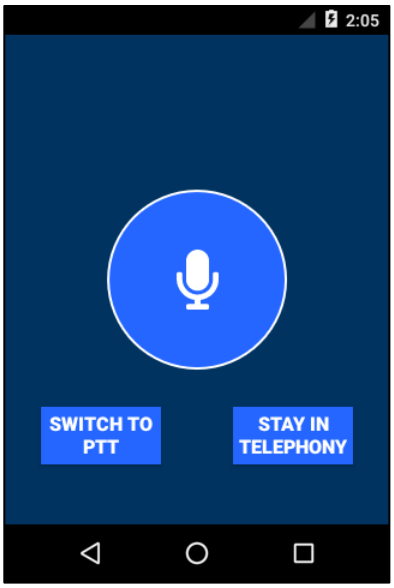


Figure 85: Mode Select

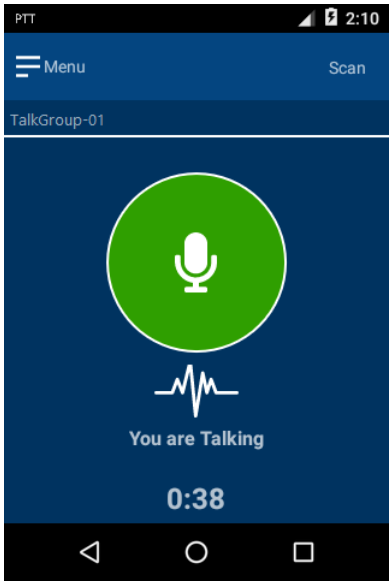


Figure 86: PTT Mode

Launching and Unlocking the PTT App

PTT

Press the Microphone icon found at the bottom of the SHOUT sp, or on the Android App screen, to launch the PTT App. The first time the app is run you will be required to unlock the app by entering a password. The password is obtained by contacting NAL Research Corporation's customer support group. Provide the IMEI number of the device to the customer support representative and they will supply you with a password, which will unlock the PTT functions.

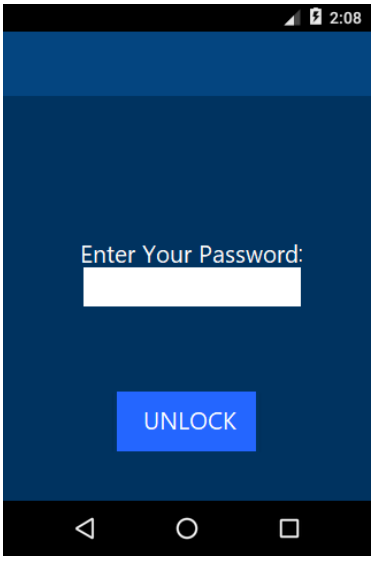


Figure 87: PTT Password Entry

Note: *IMEI is displayed in: Android Settings-> About Phone -> Status -> IMEI Information*

PTT App Screens

Mode Selection

When the PTT app launches you are presented with the option to Switch to PTT or Stay in Telephony mode. Press the 'Switch to PTT' button to connect to the Iridium network in PTT mode. The PTT Icon highlighted in **Figure 89** is displayed in the top left corner of the device when the device is in PTT mode. Telephony functions will not function while the device is in PTT mode.

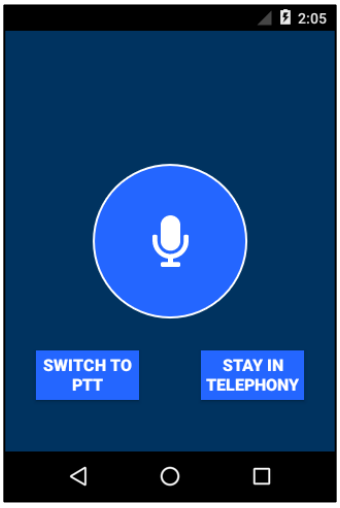


Figure 88: PTT Mode Select

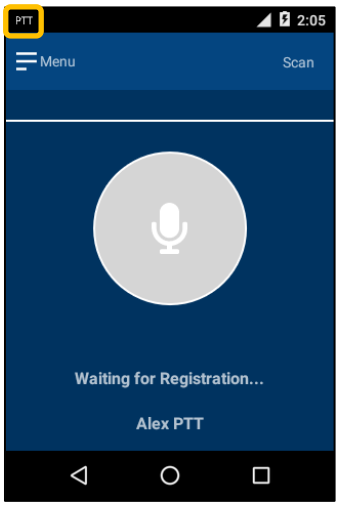


Figure 89: PTT Registration

911 Status

If The Emergency Button is pressed while in PTT Mode a screen notifying you that PTT mode has been interrupted and Emergency Tracking Mode has started is presented. You may press 'OKAY' to confirm your understanding of the switch to Emergency Tracking Mode. After the emergency mode has been canceled, you may press the Menu button and then press the 'Switch to PTT' option when you are ready to return to PTT Mode.

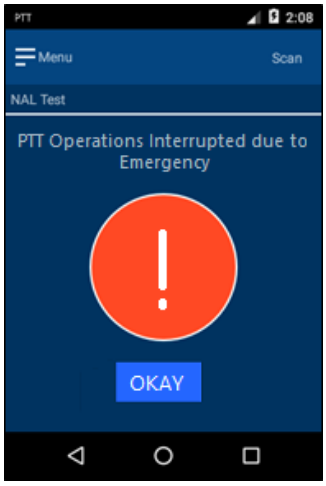


Figure 90: Emergency Mode

Idle and Scanning State

Each time the app launches and the PTT mode is selected your device will go through a registration process while connecting to the Iridium network. Once the device has been registered, you will see the name of first talkgroup appear under the menu button as highlighted in **Figure 91** below. If there is no activity in the current talkgroup by any of its members, your device status is 'Idle'. This is illustrated by the microphone circle icon displaying with a gray background. The microphone circle icon will change to an exclamation point circle icon when the device's 'Priority Talkgroup' is being monitored.

Press the Scan button to scan all of your active talkgroups for a configurable period. The active talkgroup name will appear under the menu button. Press 'Join Group' to stop scanning and join the current talkgroup. Press 'Ignore' to ignore the current talkgroup and continue to scan the remaining talkgroups. Press 'Stop Scan' to stop scanning all active talkgroups.

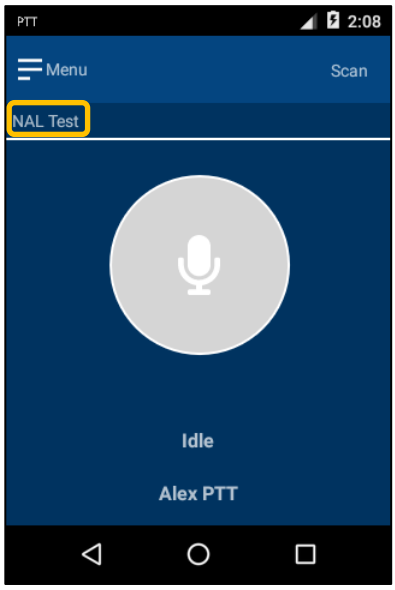


Figure 91: PTT Idle

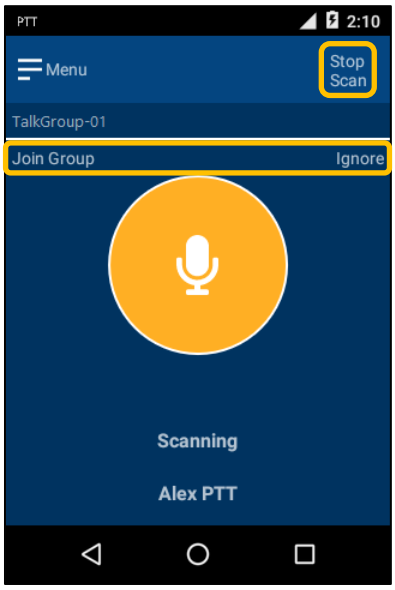


Figure 92: PTT Scanning

Open and Listening State

When a talkgroup has members who are actively listening or scanning, but no one is talking, then the device is considered to be in an 'Open' state and the text 'Open' is displayed under the blue microphone circle icon. As members of a talkgroup start to speak, your device will switch to a 'Listening' state. This is illustrated by the text 'Listening' appearing under a blue microphone circle icon. If you are listening to someone talking from your 'Priority Talkgroup', you will be alerted by the addition of the green background displayed behind the blue exclamation point circle icon.

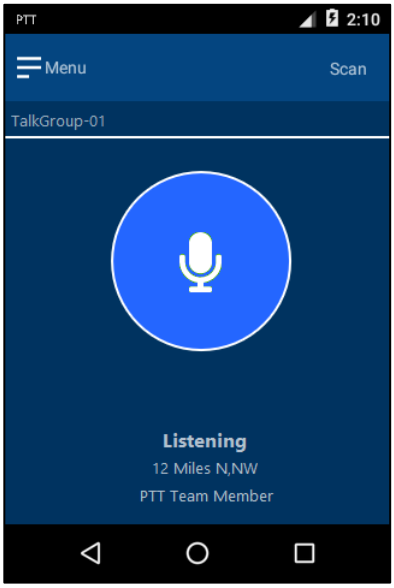


Figure 93: PTT Listening

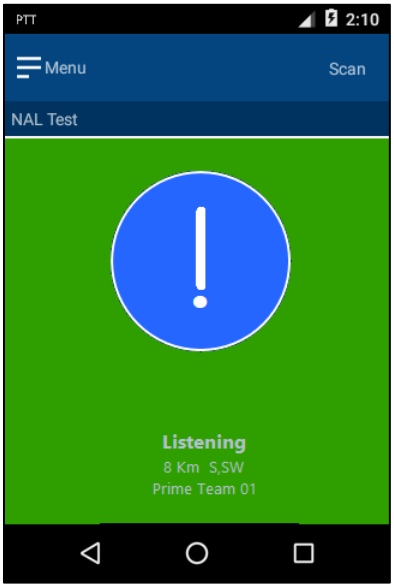


Figure 94: PTT Priority Talkgroup Listening

Talking and Denied State

When the floor is open and you wish to speak to the current talkgroup you may do so by pressing and holding the PTT button on the right side of the Shout sp. If the network grants you time to talk, you will see the text 'You are Talking' displayed under a green microphone circular icon. Your configurable talk time will count down the seconds left in your allotted time. You may release the PTT button to stop talking at any time.

If the network denies you access to talk, you will see the text 'Denied' displayed under a red microphone circular icon. You may press and hold the PTT button again to try to request the floor.

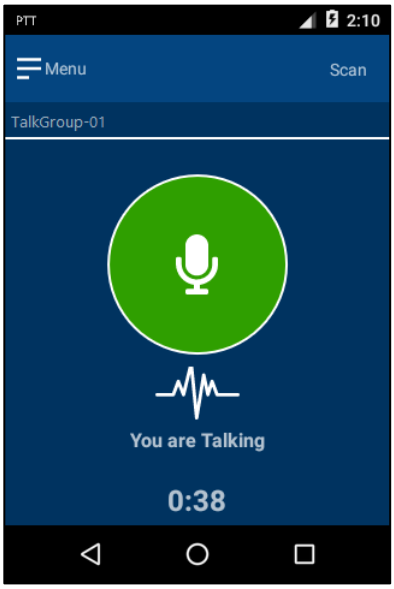


Figure 95: PTT Talking

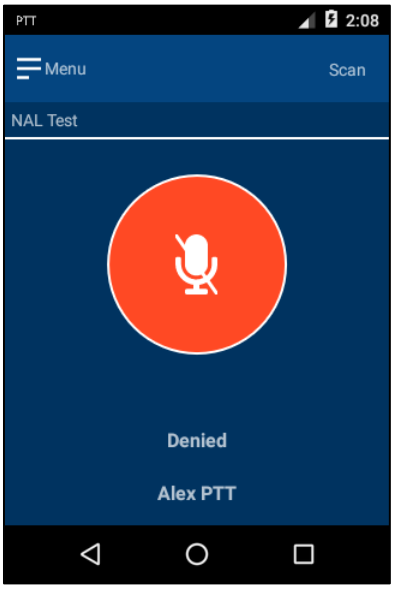


Figure 96: PTT Denied Talking

PTT Options and Settings Menu

PTT Options and Settings are available to tailor the PTT experience to the user's specifications. Each option and setting is first accessed by pressing the Menu button at the top left corner of the PTT App.

Switch to Phone

Press 'Switch to Telephony' to switch to Telephony Mode when the device is in PTT mode. Press 'Switch to PTT' to switch to PTT Mode when the device is in Telephony mode. Each action will present the user with a 'Switch Mode' confirmation screen as seen in **Figure 98**.

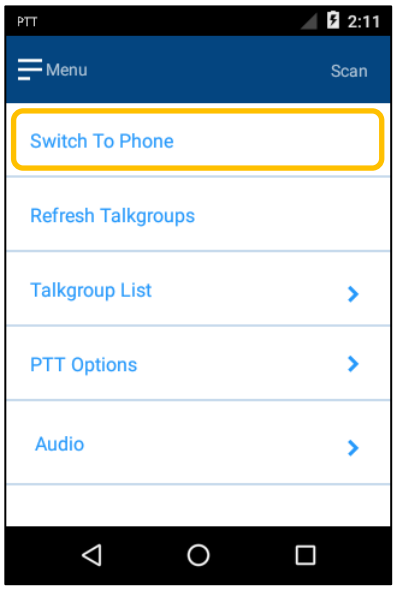


Figure 97: Switch Mode

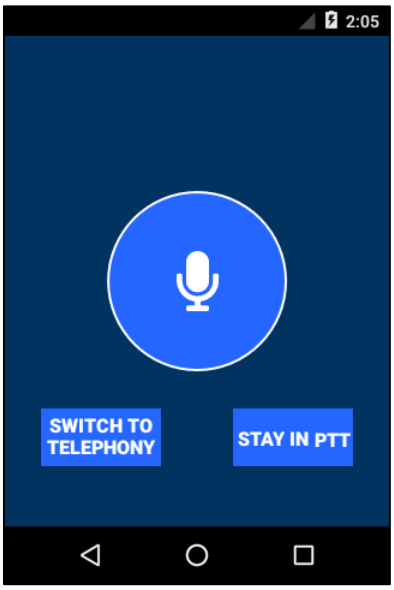


Figure 98: Switch Confirmation

PTT Refresh Talkgroup

The latest preconfigured talkgroups are loaded onto the SHOUT sp each time the PTT App registers the device with the Iridium network. If the talkgroup configuration changes while the PTT App is currently running, the App provides an option to refresh the talkgroups. Press 'Refresh Talkgroups' to update the SHOUT sp with the current configured talkgroups. This action will present the user with a 'Refresh Talkgroups' confirmation screen. See **Figure 100** below. The refresh process may take up to 10 seconds to complete.

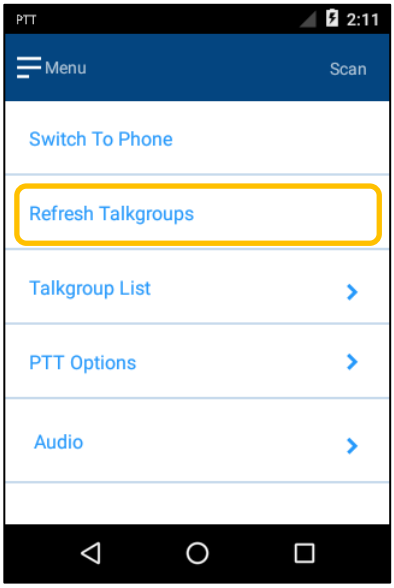


Figure 99: PTT Menu

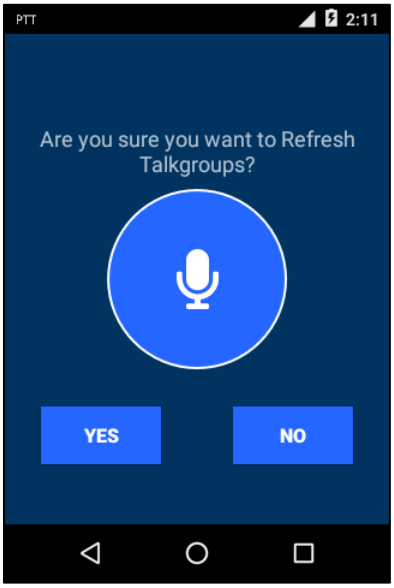


Figure 100: PTT Refresh Talkgroup

Talkgroup Selection

Press 'Talkgroup List' to view a list of the configured talkgroups that you may interact with. The microphone icon indicates the current talkgroup you have joined. The exclamation point icon points to your 'Priority Talkgroup'.

Scroll to the desired talkgroup you would like to join. Press and hold (long press) the talkgroup in the list to join it as your current talkgroup.

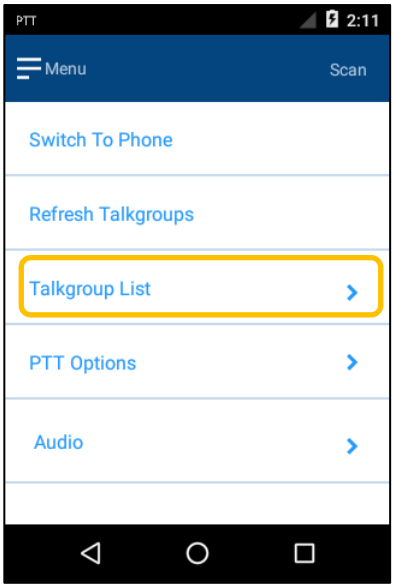


Figure 101: PTT Menu

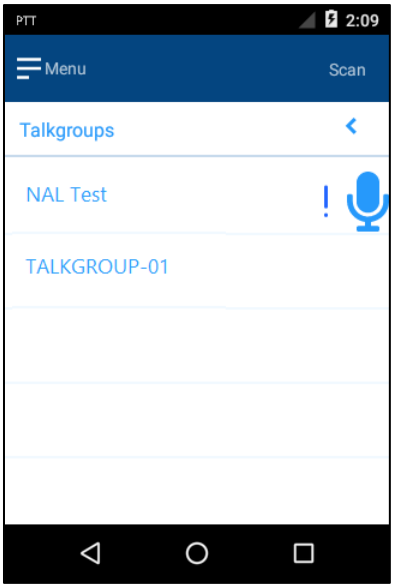


Figure 102: Talkgroup List

PTT Options

Press 'PTT Options' to view a list of options to customize your PTT user experience.

Switch the 'Talk Timer' on if you would like would like to display a countdown of the allotted talk time at the bottom of the screen as seen in **Figure 95**. The countdown timer runs from 40 seconds to zero. Switch the 'Talk Timer' off to hide the countdown timer.

Switch the 'Location Sharing' on if you would like to display your relative location to the SHOUT sp devices listening to you while you are talking. Switch the 'Location Sharing' off if you would like to hide your relative location from SHOUT sp devices which are listening to you while you are talking.

Select the Scan Period for monitoring active talkgroups while scanning them. The options are 10, 15, or 20 seconds.

Select the Distance Format to display when sharing your location represented in miles or kilometers.

Switch the 'Enable LED' on to display the LED on the SHOUT sp. Switch the 'Enable LED' off to keep the LED off.

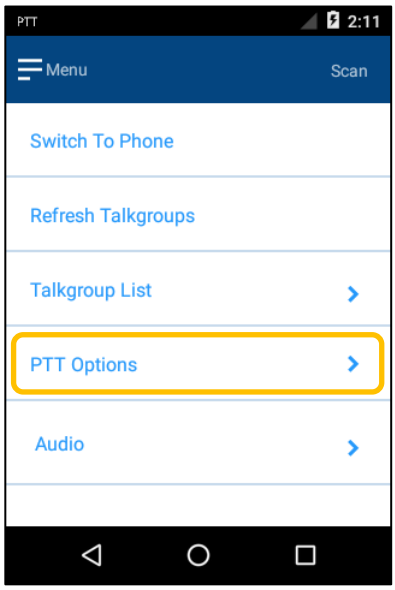


Figure 103: PTT Menu

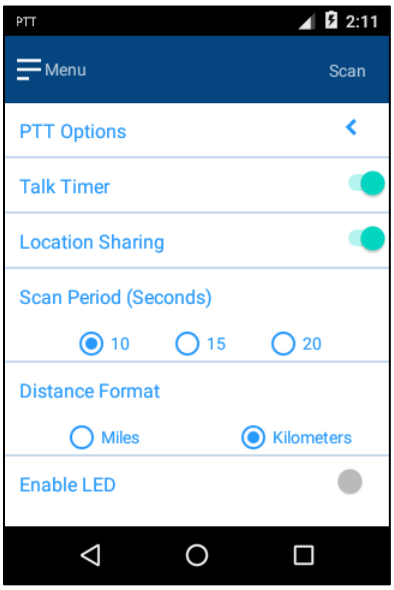


Figure 104: PTT Scanning

LED	Indication while in PTT Mode
OFF	PTT service not Provisioned and / or network are unavailable
Blinking Green	PTT service and network are available
Blinking Blue	PTT service provisioned but network is unavailable
Alt. Blue/Green	PTT in use (Talking, Listening, Open)
Solid Green	Device is in emergency mode. (Emergency Button was pushed)

Audio Options

Press the 'Audio' option to view a list of the available audio settings. Switch the Speakerphone on to rout the audio to the speakerphone on the back of the SHOUT sp, or switch it off to have the audio be heard through the earpiece on the front of the device. The audio output may be increased to seven my pressing the right arrow, or decreased to zero by pressing the left arrow.

This volume adjustment is additional to the regular volume levels made by the pressing the SHOUT sp volume up and down buttons.

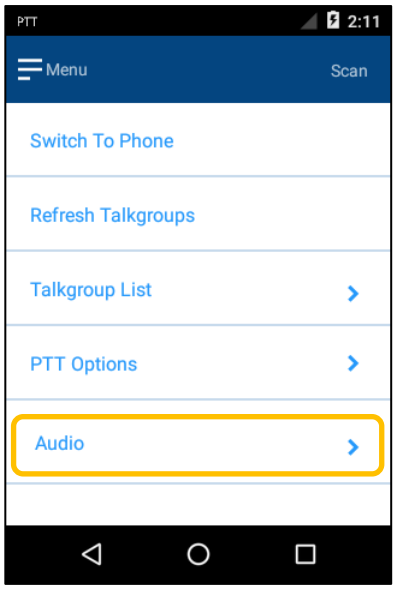


Figure 105: PTT Menu

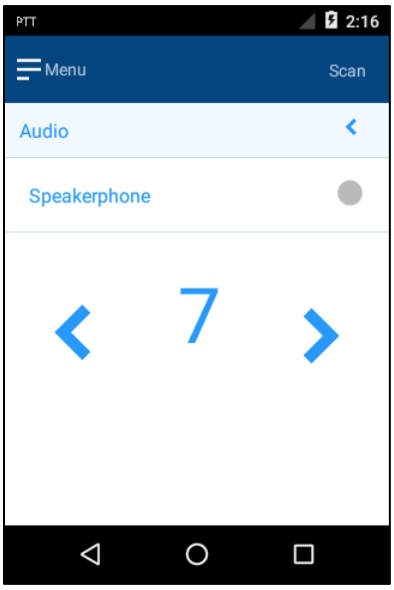


Figure 106: Audio Options

Appendix A: PMS Features

TRACKING

The SHOUT sp 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 [3].

Brevity

With PMS enabled, the 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 display as a green checkmark next to the Brevity code when selected.

Contacts

With PMS enabled, the contact(s) must have two fields—Name and IMEI number. The Contacts function allows users to enter and save a contact(s) via the keyboard.

Compose

With PMS enabled, the user must choose contacts from the contact list and not enter e-mail addresses directly. The contact(s) must have two fields—Name and IMEI number.

Appendix B: Upgrading the Firmware

The SHOUT sp firmware can be upgraded using a computer connected to the USB port of the device. Contact NAL Research Tech Support by dialing 888 SHOUT NR (888-746-8867) or emailing support@nalresearch.com.

Appendix C: Design Specifications

Mechanical Specifications

Dimensions:	4.9” x 2.7” x 0.9” (127 x 69 x 23 mm) (without antenna)
Weight:	~12 oz. (340 g)
Enclosure:	Hard anodized aluminum housing / EMI shielding / ABS plastic radome
Connector:	USB Micro-B, Micro SIM reader, 3.5 mm headset jack
Antennas:	External Iridium, embedded GPS, and embedded W-Fi / Bluetooth
Buttons:	Power, Volume Up, Volume Down, PTT, Covered Emergency
Emergency:	Guarded button
LED:	One status LED
Screen:	3.0” TFT 400 x 240 pixel capacitive LCD
Audio:	Microphone, earpiece speaker, hands free loudspeaker

Electrical Specifications

Main Input Voltage:	2.75V DC to 5.5V DC
Peak Current:	1.5A @ 5.0V DC
Battery Type:	Lithium Ion
Battery Capacity:	2.15 A-Hr
Charging Voltage:	USB 1.0, USB 2.0 or 5VDC
Rechargeable Cycles:	> 500 times

Iridium Transceiver

Operating Frequency:	1616.0 to 1626.5 MHz
Duplexing Method:	TDD
Multiplexing Method:	TDMA/FDMA
Link Margin Downlink:	12 dB average (free space)
Link Margin Uplink:	12 dB average (free space)
Average Transmission Power:	1.0W
Peak Transmission Power:	5.6W

GPS Receiver

GPS Receiver:	u-blox MAX-M8Q
Receiver Type:	L1, C/A, 72-channel

Update Rate: .....4 Hz

Accuracy: .....2.5 m CEP (position)

2.0 m CEP (SBAS)

Acquisition: .....29 seconds cold-start

29 seconds warm-start

<1 second hot-start

Sensitivity: .....–160 dBm (tracking)

–160 dBm (reacquisition)

–147 dBm (cold-start)

Wi-Fi / Bluetooth Transceiver

Operating Frequency: .....2.4 GHz ISM band

Bluetooth Class: .....Class II

Bluetooth Transmit Power: .....+10 dBm (5 – 10 m range)

Wi-Fi transmit Power: .....+17 dBm

Environmental Specifications (Electronics)

Operating Temperature: .....–4ºF to +140ºF (–20ºC to +60ºC)

Operating Humidity: .....≤75% RH

Storage Temperature: .....–4ºF to +140ºF (–20ºC to +60ºC)

Storage Humidity: .....≤93% RH

Environmental Specifications (Battery)

Operating Temperature: .....–4ºF to +140ºF (–20ºC to +60ºC)

Operating Humidity: .....≤90% RH

Storage Temperature: .....–4ºF to +140ºF (–20ºC to +60ºC)

Storage Humidity: .....≤95% RH

Charge Temperature: .....+32ºF to +113ºF (0ºC to +45ºC)

Environmental Specifications (LCD)

Operating Temperature: .....–4ºF to +131ºF (–20ºC to +55ºC)

Operating Humidity Range: .....≤90% RH

Storage Temperature Range: .....–4ºF to +185ºF (–20ºC to +85ºC)

Storage Humidity Range: .....≤95% RH

Micro SIM Card Specifications

SIM Card Height: .....15 mm

SIM Card Width: .....12 mm

Appendix D: Standard Compliance

The SHOUT sp has an internal Iridium 9523 L-band transceiver. The 9523 is tested to the regulatory and technical certifications shown below. It is assigned to the FCC Identifier Q639523.

Regulatory Approvals	Radio Tests	EMC Tests	Mechanical/ Electrical Tests
CE	ETSI EN 301 441 V1.1.1(2000-05)	ETSI EN 301 489-20 V1.2.1(2002-11) ETSI EN 301 489-1 V1.8.1(2008-04) ETSI EN 301 489-20 V1.2.1(2002-11)	EN60950-1:2006 Part 1
FCC	FCC CFR47 Parts 2, 15, and 25	EN61000-4-2 : 1995/A2 : 2001 Part 4.2 EN61000-4-3 : 2002 Part 4.3 EN61000-4-4 : 2004 EN61000-4-6 : 1996/A1 : 2001 Part 4.6 EN55022:2006	
Industry Canada	Industry Canada RSS170 Issue 2, March, 2011		

The SHOUT sp has an internal Wi-Fi / Bluetooth transceiver. The Wi-Fi / Bluetooth transceiver is tested to the regulatory and technical certifications shown below. It is assigned to the FCC Identifier Z64-WL18SBMOD.

Regulatory Body	Specification	ID (If Applicable)
FCC (USA)	Part 15C + MPE FCC RF exposure	Z64-WL18DBMOD
ISED (Canada)	RSS-102 (MPE) and RSS-247 (Wi-Fi, Bluetooth)	451I-WL18DBMOD
ETSI/CE (Europe)	EN300328 v2.1.1 (2.4-GHz Wi-Fi, Bluetooth)	—
	EN301893 v2.1.1 (5-GHz Wi-Fi)	—
	EN62311:2008 (MPE)	—
	EN301489-1 v2.1.1 (general EMC)	—
	EN301489-17 v3.1.1 (EMC)	—
	EN60950-1:2006/A11:2009/A1:2010/A12:2011/A2:2013	—
MIC (Japan)	Article 49-20 of ORRE	201-140447

NOTE: Any changes or modifications to the SHOUT sp not expressly approved by the NAL Research could void the user's authority to operate the equipment.

Note: The SHOUT sp complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Appendix E: Export Compliance

The SHOUT sp is controlled by the export laws and regulations of the United States of America (USA). 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: https://www.bis.doc.gov/index.php/regulations/export-administration-regulations-ear 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 for further information on OFAC and its requirements.