SHOUT NANO 200

USER GUIDE Rev. D

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SHOUT nano 200

User Guide

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REVISION HISTORY

Revision	Date	Description
A	11/17/2025	Formal Release
A.1	12/19/2025	Added Contacts Screen
B	12/19/2025	Formal Release
B.1	03/19/2026	Updated images; added FCC compliance statement
C	04/24/2026	Formal Release
C.1	05/18/2026	Added battery install warning/image and tracking table
D	06/25/2026	Formal Release

REFERENCE DOCUMENTS

Please email support@nalresearch.com for the latest revisions of the below Naltec documents.

Reference	Title	Version
[1]	*AT Commands for Model SHOUT nano 200*	Version A
[2]	*SatTerm for SHOUT nano 200*	Version A
[3]	*SHOUT nano 200 ATAK Plugin User Guide*	Version D
[4]	*SHOUT-MAP App User Guide*	Version C

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ACRONYM LIST

AES ..... Advanced Encryption Standard
API ..... Application Programming Interface
AT ..... Attention
BATT ..... Battery
BIS ..... Bureau of Industry and Security
BLE ..... Bluetooth Low Energy
BT ..... Bluetooth
CE..... Conformité Européenne
CRUD..... Create, Read, Update, and Delete
DAV ..... Data After Voice
DISA..... Defense Information Systems Agency
DoD ..... Department of Defense
DSN ..... Defense Switch Network
EAR..... Export Administration Regulations
EMSS ..... Enhanced Mobile Satellite Services
ESBD.....Enhanced Short Burst Data
FCC ..... Federal Communications Commission
FDMA ..... Frequency-Division Multiple Access
GNSS ..... Global Navigation Satellite System
GPS ..... Global Positioning System
GPX ..... GPS Exchange Format
GSM..... Global System for Mobile Communication
GUI ..... Graphical User Interface
IMEI ..... International Mobile Equipment Identification
IRDM..... Iridium
ISP ..... Internet Service Provider
ISU..... Iridium Subscriber Unit
Kbps ..... Kilobits Per Second
KML ..... Keyhole Markup Language
LED ..... Light Emitting Diode
LEO..... Low-Earth Orbit
MMC ..... Mission Management Center
MO..... Mobile Originated
MT..... Mobile Terminated
NIST ..... National Institute of Standards and Technology
NOAA..... National Oceanic and Atmospheric Association

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NOC ..... Network Operations Center
NORTHCOM ..... Northern Command
OFAC ..... Office of Foreign Asset Controls
PLI.....Position Location Information
PMS ..... PECOS Message Structure
PPP ..... Point-to-Point Protocol
PSTN..... Public Switched Telephone Network
RUDICS..... Router-Based Unrestricted Digital Internetworking Connectivity Solution
SBD ..... Short Burst Data
SMA ..... SubMiniature version A
SMS ..... Short Message Service
SMSC..... Short Message Service Center
STAT..... Status
TDD ..... Time Division Duplex
TDMA ..... Time-Division Multiple Access
TTKT ..... Time To Keep Trying
TTL..... Transistor–Transistor Logic
USA ..... United States of America
USB ..... Universal Serial Bus
USSF..... United States Space Force
UTC ..... Coordinated Universal Time
VAC ..... Volts (Alternating Current)
VDOP ..... Vertical Dilution of Precision

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INTRODUCTION

This guide pertains to SHOUT nano 200-01 SBD by NAL Technologies (Naltec). This low size, weight, and power (SWaP) tracker uses an Iridium satellite and mesh network to relay critical location data, emergency SOS, and text messages. The device can easily be carried or attached to a high-value, untethered, or non-powered asset.

SHOUT nano 200 is Short Burst Data®(SBD®) and mesh capable and enables pole-to-pole coverage. It has a removeable battery for extended operations, and offers additional features such as a built-in motion sensor, geofencing features, and sleep mode to reduce power consumption.

DEVICE DESCRIPTION

Internal

The rugged, impact-resistant, plastic chassis contains an embedded Iridium 9603 transceiver module, a GNSS receiver, LoRa™ mesh transceiver, Bluetooth Low Energy transceiver, low-power microcontrollers, and a removeable Li-Ion rechargeable battery.

External

The lightweight SHOUT nano 200 device has a non-touchscreen LCD display, an Iridium and GPS antenna, a belt clip, and buttons for the following capabilities: power/enter; up, down, left, and right screen navigation; and emergency/911. The USB-C interface port on the bottom of the device is for charging, firmware updates, data collection, and setting parameters using the Naltec SatTerm app.

Figure 1: SHOUT nano 200 external components

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STATUS LED BEHAVIOR

Below are the colors and patterns for the Status LED:

- RED blink – Battery level under 20%
- GREEN blink 5 times quick, 3 seconds off – New unread message in the inbox. Repeats until the message is read
- GREEN blink – Battery charging
- Solid GREEN – Not charging and above 20%
- Solid GREEN – Charging and battery full
- AMBER blink – Battery is overcharged and will not turn on until it has charged enough. This can take up to 30 minutes.

Accessories

The SHOUT nano 200 kit comes with the following accessories, except the optional battery charger.

Field-replaceable battery

PN: BAT0023

Battery charger

PN: POWS030

USB-C cable

PN: CBLA149

15W USB-C adapter
(PD 3.0, US 5V 3A output)
PN: POWS031

Belt clip

PN: 162-25008-002

Screen protector

PN: 163-25008-010

Figure 2: SHOUT nano 200 accessories

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INITIAL SETUP

Prepare Device

Prior to using SHOUT nano 200, you must first purchase commercial airtime or request United States Space Force (USSF) EMSS airtime. SHOUT nano 200 can have up to five destination addresses, such as a Network Operation Center (NOC) server. To quickly set up SHOUT nano 200 as a tracking device:

1) Remove the following from the packaging: SHOUT nano 200 and the screen protector, wall charger, and USB cable.
2) Connect the USB cable's USB-C connector to the USB-C connector port on SHOUT nano 200 (see **Figure 1**).
3) Connect the USB-C connector to the wall charger and plug charger into a wall socket.

Charge and Change Device Battery

WARNING: Improper battery installation can result in bent pins and impacts to device operation. A label located in the cavity shows the correct battery placement; ensure the battery is oriented according to the label and the image below.

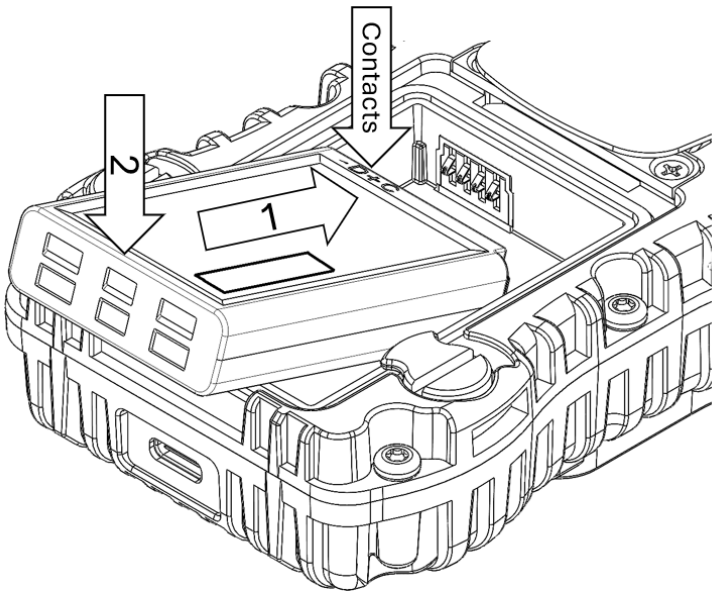

Figure 3: How to install the battery

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CHANGE DEVICE BATTERY

1) Turn the device over.
2) Using a flathead screwdriver, turn the left circular fastener counterclockwise and the right circular bolt clockwise to open the battery cover. The belt clip does not need to be removed to change the battery.

   NOTE: Do not exchange covers between devices, as the covers are uniquely marked with each device's serial and IMEI number. If the covers become mixed, use the IMEI below the belt clip or the serial number in the battery bay to match the correct cover to each device.

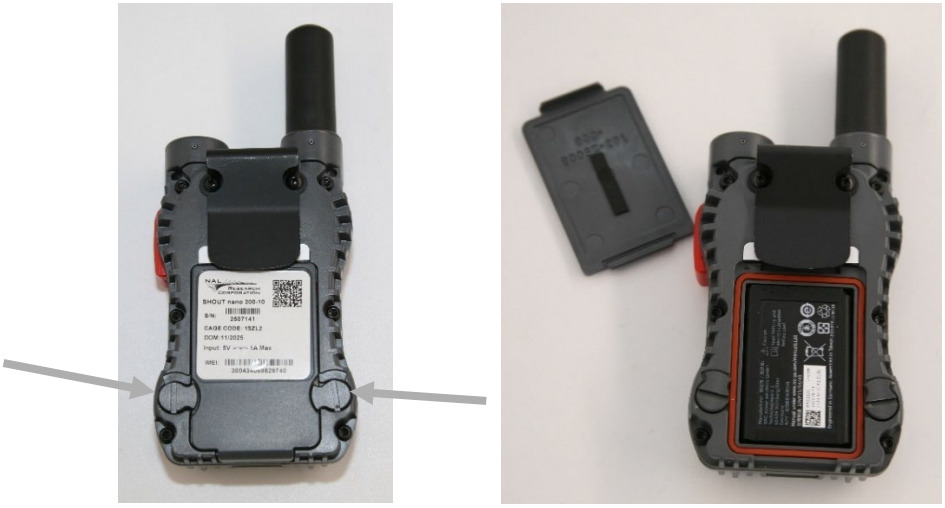

Figure 4: How to open the battery cover

3) Insert the battery and close the cover.
4) Using the screwdriver, turn the left circular fastener clockwise and the right circular fastener counterclockwise to secure the battery cover.

CHARGE DEVICE BATTERY

The device takes approximately 3 hours to fully charge when using the Naltec-provided USB 3.0 charger at +22^{0}C ambient. When charging with a USB 2.0 charger or above +45^{0}C ambient, it will experience longer charge times.

The device takes ~5-6 hours from any USB port to fully charge at +22 °C ambient. When charging above +45 °C ambient, it will experience longer charge times. The device does not support fast charging. Batteries can be exchanged and externally charged to minimize device downtime.

To charge, plug the wall charger into a 100-240 Volts (Alternating Current) (VAC) 50/60Hz power source. Confirm power is applied to the SHOUT nano 200 USB-C port.

A charging symbol appears in the battery icon on the screen header.

For more information on battery care, storage instructions, and charge cycle, see Appendix A.

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Start Device

Once fully charged, the Status LED will show solid GREEN. Press the Power/Enter button for 5 seconds. The *Naltec Splash* screen with logo will briefly display, followed by the *Home* screen.

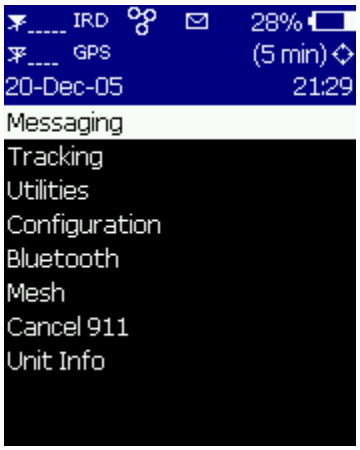

Figure 5: Home Screen

NOTE: SHOUT nano 200 enters sleep mode after a user-configured amount of time. Remove from sleep mode by pressing the Power/Enter button for 5 seconds.

SatTerm Device Commands and Configuration

SHOUT nano 200 can be configured using a computer running the Naltec SatTerm application and can be attached with a USB-C cable or via Bluetooth.

For example, the device can be turned off using the AT command **^SHUTDOWN**. If it is sleeping or in low power in between reporting cycles, pressing the Power/Enter button turns SHOUT nano 200 on for 10 seconds. During this time, take the device out of tracking mode and put it into command mode by entering a sequence of three plus signs, "**+++**". If **"+++"** is not entered within 10 seconds, SHOUT nano 200 goes back to sleep.

See Command Mode for a more detailed description and the Naltec document *AT Commands for SHOUT nano 200* [1] for a full list of AT command capabilities.

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USER INTERFACES

Power/Enter Button

SHOUT nano 200 has a single power button (see Figure 1). Simply hold the button for 5 seconds to turn the device off/on and awaken it from sleeping. **NOTE**: Upon waking up, the device will not display the Naltec splash screen.

Activate Emergency/911

The Emergency/911 button immediately sends a location report with the emergency bit set. It will continue to send reports at a rate that can be configured in the 'Emergency Report Rate' parameter until the mode is canceled. All text messages sent in this mode also contain the emergency flag set.

To activate emergency mode, open the emergency cover and press the Emergency/911 button. The top part of the display on the *Home* screen will turn RED.

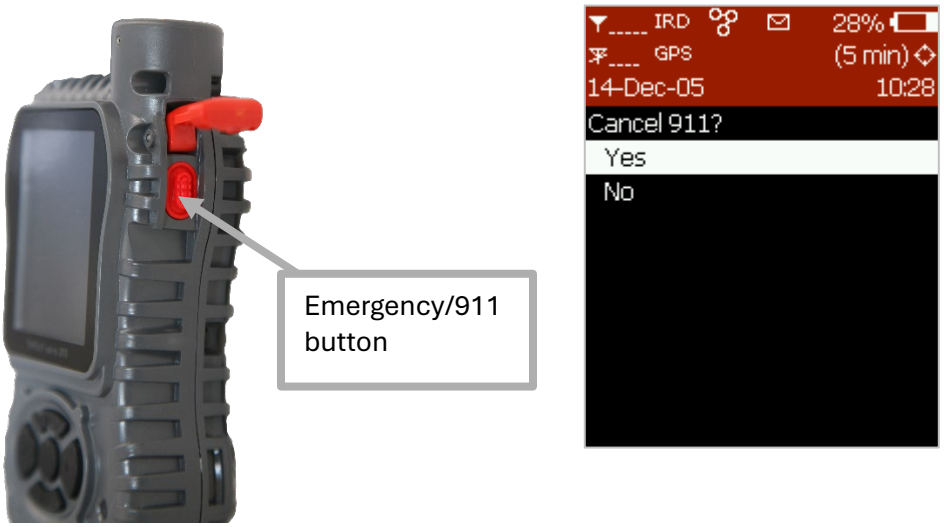

Figure 6: Activate emergency mode

To deactivate, scroll down the *Home* screen and select 'Cancel 911', then choose **Yes**. A success message will appear, and the device will resume normal operation.

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USB-C Connector Port

The SHOUT nano 200 USB-C connector port is located underneath the device.

Figure 7: USB connector port

USB DATA

SHOUT nano 200 communicates with computer equipment using the USB-C port (see above image). We recommend configuring and collecting data from the device by using both:

1) Naltec's defined AT commands, found in the manual *AT Commands for Model SHOUT nano 200* [1].

2) the SatTerm (Rev A) graphical user interface (GUI) software to configure SHOUT nano 200. The latest version of this software can be downloaded from the Naltec website.

DC POWER INPUTS

The internal 2300mAh Li-Ion battery can be charged through SHOUT nano 200's USB-C port using the provided USB-C to USB-C cable. The device can be charged from the provided AC to DC wall adapter or from any USB port capable of outputting a minimum of 500 mA. The max charge rate has an upper limit of 750mA.

Bluetooth

SHOUT nano 200 uses a Bluetooth Low Energy (BLE) transceiver to provide a secondary command interface path alternative to the USB-C connector port. Like the USB port, this interface can connect with SatTerm running on a Windows PC. You can also establish a Bluetooth connection with a Bluetooth-enabled Android or iOS device running the SHOUT nano 200 ATAK Plugin or SHOUT-MAP Application (see SHOUT Apps section).

By default, the Bluetooth interface turns off when there has been no data transfer after 10 minutes or when Bluetooth has been disconnected for more than 10 minutes.

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IMPORTANT FEATURES

Communication Links

The Iridium network is used to send location reports. To use Iridium service, the International Mobile Equipment Identification (IMEI) number must be activated with an SBD service plan through an authorized Iridium reseller or provisioned on the USSF EMSS Gateway.

When an IMEI is provisioned for service, up to 5 SBD delivery destinations can be specified. These are delivery endpoints for the data transmitted by SHOUT nano 200 and can be any combination of 3 types: IP address, email, and IMEI.

Short Burst Data® (SBD®) Capability

SHOUT nano 200-01 can send Short Burst Data (SBD) messages over the Iridium satellite network in Naltec's and government-defined report formats compatible with Naltec 9602-LP, 9602-AB, A3LA series modems, and SHOUT series tracking devices. Mobile-originated (MO) SBD messages are sent out to the Iridium satellite network. Mobile-terminated (MT) SBD messages are received from the Iridium satellite network.

LoRa® Mesh Capability

SHOUT nano 200-01 can send and receive encrypted messages in real time over mesh network, providing reliable and secure communication when SBD is not available.

Man Down

The Man Down alert detects when SHOUT nano 200 is motionless for a configurable amount of time and triggers up to 3 alerts if you do not respond affirmatively to an 'Are You OK?' pop-up menu. After alerts begin, cancel it by selecting the Cancel 911 menu or Off from the Man Down menu. Configure the following settings in this menu:

1) *Time down duration* – The amount of time the device must remain motionless before the 'Are You OK?' pop-up menu displays. Whether SHOUT nano 200 is "motionless" depends on a set of motion parameters configured using the SatTerm software.
2) *Countdown duration* – the amount of time to respond to the 'Are You OK?' pop-up menu. If the countdown expires or 'No' is selected, the chosen Man Down alerts will trigger.
3) *Alerts* – any combination of the following 3 alerts can be selected:
    a. *Locator alert*: Configurable audio alert that sounds until the Man Down alert is disabled. The alert type can be set from the Audio menu.
    b. *Start emergency*: Begins 911 mode as if the red emergency button was pressed.
    c. *Send message*: Sends a text message with a Man Down short code and GPS location information.

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Modes of Operation

SHOUT nano 200 is always in either command mode or tracking mode and can be configured to turn on in one of these modes. The factory-set Start-Up Mode is the tracking mode, which can be changed using the **^START** command. For normal operational tracking scenarios, set the Start-Up Mode to Tracking Mode so that the unit continues tracking after waking up from sleep.

COMMAND MODE

When in command mode, SHOUT nano 200 accepts AT commands through the USB connection. The command set is detailed in the document *AT Commands for SHOUT nano 200* [1].

Use the commands to configure operating parameters that allow SHOUT nano 200 to operate as a modem and to query the GNSS receiver. Command mode can be switched to tracking mode by the AT command **^TRK**. To switch back, use the escape sequence **+++**.

TRACKING MODE

In this mode, SHOUT nano 200 automatically transmits position reports using parameters contained in a tracking profile. Refer to the *SatTerm for SHOUT nano 200 Manual* [2].

The device can transmit messages in both Naltec's defined report formats and according to the PECOS Message Structure (PMS) compatible with the US Northern Command (NORTHCOM) Mission Management Center (MMC) server. The PMS complies with the Blue Force Tracking Data Format Specification as defined in the document *PECOS Message Definition Specification, 200907-001 Version 1.7*.

Tracking mode has configuration parameters that control the reporting capabilities and power consumption. The device can be configured to send reports at an interval ranging from 1 minute to once every 7 days. SHOUT nano 200 can operate in a low-power mode, enabling it to turn off and sleep between reports.

Tracking may enter the low-power mode while using USB and Bluetooth interfaces. The command **AT^PWRAO** (Power Always On) keeps SHOUT nano 200 turned on in this situation. This setting prevents the device from sleeping and greatly increases power consumption. Disable this command when finished using the USB or Bluetooth interface. Refer to the document *AT Commands for SHOUT nano 200* [1] for additional details.

The more commonly used tracking parameters are "Time Between Reports" (**^TBR**), "Time to Keep Trying" (**^TTKT**), and "Callable" (**^CAL**). The following features can also be utilized to further tailor tracking mode to a specific application: "GNSS power" (**^GAO**), "communication link availability" (**^LNK**), "profile selection" (**^TPN**, **^TPT**, **^TPE**), motion detection, and geofencing.

"Time Between Reports" (**^TBR**) and "Time to Keep Trying" (**^TTKT**) adjust how often to send reports and how long SHOUT nano 200 tries to achieve a successful report transmission. Decreasing the "Time Between Reports" increases data points for more detailed situational awareness and raising the "Time to Keep Trying" improves the chances of transmission success. Both options also directly affect the SHOUT nano 200 power consumption.

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For supporting message-receiving scenarios, referred to as “Callable,” the SHOUT nano 200 Iridium modem can be set to always on by using the **^CAL** command. This configuration prevents the device from sleeping and greatly increases power consumption.

To facilitate power management and time to acquire location, configure SHOUT nano 200 to control the power state of the GNSS module. The module can be set to always on using the command **^GAO**, which prevents the GNSS from turning off after obtaining a valid fix.

While in tracking mode, SHOUT nano 200 can load tracking profiles dynamically. By default, there are 2 tracking profiles set aside for normal tracking and emergency tracking. Typically, when tracking mode starts, the profile for normal tracking is loaded, specified by the "Tracking Profile Normal" (**^TPN**) setting.

When the emergency mode is triggered, the tracking mode switches to using the ‘Tracking’ profile for emergency tracking, specified by the "Tracking Profile Emergency" (**^TPE**) setting. This allows SHOUT nano 200 to be configured to operate differently when there is an external stimulus.

Tracking mode also loads a different tracking profile if geofences are enabled and SHOUT nano 200 enters or exits a geofence. Priorities are assigned to the different stimuli, and SHOUT nano 200 only switches to the associated tracking profile if it has a higher priority. Emergency tracking has the highest priority, geofence is the second highest, and normal tracking is the default.

CALL-OUTS

Using an onboard real-time clock, SHOUT nano 200 can be configured to send daily call-out reports at specified Coordinated Universal Time (UTC) times.

These call-out reports are in addition to tracking reports sent at a predefined tracking interval, and they are indistinguishable from each other. Call-outs can be used as a heartbeat to determine if the device is still operational (refer to the *SatTerm for SHOUT nano 200 Manual* [2]).

GEOFENCING

A geofence is a set of connected latitude and longitude coordinates that defines a region or zone of interest. SHOUT nano 200 can use location data from its GNSS receiver to determine whether it has entered or exited the bounds of preconfigured geofences. Refer to *the SatTerm for SHOUT nano 200 Manual* [2].

A geofence is defined by a minimum of 3 coordinates and a max of 50. Multiple geofences can be configured, each with a unique set of tracking parameters that cause SHOUT nano 200 to change its tracking behavior while in a specific geofence.

Each geofence can send a report upon entering and exiting the defined region. They can also be configured to turn off the Iridium modem for regions that require radio silence.

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MOTION DETECTION

The device's built-in omnidirectional movement sensor can reliably detect motion and functions regardless of how SHOUT nano 200 is mounted or aligned. It is sensitive to both tilt (static acceleration) and vibration (dynamic acceleration).

The signal level is fed directly into the SHOUT nano 200 microcontroller to wake the device out of low-power mode when activity is sensed and to transmit a location report. The motion sensor has a variety of settings that impact its detection sensitivity. The motion sensor can be enabled or disabled (refer to *the SatTerm for SHOUT nano 200 Manual* [2]).

ENCRYPTION

SHOUT nano 200 can be configured to encrypt/decrypt all transmitted and received payload data using 256-bit Advanced Encryption Standard (AES) encryption. Mesh data is also encrypted with payload keys.

To enable encryption, assign a cryptographic administrator to be responsible for modifying the encryption and decryption keys and setting the device to use encryption (refer to *the SatTerm for SHOUT nano 200 Manual* [2]).

The 256-bit AES encryption algorithms implemented here comply with NIST FIPS 140-2 (see the following documents (https://csrc.nist.gov/publications/detail/fips/140/2/final):

1) *Security Requirements for Cryptographic Modules*, FIPS PUB 140-2, US Department of Commerce, National Institute of Standards and Technology (NIST), May 25, 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 19, 2003)

REMOTE UPDATES

Using the required update password, SHOUT nano 200 can be configured over the air through the remote update option. This allows remote, unattended trackers to be reconfigured without requiring direct access to the device.

All of the tracking profile parameters and most of the general parameters can be configured via remote updates (refer to *the SatTerm for SHOUT nano 200 Manual* [2]). Naltec provides 2 software programs that can be used to compose and transmit remote updates: *Server for Trackers* and *Remote Configure*, downloadable on the Naltec website.

Refer to the software applications for the list of remotely configurable parameters.

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SHOUT APPS

SHOUT nano 200 can be used with a mobile device via Naltec's ATAK SHOUT Plugin and SHOUT-MAP Application. The ATAK SHOUT Plugin and SHOUT-MAP App enable capabilities such as device status, text messaging, managing tracking parameters (e.g., reporting rate, reporting format, geofencing), diagnostic utilities, and device configuring.

Pairing SHOUT nano 200

IMPORTANT: Bluetooth must be enabled on SHOUT nano 200 before opening the apps. A 'white' Bluetooth icon appears to show it is enabled (see the Bluetooth Pairing section). Refer to the *SHOUT nano 200 ATAK Plugin User Guide* [3] and *SHOUT-MAP App User Guide [4]* for more information.

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USING SHOUT NANO 200

Home Screen

Immediately after device power up, SHOUT nano 200 momentarily displays the Naltec logo by the Enter Pin screen (if enabled). Enter the 4 digits to be taken to the *Home* screen.

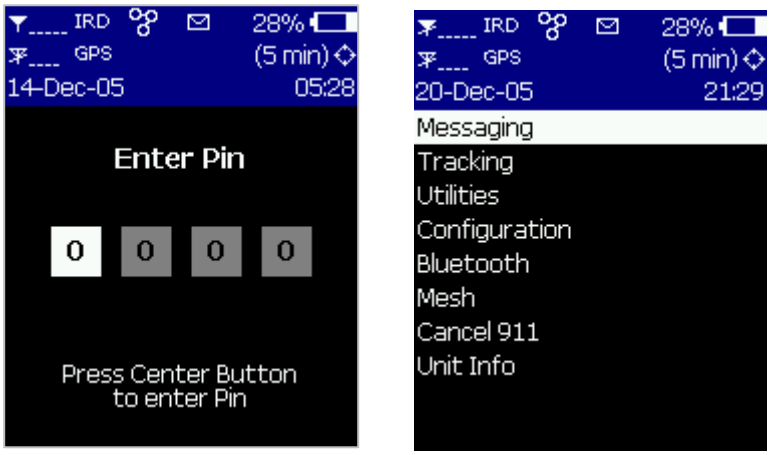

Figure 8: Enter Pin and Home Screen

The *Home* screen menu displays the following functionalities:

- Messaging
- Tracking
- Utilities
- Configuration
- Bluetooth pairing
- Mesh
- Cancel 911
- Unit Info

Use the keypad arrow buttons to navigate the menu and the Power/Enter button to select a desired menu option. The 'Device Status Symbols' field displays at the top of the *Home* screen. Some symbols do not appear until an event is initiated, such as sending or receiving a message.

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Status Symbols

Table 1: Status Symbols

Symbol	Description
	Denotes either: (1) the Iridium transceiver is on with real-time signal strength represented by the number of vertical bars or (2) SBD message transmission is in progress. The signal strength can range from the lowest of zero to the highest of 5 bars. During transmission, the antenna must have a clear view of the sky. SHOUT nano 200 cannot send messages or reports from inside a building.
	The GNSS receiver is on with real-time satellite acquisition status represented by the number of vertical bars. • One bar - Valid time and date fix • Two bars - 2D fix or dead reckoning • Three bars - 3D fix with HDOP higher than 2.0 • Four bars - 3D fix with HDOP less than 2.0 Although the SHOUT nano 200 receiver can often obtain a location fix when the antenna is partially blocked (near buildings, in a room next to a window, etc.), the antenna must have a clear view of the sky to minimize acquisition time, provide better position accuracy, and reduce power consumption.
	All audio alerts are off. If this icon does not appear in the screen header, the alerts are on.
	One or more unread messages are in the inbox.
	One or more messages are in the outbox ready to be sent, or one or more messages in queue failed to be sent.
	Mesh is enabled. Symbol turns red when an error condition is detected.
	Symbol turns green when connected to mesh-enabled devices
	Tracking (standard tracking, geofence tracking, etc.) is on when the symbol is bright white and dimmed gray when off. If standard tracking is on, a countdown timer until the next report appears beside the symbol.
	Man Down function is enabled.
	Man Down function is active.

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Symbol	Description
	Bluetooth enabled.
	Symbol turns green when connected to Bluetooth-enabled device.

Battery Charging Status

Table 2: Battery Charging Status

Icon	Description
Normal battery	Current battery level
Green battery	Charging is complete
Blue plug	Battery is charging
Yellow plug	Charging rate is slowed due to high operating temperature
Red exclamation mark	The operating temperature is out of range for safe charging

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Messaging

View, compose, and erase messages here. You can also manage mailboxes and set configurations such as enabling mailbox checks at a desired frequency and including GPS coordinates with each message. On the *Home* screen, select *Messaging*, then use the navigation buttons on SHOUT nano 200 to manage your mailboxes.

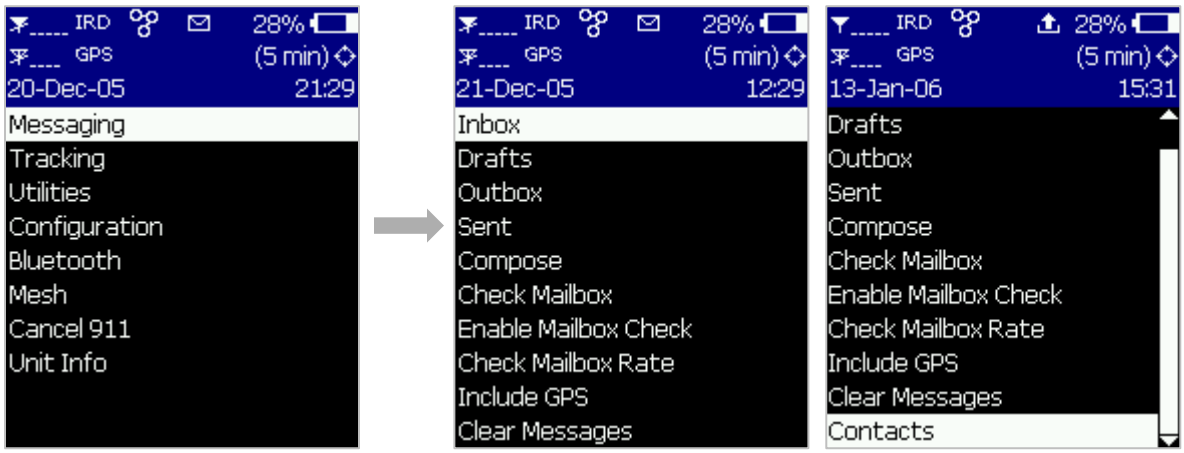

Figure 9: Access mailboxes and compose and erase messages

MESSAGING > INBOX

The *Inbox* contains all incoming read and unread messages with the newest at the top of the list. Navigate to *Configuration* > *Audio* > *Alerts* to enable audible alerts for new incoming messages.

1) Click the desired message.

2) A *Received* will display. Scroll down to view the entire message (tracking data).

3) Press the center button on the device to reply, forward, or delete the message.

Figure 10: How to read messages in your inbox

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MESSAGING > DRAFTS

This screen contains draft messages saved under the *Compose* menu. SHOUT nano 200 stores the newest message at the top and the oldest message at the bottom of the list. Selecting a draft takes you to the *Compose* functionality where you can complete and send your message.

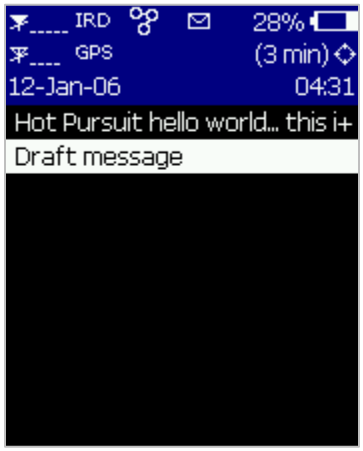
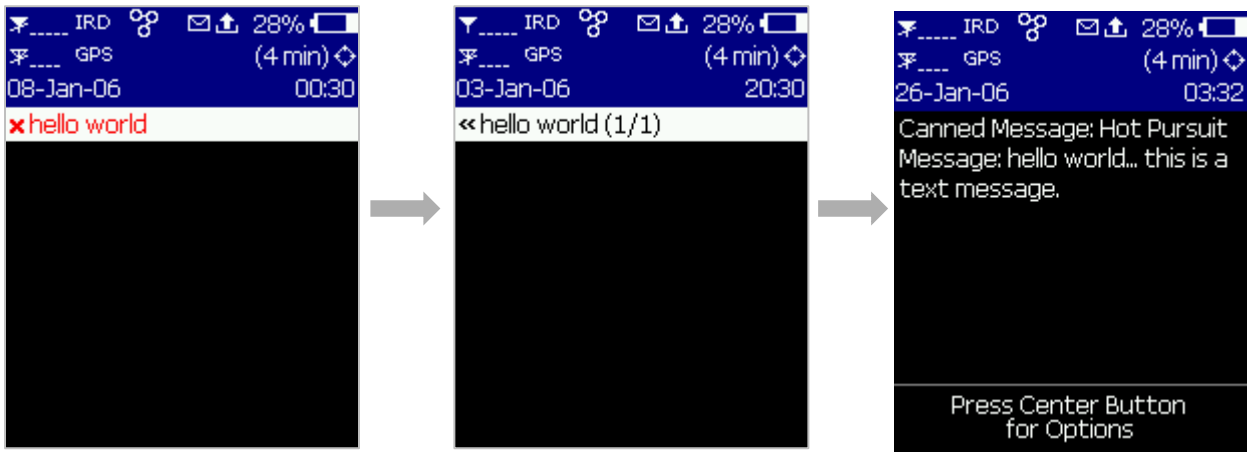


Figure 11: Complete a drafted message

MESSAGING > OUTBOX

Outbox contains both messages waiting to be sent or messages that failed to send. A message in the process of being sent is marked with a **<<** symbol. A message that failed to send shows a red **X** symbol. A message in queue waiting to be sent does not have a symbol.

For each message queued in the outbox, SHOUT nano 200 has a two-minute window to transmit before it becomes dequeued to avoid draining the battery.



1) See all unsent messages.

2) Select the desired message.

3) Press the center button to dequeue or delete the message.

Figure 12: How to send outbox messages

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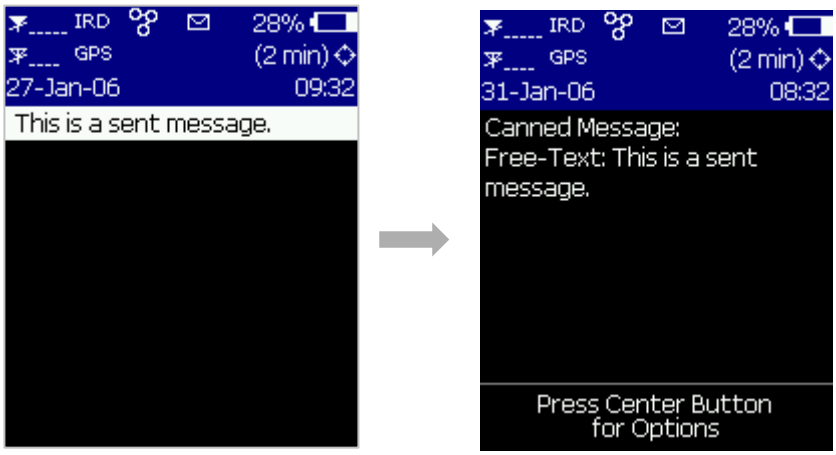
MESSAGING > SENT

The *Sent* mailbox contains messages successfully sent to the Iridium network . A message can be resent, forwarded, or deleted.

- *Resend* moves a message to the bottom of the outbox's sending queue.
- *Forward* opens the *Compose* section to enter additional information. You can then resend the message after modifying it or cancel the process.
- *Delete* permanently removes the message from the *Sent mail*box.

SHOUT nano 200 stores sent messages with the newest message displayed at the top of the list.



1) See all sent messages here.

2) Press the center button to forward or resend the message.

Figure 13: How to view sent messages

MESSAGING > COMPOSE

In the *Compose* function, scroll down the menu to enter, edit, and send canned messages, free-text messages, or a combination of both to 1) a NOC server, 2) a predefined list of email addresses, and/or 3) any email addresses entered via the keyboard.

The SatTerm software creates and saves predefined email addresses into the SHOUT nano 200 contact list. During setup, SatTerm requires connectivity between SHOUT nano 200 and a NOC server to synchronize the lookup table of short codes. As with canned messages, short codes map the actual email addresses to a lookup table located at a NOC.

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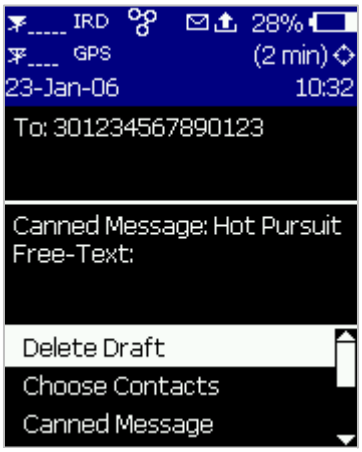
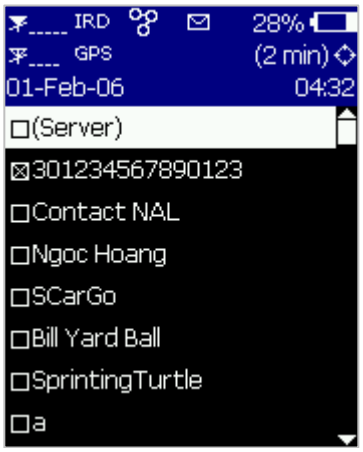
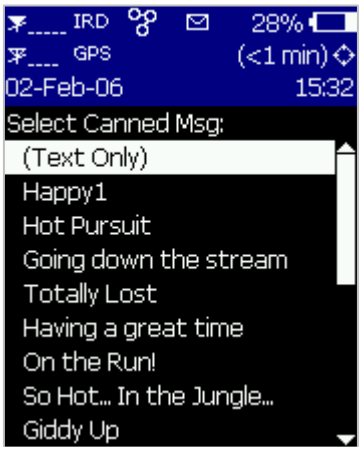


Scroll down menu to complete desired fields



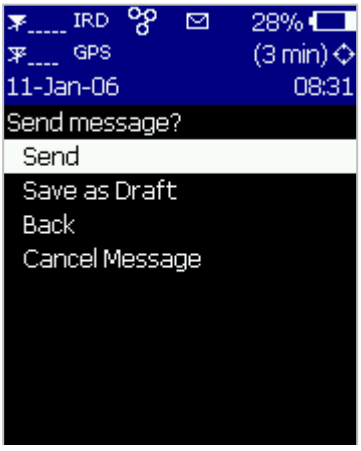
Compose > Choose Contacts



Compose > Canned Message

Compose > Enter Text

Compose > Choose Link



Compose > Send

Figure 14: How to compose a message

MESSAGING > CHECK MAILBOX

Select this option to see the number of unread and queued messages in your mailboxes. The *Check Mailbox* functionality is available ONLY when the Iridium link is enabled. SHOUT nano 200 can check mailboxes for any pending messages at the Iridium gateway when:

1) Manually forcing the device to check the mailbox at any time using this screen.
2) Tracking mode is enabled. SHOUT nano 200 will automatically check the mailbox each time it wakes up to send a position report.
3) Using *Check Mailbox Rate* (see section below), SHOUT nano 200 can be set to automatically wake up and check the mailbox at a preset frequency. A position report will not be sent when the device wakes up to check the mailbox unless the mailbox check rate coincides with the tracking report rate.

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The *Check Mailbox* functionality can either be in *Idle* or *Checking* the Iridium gateway for any pending messages to be downloaded. As the messages are being downloaded, SHOUT nano 200 shows the number of unread messages in the inbox and the number of messages still queued at the Iridium gateway to be downloaded.

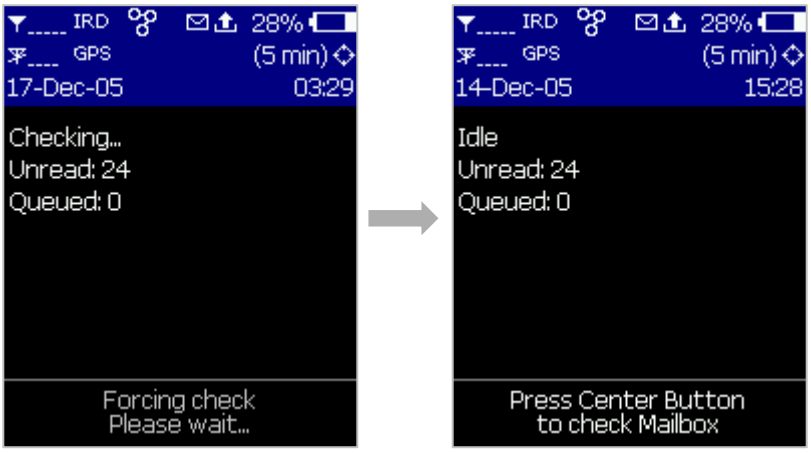
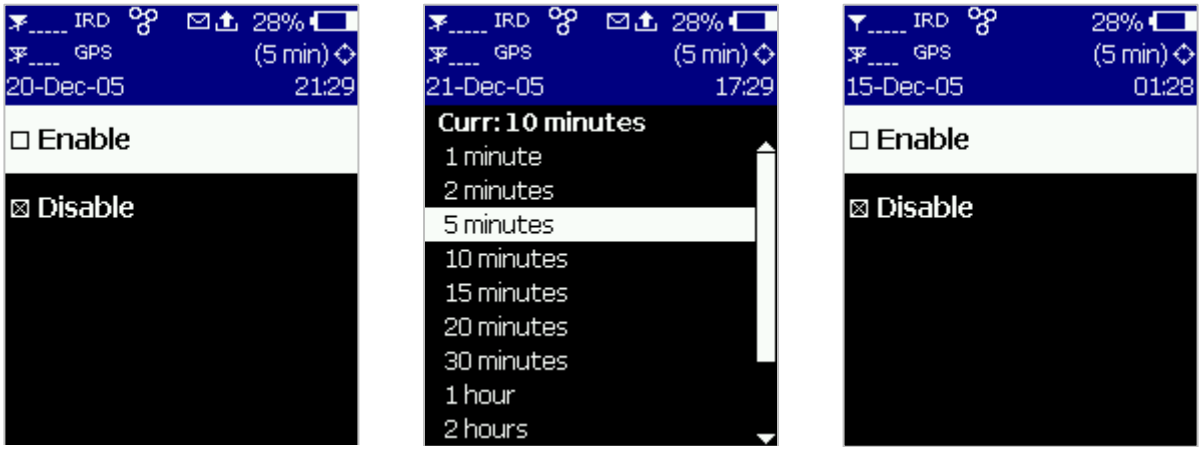


Figure 15: View number of messages in your mailboxes

MESSAGING >ENABLE MAILBOX CHECK, CHECK MAILBOX RATE, INCLUDE GPS

Enable Mailbox Check is available ONLY when the Iridium link is enabled. Use *Check Mailbox Rate* to set the time between mailbox checks and to enable mailbox check automatically.

By default, canned and free-text messages do not include GPS information. Use *Include GPS* to send a message with this data attached. **NOTE**: It may take up to an additional 29 seconds for these messages to send.



Messaging > Enable Mailbox Check

Messaging > Check Mailbox Rate

Messaging > Include GPS

Figure 16: Enable mailbox check, check mailbox rate, and include GPS

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MESSAGING > CLEAR MESSAGES

Under *Clear Messages*, determine which mailboxes to clear or choose 'Clear All'. Choose 'Erase' on the confirmation screen.

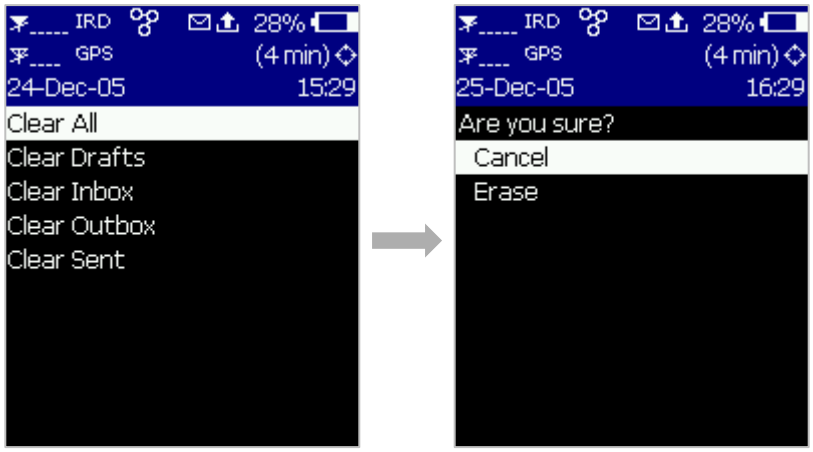

Figure 17: How to erase messages

MESSAGING > CONTACTS

To enter a new contact, click 'Add Contact', type in the device IMEI and name, then press 'Done.' It will appear with existing contacts in the *Contacts* menu.

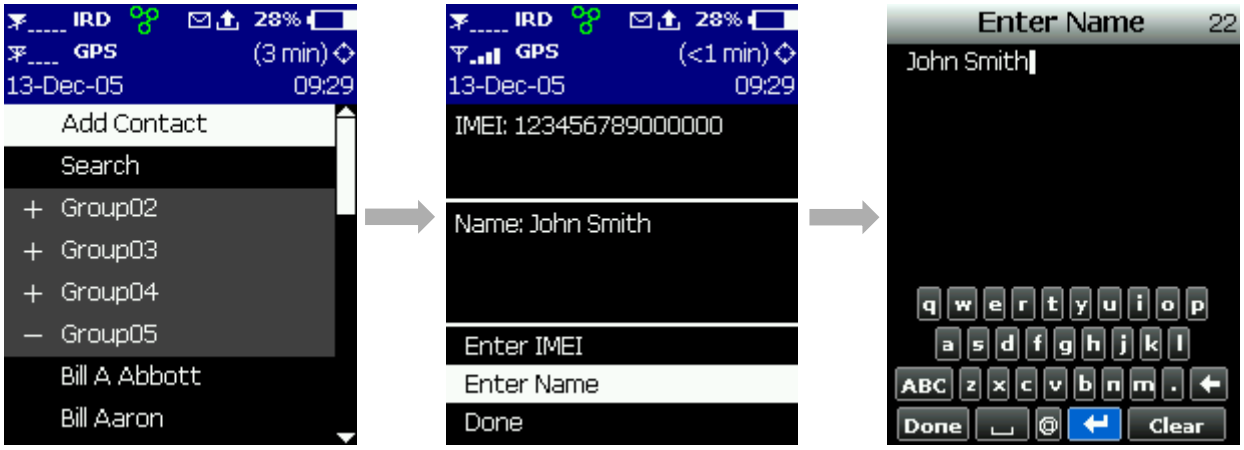

Figure 18: How to add a new contact

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Tracking

In the *Tracking* function, configure report rates and formats, enable geofences, send brevity codes, and manage man down alerts and messages. To enable tracking capabilities, navigate to *Home* > *Tracking* > *Enable Tracking* > *Enable*. Some functionalities such as Geofences require SatTerm to set up. Refer to *SatTerm for SHOUT nano 200 [2]* for more information.

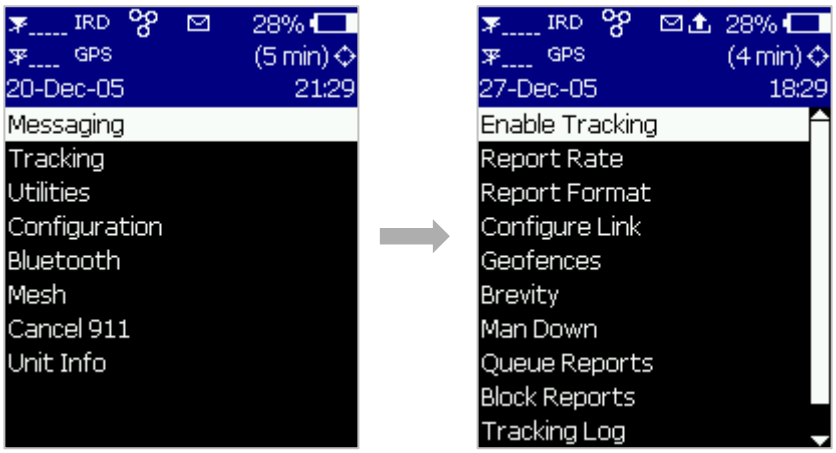

Figure 19: How to access and enable tracking capabilities

TRACKING > REPORT RATE

Configure report send-out duration here. When tracking is on, SHOUT nano 200 immediately turns the GPS receiver and attempts to transmit a position report (this may take up to 2 minutes). The next report is sent automatically based on the desired reporting rate. The countdown timer to the next report is displayed inside the parentheses next to the tracking symbol.

When waking up to transmit a location report and the Iridium link is used, the SHOUT nano 200 antennas must have a full view of the sky; otherwise, it will fail to send. By default, a failed report will not be resent but can be forced to stay in the *Outbox* awaiting to be resent.

A report rate set to more than 2 hours forces the GPS receiver into either a warm-start or cold-start fix (~29 seconds). As a result, SHOUT nano 200 consumes more battery power and the total number of reports is reduced.

Important: SHOUT nano 200 automatically resends all failed messages in the Outbox after a successful position report transmission. To avoid draining the battery unintentionally, carry out frequent maintenance on the Outbox and delete unwanted failed messages.

The SHOUT nano 200 logs and saves all position reports in its circular memory. When its memory is full, the oldest report is overwritten. SatTerm can be used to retrieve all saved position reports.

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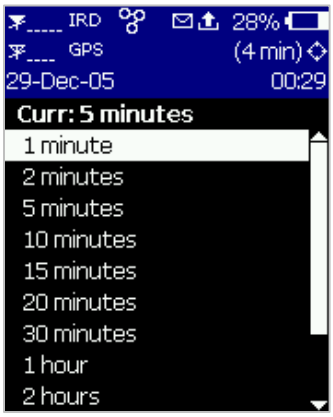

Figure 20: Configure report send-out duration

TRACKING > REPORT FORMAT

SHOUT nano 200 can transmit position reports in either 30-byte or 10-byte format, which is selected strictly for the purpose of Iridium airtime cost-saving. Both of these formats are backwards compatible with the device.

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

The 10-byte format includes UTC time, latitude, longitude, and Position (3D) Dilution of Precision (PDOP). With UTC date omitted, SHOUT nano 200 relies on the NOC server to stamp the date as the report arrives. Encryption is not available with the 10-byte format. Latitude and longitude are recorded with about 1.1 meters in resolution.

SHOUT nano 200 can also send position reports and text messages in PMS, which complies with the Blue Force Tracking Data Format Specification. The device ships without PMS features activated and can only be enabled by Naltec at the request of an authorized user.

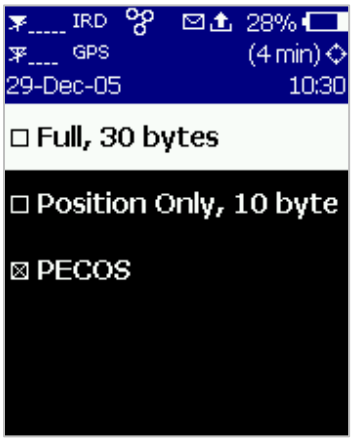

Figure 21: Configure position report format

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TRACKING > CONFIGURE LINK

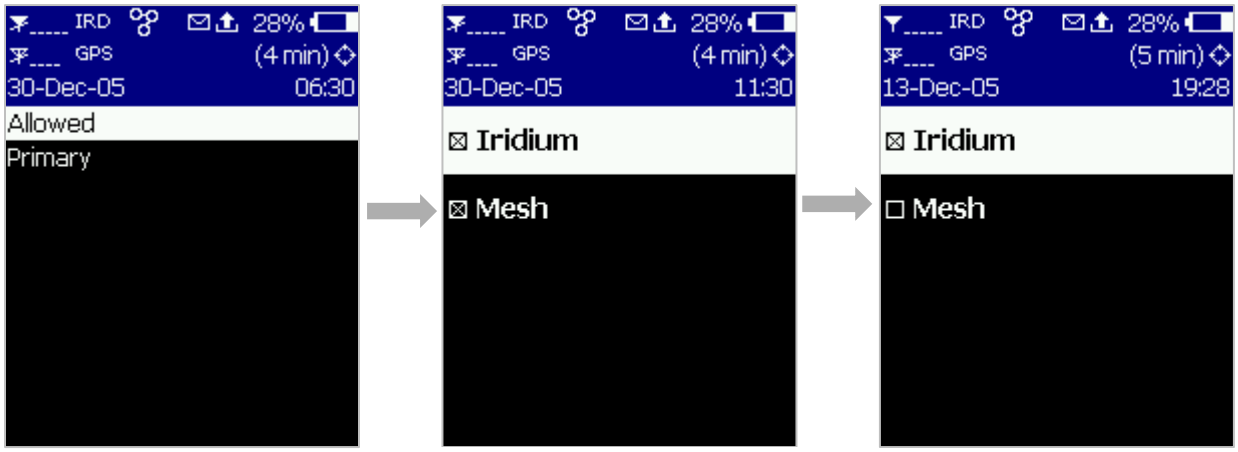
SHOUT nano 200's default setting is *Yes* to allow the Iridium link to be used to transmit reports and messages. If the Iridium link is not allowed to be used (Iridium radio silence), uncheck the box next to Iridium. If *Tracking* and *Data Logging* are enabled and Iridium link is set to *No*, tracking reports are saved in its circular memory.

The Mesh link option allows the use of mesh for text messages and tracking reports in the outbox. Tracking does not directly use Mesh for sending tracking reports, however when tracking reports are in the outbox and the Mesh link is enabled, a tracking report will attempt to send using a mesh neighbor's Iridium link.

Tracking reports will enter the outbox when they fail to send during the normal sending schedule and the Queue Failed Reports option is turned on (see Tracking > Queue Reports).

Under the *Configure Link* > *Primary* screen, the checked option is used first. As mentioned above, Tracking does not use Mesh, so the Iridium link is always used as the primary option for tracking reports.

For messages in the outbox, including tracking reports that are added to the outbox due to the Queue Reports setting, the Primary link setting will control which link is used first. When Mesh is selected as the primary link, and there are neighbors present on the Mesh, the message will send from the outbox through Mesh without making an attempt with Iridium.



Configure Link > Allowed Configure Link > Primary

Figure 22: Configure connectivity link

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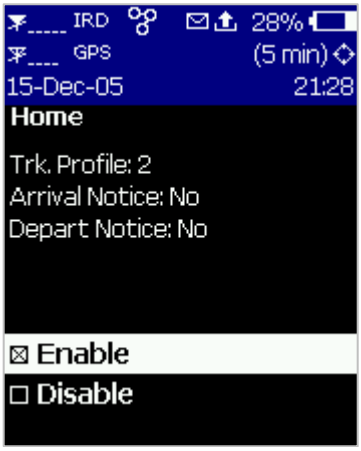
TRACKING > GEOFENCES

A geofence is a set of connected latitude and longitude coordinates that defines a region or zone of interest. This functionality can work independently as a separate tracking mode for specific applications or can be implemented alongside standard tracking.

Geofences are bound by a minimum of 3 coordinates and a max of 50. Each fence has a unique profile that triggers SHOUT nano 200 to change its tracking behavior while inside a specific fence. For example, it allows the device to turn off the Iridium link for regions that require radio silence.

Naltec recommends using both SatTerm and Google Maps to set geofences. You can also enter a sequence of latitude and longitude pairs to define a fence using just SatTerm. Refer to the *SatTerm for SHOUT nano 200 [2]* for detailed information.

1) Select the desired geofence.



2) Select 'Enable' or 'Disable'.

Figure 23: How to enable and disable geofencing

The *Geofences* menu limits you to the following options: 1) browsing a list of fences loaded into the device through SatTerm, 2) viewing the map of each fence and its type of notification (arrival or departure), and 3) enabling/disabling a fence. Enter other geofence features through SatTerm (see *SatTerm for SHOUT nano 200 [2]*).

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TRACKING > BREVITY

The *Brevity* code is part of the PMS/PECOS format. SHOUT nano 200 ignores the *Brevity* settings if the PMS/PECOS format is not activated and not selected.

With PMS enabled, you have the option to select any one of 16 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. Each code lights up as a green dot inside the *Brevity* icon when selected.

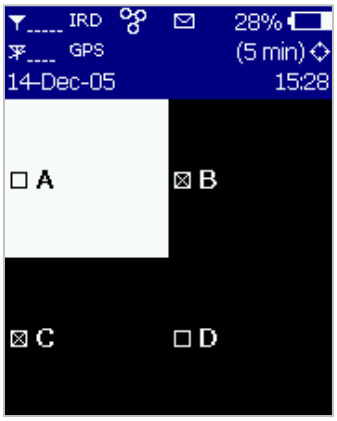

Figure 24: How to select brevity codes

TRACKING > MAN DOWN

The *Man Down* alert detects when SHOUT nano 200 is motionless for a configurable amount of time and triggers up to 3 different alerts if you do not respond affirmatively to an “Are You OK?” pop-up menu. After alerts begin, you can cancel it by selecting the *Cancel 911* menu or selecting *Off*.

Use the menu options to enable and disable the capability, initiate alerts or send a message, and set a time down and count down rate. Configure these settings here:

1) *Time Down Duration* – The amount of time the device must remain motionless before the “Are You OK?” menu displays. Whether SHOUT nano 200 is “motionless” depends on a set of motion parameters configured using the SatTerm software.
2) *Count Down Duration* – The amount of time for you to respond to the “Are You OK?” pop- up menu. If the countdown expires or you select *No*, the selected alerts will trigger.
3) *Alerts* – Any combination of the following three alerts can be selected:
    - *Locator Alert:* Configurable audio alert that sounds until the *Man Down* alert is disabled. You can set the alert type from the *Audio* menu.
    - *Start Emergency*: Starts emergency mode as if the red emergency button were pressed.
    - *Send Message*: Sends a text message with a *Man Down* short code and GPS location information.

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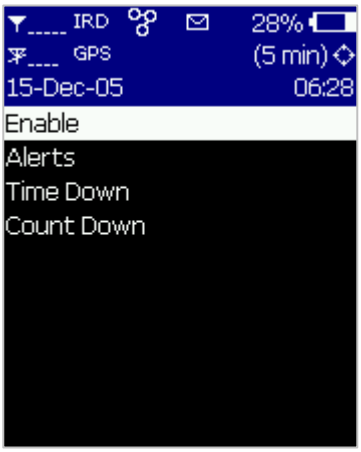
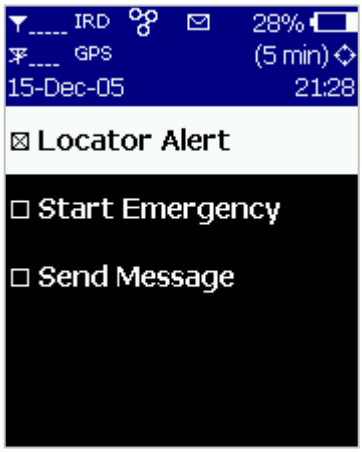


Tracking > Man Down menu



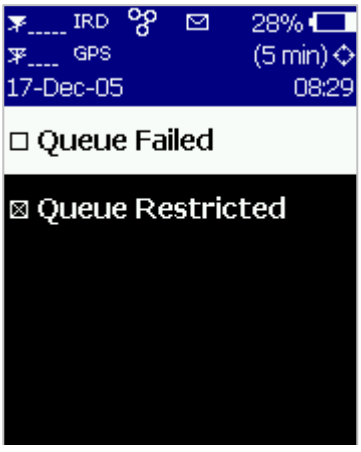
Tracking > Alerts

Figure 25: Enabling and configuring Man Down capabilities

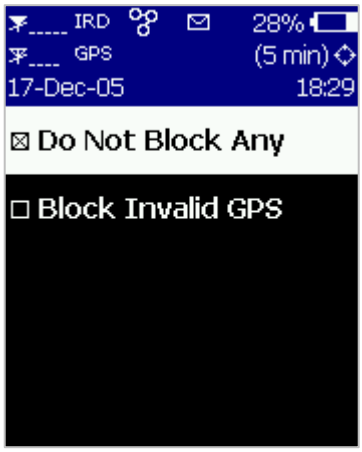
TRACKING > QUEUE REPORTS, BLOCK REPORTS

SHOUT nano 200's default setting is to discard all tracking reports that fail to transmit because of poor signal quality. Use *Queue Report* functionality to add failed tracking reports to the *Outbox* so they are resent at a later time. Queue Failed will add tracking reports that fail to send to the Outbox. The Queue Failed option should be turned on if the user would like tracking reports to send through mesh relay when Iridium signal is unavailable. Queue Restricted will add tracking reports to the outbox when they attempt to send and the Iridium link is disabled.

Under Block Report, configure SHOUT nano 200 to send only tracking reports with a valid GPS position. By default, all tracking reports will be sent, even those with an invalid GPS position.



Tracking > Queue Reports



Tracking > Block Reports

Figure 26: How to manage tracking report configurations

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TRACKING > TRACKING LOG, STATISTICS

SHOUT nano 200's default setting is to log and save all position reports in its circular memory. You can turn off this feature with the *Data Log* menu. When the device's memory is full, the oldest reports are overwritten. You can use SatTerm to retrieve all saved position reports.

The *Statistics* menu has a countdown timer until the next report at the top of the screen and is replaced with *Off* when tracking is disabled. The bottom half of the screen displays the last successful report sent by tracking or emergency notification.

NOTE: Check-In, free-text, and canned messages are not considered "reports," and therefore are not displayed even if a message is sent successfully.

Tracking > Tracking Log

Tracking > Statistics

Figure 27: How to enable tracking logs and view reports

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Utilities

The *Utilities* function enables you to send a test report, erase stored GPS data, and view your GPS position, Iridium signal strength, and battery health information. On the *Home* screen, select *Utilities*, then use the navigation buttons on SHOUT nano 200 to choose an option.

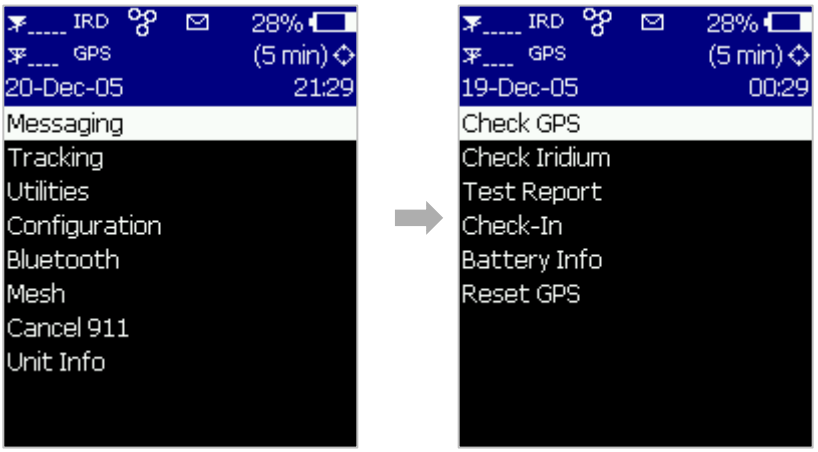

Figure 28: Navigate to Utilities menu

UTILITIES > CHECK GPS

Under *Check GPS*, see the current GPS position in latitude/longitude or MGRS format, depending on the mode set by AT command **^POSFMT**. The GPS receiver stays on until you leave this screen.

Monitor position accuracy by observing the Horizontal Accuracy (HACC), measured in meters. HACC is defined as the radius of a circle centered on the true value that contains the GPS measurement. Thus, a position fix with 10 meters HACC accuracy indicates that it is within 10 meters of the true position. The higher the HACC value, the less accurate the GPS measurement.

Figure 29: Check GPS

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The *Check GPS* functionality is a good indicator of whether the GPS receiver has sufficient signal to initiate a test report when located in a challenging environment, such as dense foliage or around urban settings with tall buildings.

Monitor HACC in real-time to ensure it converges to a small and stable value (usually less than 25 meters). At which point, it is certain that a 3D fix can be obtained with the most current ephemeris data being updated and saved. You can then go back to the *Utilities* menu to send a test report.

When the GPS receiver cannot acquire a fix, HACC gradually increases, and at some point, stops at a value of 4294967.500. It is an indication that the surrounding obstructions prevent the GPS receiver from obtaining a fix and you should move to a different location.

UTILITIES > CHECK IRIDIUM, TEST REPORT

Check Iridium 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 you leave this screen by pressing the back button and may cause battery depletion.

When on the *Test Report* screen, SHOUT nano 200 immediately turns the GPS receiver on to update its location data. This information is continuously updated and displayed in real time whether there is a valid fix or not. Similar to *Check GPS*, you can monitor HACC to determine if a valid fix is possible. Once obtained, the GPS receiver is turned off and the most recent 3D fix info is shown.

This information (called test report) can be sent to a NOC server by pressing the center button. A test report has the same format as a regular position report and is treated as such by a NOC. Sending a test report does not disrupt or change the tracking reporting rate.

The *Test Report* option is a good diagnostic tool used to ensure proper operation of the GPS receiver and the Iridium transceiver. It can also be used to manage battery life by turning off tracking mode and strategically sending on-demand location reports.

Utilities > Check Iridium

Utilities > Test Report

Figure 30: Check GPS and Iridium and send a test report

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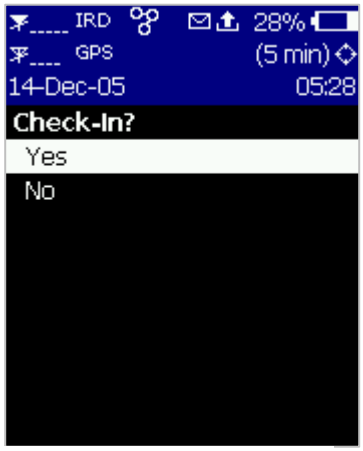
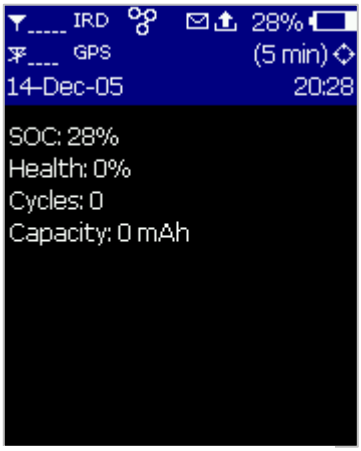
UTILITIES > CHECK-IN, BATTERY INFO

Use *Check-In* to send a quick message. Once confirmed, SHOUT nano 200 sends out a reserved canned message code representing a *Check-In* message. If the *Include GPS* functionality is enabled, GPS location is attached to the message and may take longer to complete.

Select *Battery Info* to see information on the device's battery health.



Utilities > Check-In



Utilities > Battery Info

Figure 31: Send a check-in message and view battery information

UTILITIES > RESET GPS

Reset GPS erases aiding data stored in the GPS receiver. Use this in the rare event SHOUT nano 200 is failing to acquire a GPS position after being relocated from a long distance.

Figure 32: How to reset GPS

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Configuration

Select *Configuration* to enable and configure device capabilities, such as GPS position formatting, screen characteristics, and volume levels. You can also reset settings here.

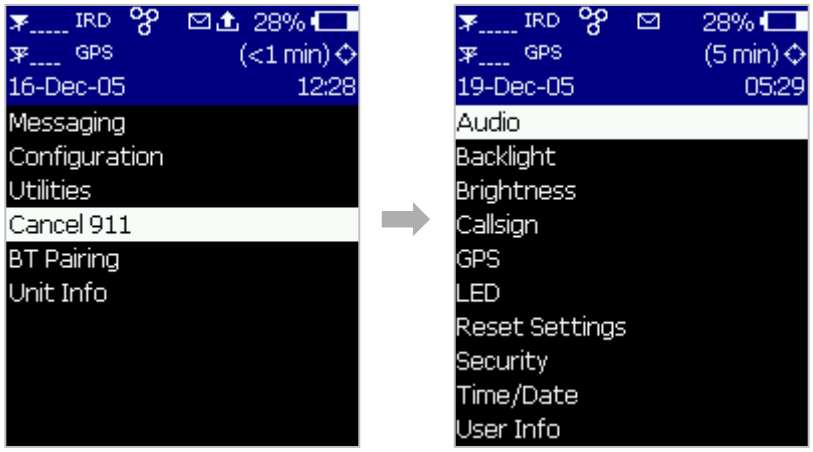

Figure 33: Navigate to Configuration menu

CONFIGURATION > AUDIO, BACKLIGHT, BRIGHTNESS

The first 3 screens under *Configuration* allow you to make adjustments to the device's volume, backlight timing, and brightness levels. Select *Configuration* > *Audio* > *Alerts* to choose when the device makes an audible noise.

Select the *Audio* option to change the frequency, tone, and mute setting of general error, incoming messages, and man down countdown alerts. All audio can be muted through a single setting (except the locator alert).

Use *Backlight* to set the period of inactivity after which the SHOUT ts turns the LCD backlight off. Choose *Always On* for nighttime use.

Change the LCD brightness by selecting *Contrast*. Slide the contrast bar to the desired setting and press back to accept.

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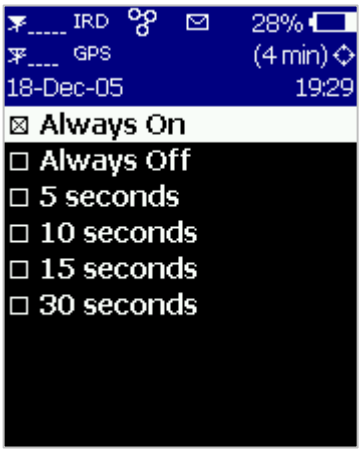
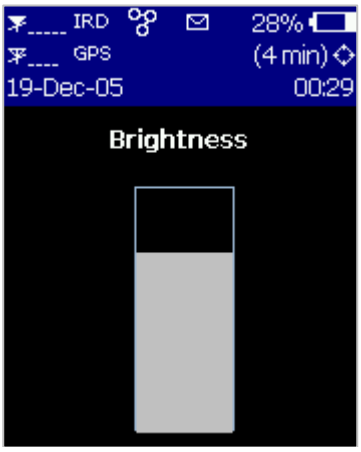
Configuration > Audio



Configuration > Backlight



Configuration > Brightness

Figure 34: How to configure device volume, backlight, and brightness

CONFIGURATION > CALLSIGN

Use the *Callsign* functionality to edit your existing name. Press 'Done' to save.

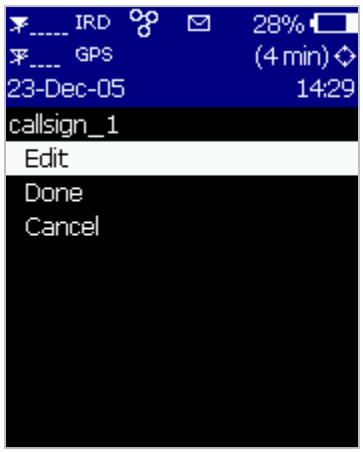


Figure 35: Edit your callsign

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CONFIGURATION > GPS

Change your position format and model in the *GPS* function. Use *Position Format* to select one of 4 GPS position formats to be displayed on the LCD screen. This option is different from *Report Format* option under *Tracking*, which defines the position report format to be transmitted to a NOC.

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

Configuration > GPS | GPS > Position Format | GPS > Position Model

Figure 36: Configure position format and model

- *Portable (default setting)* – Suitable for most situations; for applications with low accelerations; maximum altitude of 12 km; maximum velocity of 310 m/sec; maximum vertical velocity of 50 m/sec; sanity check type: altitude and velocity; maximum position deviation: medium.
- *Stationary* – Used in timing applications (antenna must be stationary) or other stationary applications; velocity is constrained to 0 m/s; zero dynamics assumed; maximum altitude of 9 km; maximum velocity of 10 m/sec; maximum vertical velocity of 6 m/sec; sanity check type: altitude and velocity; maximum position deviation: small.
- *Pedestrian* – Applications with low acceleration and low speed, as a pedestrian would move; assuming low accelerations; maximum altitude of 9 km; maximum velocity of 30 m/sec; maximum vertical velocity of 20 m/sec; sanity check type: altitude and velocity; maximum position deviation: small.
- *Automotive* – Used for applications that can be compared with the dynamics of a passenger car; assuming low vertical acceleration; maximum altitude of 6km; maximum velocity of 84 m/sec; maximum vertical velocity of 15 m/sec; sanity check type: altitude and velocity; maximum position deviation: medium.
- *Airborne < 1g* – Used for applications that have to handle a higher dynamic range than a car and higher vertical accelerations; no 2D position fixes supported; maximum

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altitude of 50 km; maximum velocity of 100 m/sec; maximum vertical velocity of 100 m/sec; sanity check type: altitude; maximum position deviation: large.

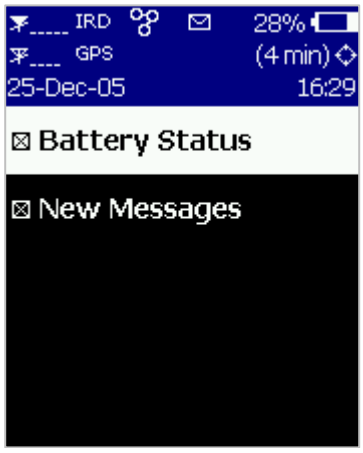
- *Airborne < 2g* – Recommended for typical airborne environment; no 2D position fixes supported; maximum altitude of 50 km; maximum velocity of 250 m/sec; maximum vertical velocity of 100 m/sec; sanity check type: altitude; maximum position deviation: large.
- *Airborne < 4g* – Only recommended for an extreme dynamic environment; no 2D position fixes supported; maximum altitude of 50 km; maximum velocity of 500 m/sec; maximum vertical velocity 100 m/sec; sanity check type: altitude; maximum position deviation: large.

CONFIGURATION > LED, RESET SETTINGS

The Status LED illuminates to show 1) battery capacity/charge status and 2) new message received. Note that having this capability enabled will impact battery life.

The *LED* functionality allows the user to disable the LED from lighting up for these two reasons. See Status LED Behavior section for more information. If you disable one of these, the associated LED behavior is turned off.

Choose *Reset Settings* to restore configurations to manufacturer settings.



Configuration > LED

Configuration > Reset Settings

Figure 37: Configure Status LED and Reset Settings

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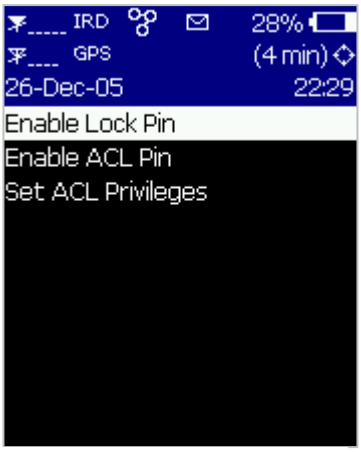
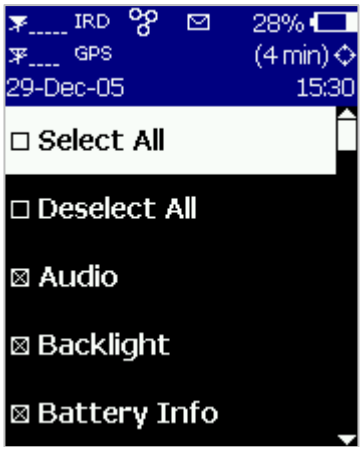
CONFIGURATION > SECURITY

In the *Security* function, enable or disable the power-up PIN code and Access Control List (ACL) PIN code and set up the ACL PIN. Choose *ACL Priviliges* to set which menu icons are visible.



Security menu options

Security > Enable Lock Pin
Security > Enable ACL Pin
Note: You will have to re-enter this pin.

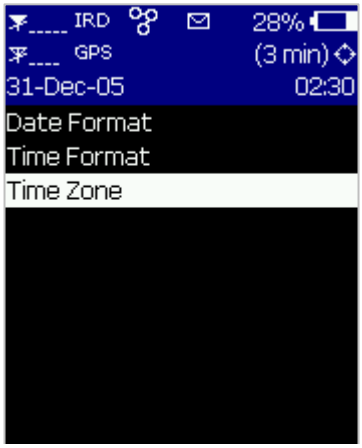


Security > Set ACL Privileges

Figure 38: Enable Lock and ACL Pins and set ACL privileges

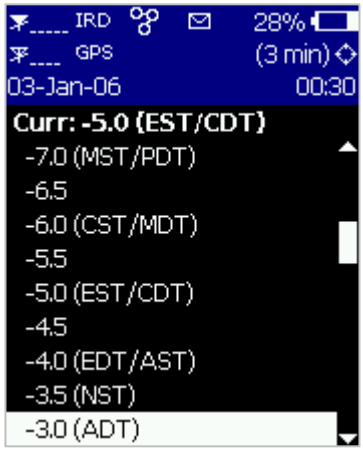
CONFIGURATION > TIME / DATE

Easily change the UTC time and date and time format in the *Time / Date* menu. In *Time Format*, choose between 24 hour or AM/PM options. The local time zone can also be set.



Time / Date menu

Time / Date > Date Format



Time / Date > Time Zone

Figure 39: How to format date, time, and time zone

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CONFIGURATION > USER INFO

Navigate to this screen to find the user's name, location, and contact number entered using SatTerm software (see *SatTerm for SHOUT nano 200 [2]*).

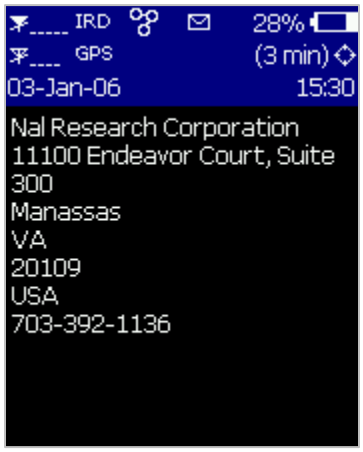
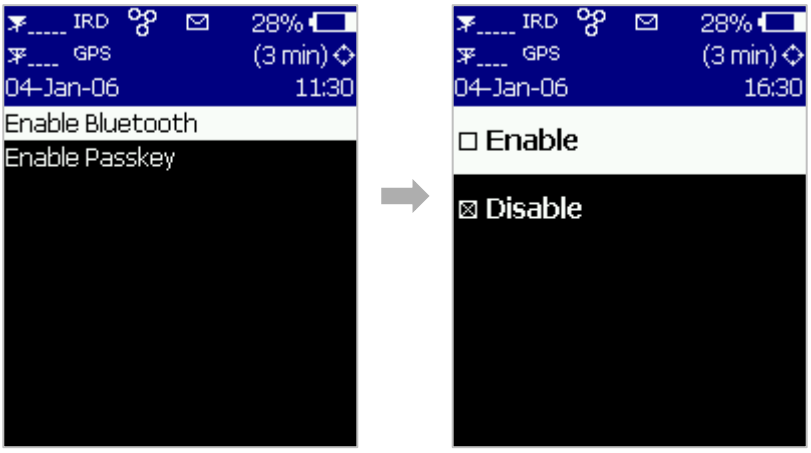


Figure 40: How to view user information

Bluetooth

The *Bluetooth* function enables the device to be discovered and paired with another device that has Bluetooth-pairing capabilities. **NOTE**: Enable Passkey is optional.



A white Bluetooth icon indicates SHOUT nano 200 is Bluetooth enabled; a green icon indicates it is connected to a Bluetooth-enabled device.

Figure 41: How to enable Bluetooth

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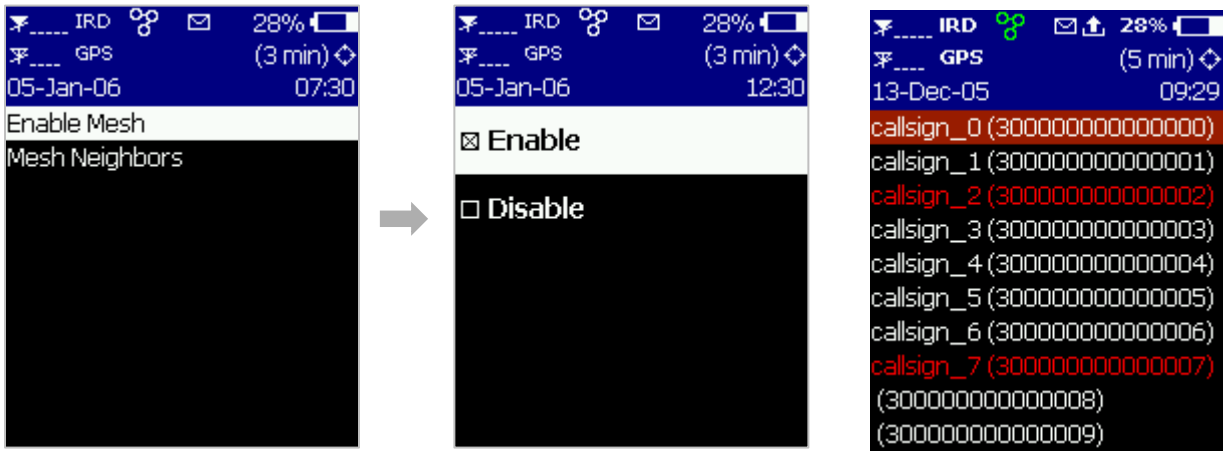
Mesh

Turn Mesh capabilities on and off in this screen and find other mesh-enabled devices. The Mesh Neighbors list shows the Callsign and IMEI number of the active neighbors on the mesh. If a neighbor has 911 mode active, the list item will be shown in red.



Mesh menu

Mesh > Enable Mesh

Mesh > Mesh Neighbors

Figure 42: Enable mesh and see mesh-enabled devices

Cancel 911

Cancel the 911 message to the NOC on this screen. The cancellation message is then queued in the *Outbox* to be transmitted, emergency mode ends immediately, and the device will resume normal operation.

NOTE: Turning the device off does not cancel emergency mode. You must select *Cancel 911* to cancel the emergency. The top part of the display on the *Home* screen will change from RED back to BLUE.

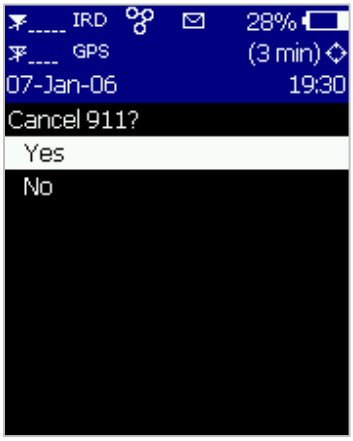


Figure 43: How to cancel 911

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Unit Information

Find the following device info on this screen: IMEI, APP firmware version, power firmware version, boot firmware version, and Iridium firmware version. On the *Home* screen, select *Unit Information*, then use the navigation buttons on SHOUT nano 200 to see the desired data.

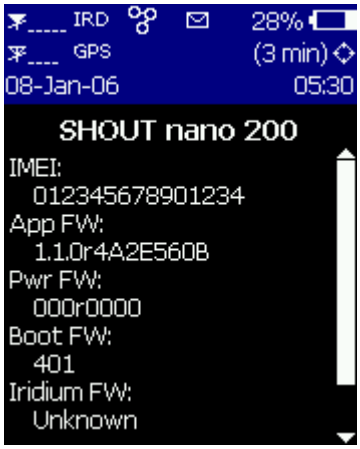

Figure 44: How to view unit information

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TURN OFF DEVICE

Press and hold the Power/Enter button shown below on the SHOUT nano 200 to turn the device off.

Figure 45: Turning off SHOUT nano 200

A 'Powering Off' message on the device screen indicates normal shut down. The green LED light will also turn off.

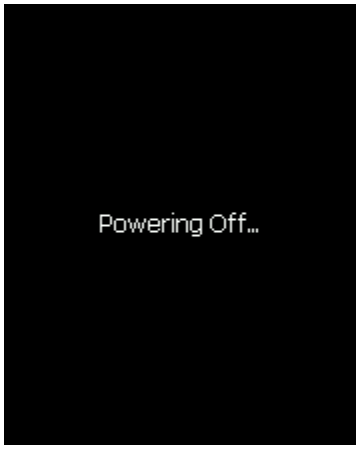

Figure 46: Normal power off message

NOTE: Abnormal shutdown messages are noted below.

1) *Thermal Shutdown*: This message indicates SHOUT nano 200 is outside the safe battery operating temperature range.
2) *Battery Undervoltage Shutdown:* This message indicates battery is under the voltage required for device operation. The device should be recharged before continuing use.

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APPENDIX A: STORAGE AND MAINTENANCE

1) Devices should be stored in a cool, dry, well-ventilated area. DO NOT store the SHOUT nano 200 units in direct sunlight, which may expose them to extreme temperatures. Maintain temperature and humidity levels between 10^0-27^0C and 30-50%, respectively.
2) When storing the SHOUT nano 200 devices for extended periods, store at a half-charged state or 50% on-battery level indicator. Refer to the Battery Charging Status section for charging status indication.
3) Units with state of charge greater than 50% must be discharged to 50% level prior to long-term storage (more than 2 weeks).
4) You must turn off SHOUT nano 200 prior to long-term storage.
5) Devices in long-term storage shall be inspected by the user **every 3 months** and checked to ensure that charge is still around 50%. Units below this state of charge must be re-charged to this range prior to long-term re-storage.

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APPENDIX B: REGULATORY STANDARDS COMPLIANCE

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help

The Iridium 9603 transceiver inside SHOUT nano 200 is tested to the regulatory and technical certifications shown in the table below.

Regulatory Approvals	**Radio Tests**	**EMC Tests**
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

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APPENDIX C: EXPORT COMPLIANCE

SHOUT nano 200 is controlled by the export laws and regulations of the United States of America (U.S.). It is the policy of NAL Technologies to fully comply with all U.S. export and economic sanction laws and regulations. The export of NAL Technologies 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 Technologies 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 Technologies.

The export and re-export of NAL Technologies 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.gov/ for further information on BIS and the Export Administration Regulations (EAR). Additional export restrictions are administered by the U.S. Department of the Treasury's Office of Foreign Asset Controls (OFAC). See: http://www.ustreas.gov/ofac for further information on OFAC and its requirements.

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APPENDIX D: DESIGN SPECIFICATIONS

Mechanical

Dimensions	118.9mm x 68.8mm x 29.7mm (4.68 x 2.71" x 1.17")
Weight	235.5 g (8.31 oz.)
Enclosure Material:	Hard ABS/PC plastic
Interface Connector:	USB-C receptacle
Antennas:	Iridium, GNSS, LoRa™ Mesh, Bluetooth
ON/OFF and Arrow buttons:	Dome push buttons

Iridium RF

Operating Frequency:	1616.0 to 1626.5 MHz
Duplexing Method:	TDD
Multiplexing Method:	TDMA/FDMA
RF TX output power (average):	1.6 W
Rx Sensitivity at 50Ω (typical):	–117 dBm
Link Margin–Downlink:	13 dB
Link Margin–Uplink:	7 dB

GNSS

Type of GNSS Receiver:	u-blox MAX-8MQ
Receiver Type:	72-Channel GPS L1 C/A, SBAS, QZSS, GLONASS
Update Rate:	4 Hz
Accuracy:	Position: 2.5 meters (8.2 feet) CEP Position SBAS: 2.0 meters (6.6 feet) CEP
Acquisition (typical):	Hot starts: 1 second Aided starts: 2 seconds Cold starts: 29 seconds
Sensitivity:	Tracking: –166 dBm

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	Reacquisition: –160 dBm
	Cold starts: –148 dBm
Operational Limits:	Altitude: 50,000 meters (164,000 feet)
	Velocity: 500 m/s (1,640 feet/second)
	Dynamics: ≤ 4 g

As long as power is provided to SHOUT nano 200, the GNSS receiver provides real-time clock functionality and stores ephemeris data in its memory before turning off (sleeping between reports). The ephemeris data is valid for up to 2 hours and can be used in future startup to improve time-to-first fix.

Bluetooth RF

Operating Frequency:..... 2.4 GHz

Protocol: ..... Bluetooth Low Energy v4.0

Power Output: ..... +10 dBm

Sensitivity: ..... -93 dBm

Electrical

Internal Battery Type: .....Rechargeable Li-Ion 2300mAh

Maximum Input Power Consumption: 1A

SHOUT nano 200 Input Voltage:.....+5VDC

Electromagnetic Interference MIL-STD-416G

- RS103 Radiated Susceptibility, Electric Field, 2 MHz - 18GH
- CS118 Personnel Borne Electrostatic Discharge

Environmental

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

Charging Temperature Range: ..... –0°C to +45°C (+32°F to +113°F)

Ingress Protection:..... IP67

Operating Humidity..... ≤ 75% RH

Environmental Tests MIL-STD-810H

- Vibration 514.8, Proc 2 Loose Cargo
- Shock 516.8, Proc 4 Transit drop unpackaged, 48” 26 times
- Temperature 501.7, 502.7, 503.7 (see above)

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- Storage Humidity 507.6 Proc 2 storage
- Immersion 512.6, Proc 1, 1-meter 1 hour, 10C precondition

Data/IO

Short-Burst Data Mobile-Originated:..... 340 bytes per message (Iridium)

Short-Burst Data Mobile-Terminated: ..... 270 bytes per message (Iridium)

Multi-Interface Connector: ..... USB-C

Software Interface: ..... AT commands via USB or Bluetooth

Power Adapters

AC Power Adapter: .....POWS031 (100–240 VAC, 5060 Hz input)

12 V Car Adapter: .....POWS009 (12 VDC car battery input)

LoRa Mesh Transceiver

Frequency range: 862-930MHz

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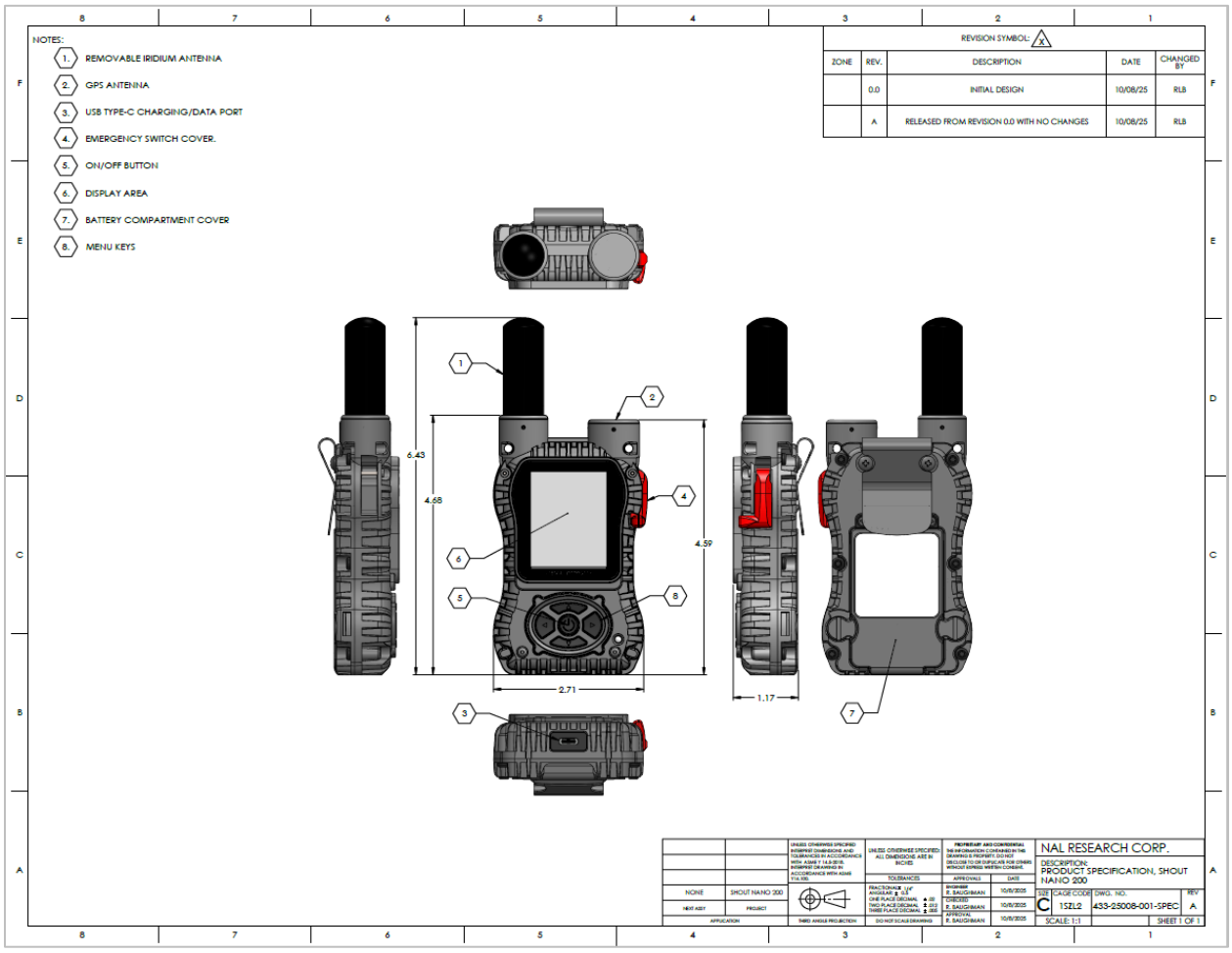
APPENDIX E: SHOUT NANO 200 MECHANICAL DRAWING



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