Android RadioMsg App V2.0 by VK2ETA.

Quick Start Guide

Dated 12th of September 2022

1. What can this application do?

One liner: group situation awareness and warnings, plus bi-directional SMS and email exchanges of short messages over the radio.

1.1 In short, here are some of the usages:

1. Send a short text message or a GPS position to: another station, OR, using a second station as a relay, send messages to an email address OR to a cellular telephone as an SMS (150 characters maximum).

2. Automatically forward replies from Email or Cellular SMS recipients over RF to the original station.

3. Send a picture, and optionally attached GPS position and text message, to another station OR to an email recipient.

4. Act as a relay (server) station for a) forwarding RF messages to other stations OR to an email address using cellular data or a WIFI network OR to a cellular telephone as an SMS using the SMS credits of the SIM card and b) forward received emails and SMS replies towards the corresponding station(s) over RF.

5. As a relay, store received messages for later retrieval.

6. Send canned short situational messages to other stations (E.g. Road conditions, Points of Interest etc…) with precise GPS location and vehicle speed information.

7. Track the GPS positions sent by other stations and provide visual alerts when approaching these Points of Interest.

8. Provide a direction and distance to the GPS locations or a map view of the Points of Interest.

This application is compatible with the Pskmail Java application version 3.0 and later which runs on Windows, Linux (inc. Raspberry Pi OS) and Chromium. See the RadioMsg tab in that application.

At this point there is no exchange with the APRS network as is the case with the Android AndPskmail app.

1.2: Typical applications:

1.2.1 Keeping in contact with other Hams or with family and friends where cellular networks are not available:

> You are going on an outdoor adventure and you want just to send a status information or a meeting point to others who may or may not have a Ham license.

> Send messages between stations over RF similar to an SMS exchange with other HAMs.

> Or setup a station using this app on a phone or tablet which has cellular or WIFI access either at home, in your car or in the bush, and use it as a Radio Message relay capable of two way exchanges with email or cellular SMS recipients.

> You could use HF or VHF/UHF depending on the path to the relay station.

> This relay station could simply be an older phone (Android version 5 and above) connected to a handheld or HF transceiver, thereby minimizing the station's power budget.

1.2.2. As a variation on the above, a group of outdoor enthusiasts want to keep track of each other's position and status:

> The position of each station can be queried and displayed as a direction and distance information or shown by a marker on a map thereby keeping a situational awareness of the group's members.

> Any station can also be enabled as a relay and be used to manually mesh the radio exchanges.

> Simple phone to VHF/UHF handheld audio coupling can be very effectively used with modes like MT-63 or Olivia.

> Adjustable length pre-transmission tone provides an audio warning and makes manual keying of the radios a valid option.

1.2.3. Driving in a convoy of cars and we need the lead car to advise of road conditions and the tail car of overtaking vehicles:

> This was the original purpose of this app in fact, as when traveling long distances in the Australian outback the lead car has no reference points to pass on to the convoy by voice (like a building or even a tree). Clouds of dust lifted by the forward car(s) means that several kilometers or miles can separate each cars for safety and comfort, removing any visual

clue of the location of the obstacle.

Hence the prepackaged short messages with precise GPS location and vehicle speed. The cars in the convoy can then get visual alerts before arriving on the location of the obstacle (E.g. "Bull Dust hole", "Roos on Road", "Washout", "Cattle Grid", "Road Train" in the Ozzy lingo).

Used also when a group of 4WD vehicles are traveling a challenging track and warnings and tips need to be passed on to the group ("Use Left Track", "Keep to the Right", "Slippery", etc..).

Since both the GPS location and the speed of the vehicle at that point is sent, it provides the rest of the convoy or group very useful information to avoid damages to their cars or worse.

The tail car can send an "Alert: Overtaking vehicle" type of message to the rest of the convoy which is displayed as an immediate pop-up alert on their devices.

Simple beep sequences can be sent back from each station to acknowledge receipt of the messages. Up to eight receiving stations can be differentiated this way.

Please note that it is your responsibility to adhere to the rules regarding modulation types, frequency bands and third party traffic rules in your area of operation.

2. Acknowledgments and notes:

The modulation schemes are taken from, and compatible with, the Fldigi modems, including it's implementation of RSID. I wish to acknowledge the Fldigi team headed by David Freeze (W1HKJ) as the modems code has been taken directly from the Fldigi application.

The RSID mode identification used here is the work of Patrick Lindecker and is an important help in the RadioMsg "protocol".

The structure of the messages is kind of a hybrid between Pskmail and Flmsg thus allowing messages to be human readable while minimizing the overheads.

Most modes are FEC based and span data speeds from 14 words per minute (THOR4) up to 2540 WPM (8PSK500) and also include Olivia and MT-63 modes, providing for a wide range of propagation and operating conditions.

Without the work of these OMs and others I would not have been able to develop this current application. I have maintained their GPL license terms in this application. The code base is an evolution of the AndPskmail and AndFlmsg applications I developed earlier.

The logic and Java code of this application has recently been incorporated in a new version of Pskmail (V3.0 onward) for Windows/Linux/Chromiun devices.

I wish to also acknowledge Rein (PA0R) who started Pskmail in 2005 using the Perl language. Pär (SM0RWO) and Roberto (IS0GRB) joined the group later on and work started on a cross-platform Pskmail Java client.

Since Java is one of the main languages used in Android development it made sense for me to port the RadioMsg logic to the Pskmail Java application.

Since these above developments took place, new modes like JS8 came into existence and may be looked at for future developments.

Thank you to all the testers too, in particular Wayne (VK2DYZ) who has been the most ardent supporter of the app and provided great feedback.

3.1 What's new in Version 2.0.0.11:

1. Added RIG Control option via Android USB host mode (OTG). Allows PTT switching using a USB serial port converter.

Since approximately version 7 of Android, device permitting, the audio is also routed via a USB audio interface if connected.

The DigiRig device is great solution for interfacing both audio and PTT control via a single USB connection.

See https://digirig.net/product/digirig-mobile/.

3.2 Installation:

Download the RadioMsg.apk file from the website at:

https://bitbucket.org/VK2ETA/radiomsg/downloads/

Save it to the phone storage.

From there use a file explorer on the device to install the .apk file.

You may have to allow 3rd party applications to be installed for this to work. This is found under Settings / Security / Unknown Sources OR Setting / Applications / Unknown Sources, for older versions of Android.

In your applications list you should now have a RadioMsg app with the

following logo:

At launch you will be asked to accept a series of permissions that are explained below:

1. Send and view SMS messages: if enabled in the settings, allows the relay of messages to the cellular network, sending SMS messages to a phone number and vice versa: receiving SMS messages and forwarding them over RF.

2. Access Fine Location: The GPS position and data is essential for position reporting.

3. Access photos, media and files: access to the app's directory on the SD card (internal or external) for storing messages.

4. Record Audio: audio input for the modem.

5. Make and manage phone calls: to disconnect the Bluetooth interface when receiving a phone call. Telecommunication regulations generally forbid connecting a person to the telephone network or to do so without a warning.

If you have previously denied some critical permissions, you will have to go back to the Device's Settings/Apps and re-allow the missing permission.

The full source code and the Quick Start Guide can be downloaded from the web site above.

3.3 Interfacing with the Radio:

For a commercial solution see the DigiRig device at
https://digirig.net/product/digirig-mobile/

I really like the concept of a very small unit which includes on one USB port a sound card, a serial interface for CAT control and a hardware PTT.

It connects to an Android device using an OTG cable and redirects the sound input and output to the radio and offers a hardware PTT via the RTS signal as implemented in the RadioMSG app (See RIG Control settings).

No CAT control for frequency and modes changes are implemented in the RadioMsg app for now but is planned for later on.

The DigiRig unit also connects to Windows and Linux computers via the single USB port.

Disclaimer: I have no financial interest in the product but I received a free sample for software development and testing.
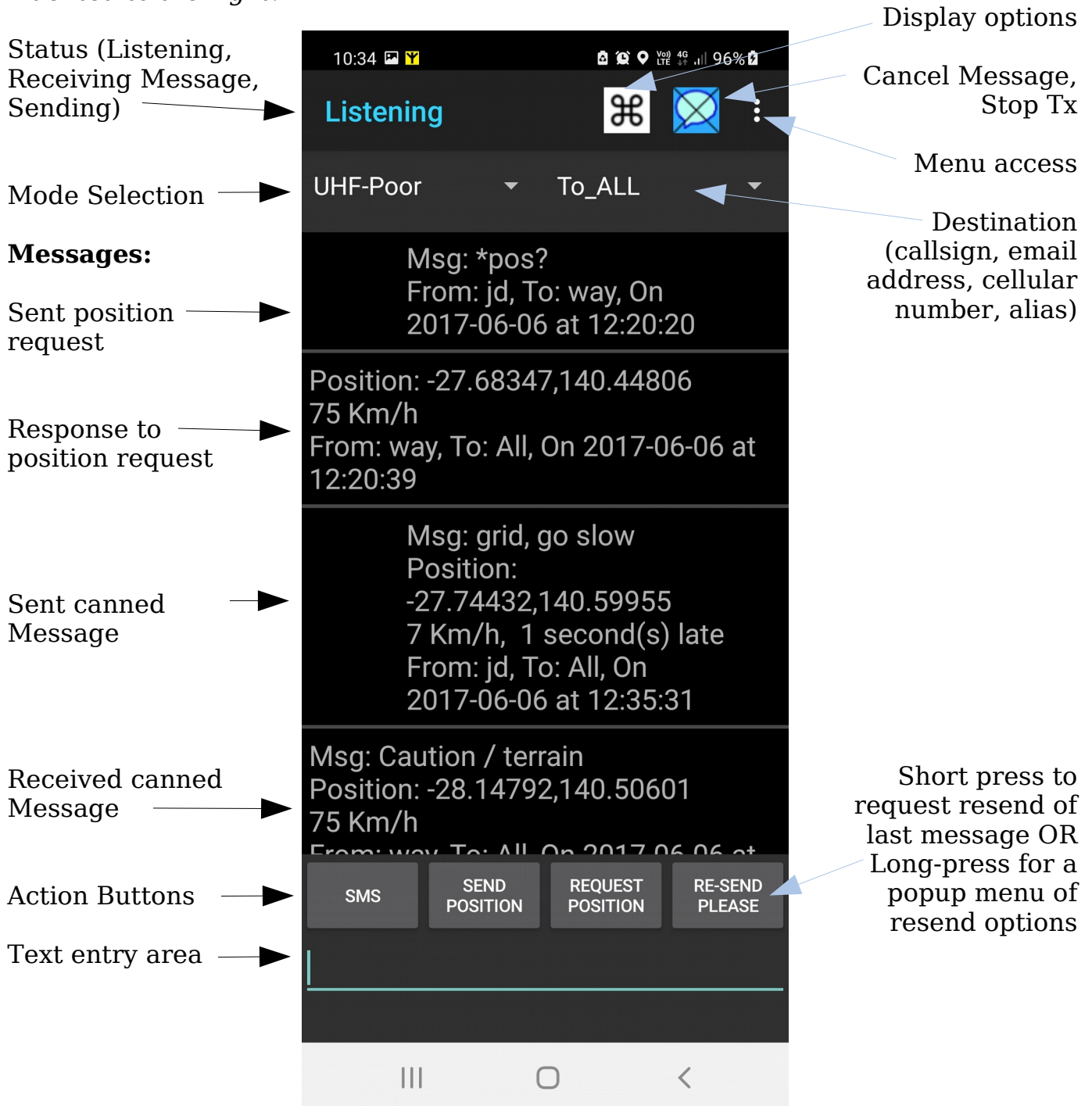

For home brewed solutions please refer to the appendix of the AndFlmsg user manual which show a simple interface for radios with VOX and a Bluetooth interface with integrated VOX. Available at:
https://bitbucket.org/VK2ETA/andflmsg/downloads/

4. Screens familiarization:

The various screens are accessed by swiping the screen left or right.

4.1 Messages screen

This is the screen shown at app launch. Messages are displayed like in an SMS application: *Received messages aligned to the left, Sent messages indented to the right.*

Status (Listening, Receiving Message, Sending)

Mode Selection

Messages:

Sent position request

Response to position request

Sent canned Message

Received canned Message

Action Buttons

Text entry area

Display options

Cancel Message, Stop Tx

Menu access

Destination (callsign, email address, cellular number, alias)

Short press to request resend of last message OR Long-press for a popup menu of resend options

Screen contents:

10:34

Listening

UHF-Poor ▼   To_ALL ▼

Msg: *pos?
From: jd, To: way, On
2017-06-06 at 12:20:20

Position: -27.68347,140.44806
75 Km/h
From: way, To: All, On 2017-06-06 at
12:20:39

Msg: grid, go slow
Position:
-27.74432,140.59955
7 Km/h, 1 second(s) late
From: jd, To: All, On
2017-06-06 at 12:35:31

Msg: Caution / terrain
Position: -28.14792,140.50601
75 Km/h
From: way, To: All, On 2017-06-06 at

| SMS | SEND POSITION | REQUEST POSITION | RE-SEND PLEASE |

Note the small RadioMsg icon in the notification area at the top of the screen (the antenna in a yellow box) to remind the user that the

modem is running. Pulling down the notifications and clicking on the RadioMsg notification brings the application back to the foreground.

Also note that the RadioMsg app will continue to run even if the phone's screen is switched off.

Navigating away from the RadioMsg app does not prevent it from running in the background.

To Exit the app, press on the menu button then choose exit. This is to ensure the app is kept listening to the radio even if not in the foreground.

The "Cancel Message" button shown as [image] or [image] will, if

not transmitting, remove the latest message in the queue, or if transmitting, cancel the transmission, remove the message from the queue and either continue with the transmission of the next message to be sent, or return to Rx if no more message are awaiting transmission.

The status line in the top left part of the screen shows the number of messages in the queue and, when transmitting, the progress of the last message transmission. E.g. "Sending: 45% (2)" = currently at 45% in the transmission of the current message and 2 more messages to send afterwards.
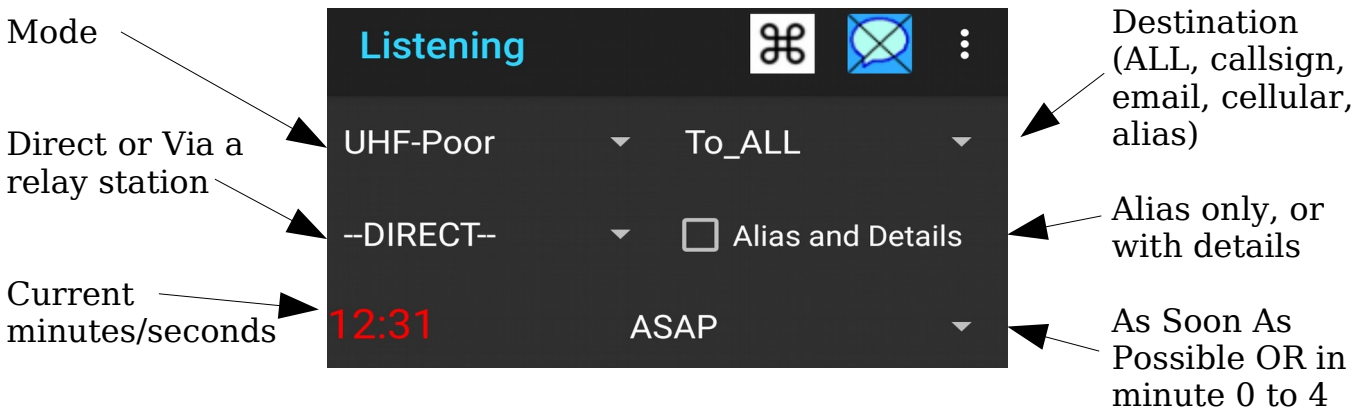
A status line of "Message?" indicates that either an RSID or that a start of message character has been received and the app is waiting for more information to decide if it is a legitimate message frame or just garbage.

A status of "Receiving Message" indicates that a message is incoming.

Transmission of queued messages are put on hold until the reception is completed. It is therefore safe to send a message at any time as its transmission will wait for a clear channel.

Display option button (expert mode only): ⌘

Function: to changes the top and the bottom of the message screen to include one, two or three lines of selections (top) and one or two rows of buttons (bottom).
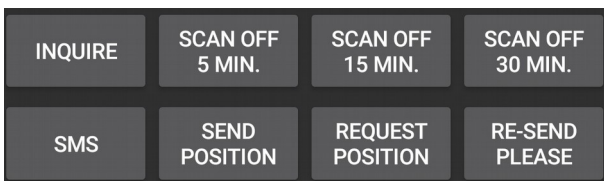
Mode

Direct or Via a relay station

Current minutes/seconds

Destination (ALL, callsign, email, cellular, alias)

Alias only, or with details

As Soon As Possible OR in minute 0 to 4

The time color code is White = from internal clock, Green = from GPS, Red = Synchronized to a relay station.

"When to send" is either ASAP (As Soon As Possible) or during minutes 0 to 4 for the 5 minutes cycle of a scanning relay. The scanning function is only available in the Java Pskmail application and allows a single station to listen on several frequencies (see section 6.5 below to stop and restart the scan function).

If the setting is set to "Simple Mode" only the first line is shown (no relaying, no scanning relay). In Expert Mode the display option button and the 2nd and 3rd lines are accessible.

The tick box option of "Aliases and details" is discussed further below in sections 6.2 and 6.3.

The bottom of the screen toggles from one row of buttons, to two rows.

The inquire button allows to check the link quality for the current mode towards a selected station. A value between 0 and 100% is returned and represents the last exchange signal quality.

 The rest of the buttons are targeted at scanning servers and are only applicable to the Pskmail servers. It allows for stopping the scan of a server to permit a series of exchanges on the current frequency.

Message Detail screen:

In the message screen, long press on any message and a detailed message view with message specific actions is shown.
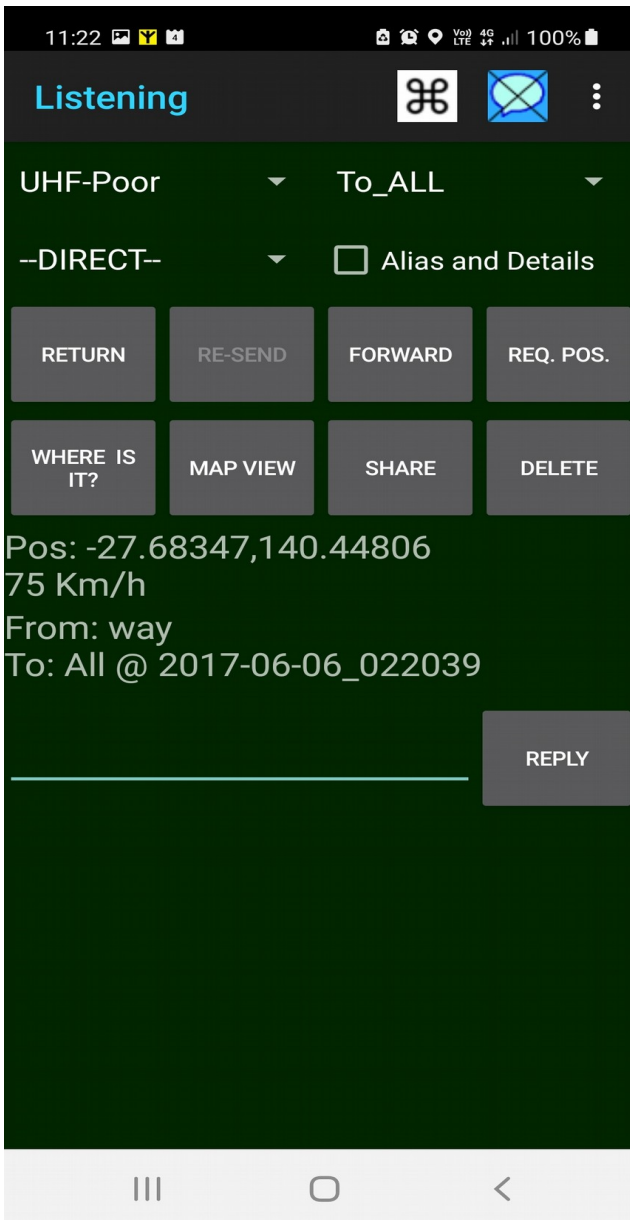
Re-Send button: available only for messages sent from this station. Destination is kept as per original message. Mode can be changed.

Forward button: send received or sent message according to destination and mode as shown at the top.

Req. Position: Requests Position from the sender of the message.

"Where is it?" button: only when a GPS position is available. If installed, opens the Where is it app showing the current direction and distance towards the GPS position. See section 7.1.3 below.

"Map View" button: only when a GPS position is available. Opens the default mapping app (generally Google Map, but can be changed) with a marker at the GPS position.

Share button: opens a dialog for forwarding the message information to various apps like SMSs, emails etc…

Reply: sends the text typed in the text area to the originator of this message.

4.2 Modem screen

This screen is shown when swiping left from the Messages screen.

Current Mode → MFSK32

CPU load

Rx and Tx RSID (see below), as per Fldigi

Audio Volume (kept in settings)

Modem received characters

Temporary overlay displaying text signaling receipt of new message

Received from: vk2eta-1, To me
Msg: *pos?

Message frame (<SOH>...to .....<EOT>)

Waterfall display

Waterfall Sensitivity

Signal to Noise bar (brighter bar) and Squelch bar (darker colour)

Rx RsID   Tx RsID

Vol:

[ttitR o0tR o<SOH>vk2eta-1:vk2eta
sms:*pos?
ocbp<EOT>
e*tnseqz nusqittijte hcilgi m uRRq
cdpvoB*zt9ov6*,uj8kosRnwf
ocbp

f0fP,tdmqe xJTet et xCq Saosp; i
tw0$uls nluht:ost QttZkdrtCeirw a gtxk&
Tlo...   ...
s ah...
RSID: PSK500R @ 1497.3 Hzxp–ñ anDaVQ
[evcf otirtye<SOH>vk2eta-1:vk2eta
sms:*pos?
ocbp<EOT>

500   1000   1500   2000   2500   3000

S2N

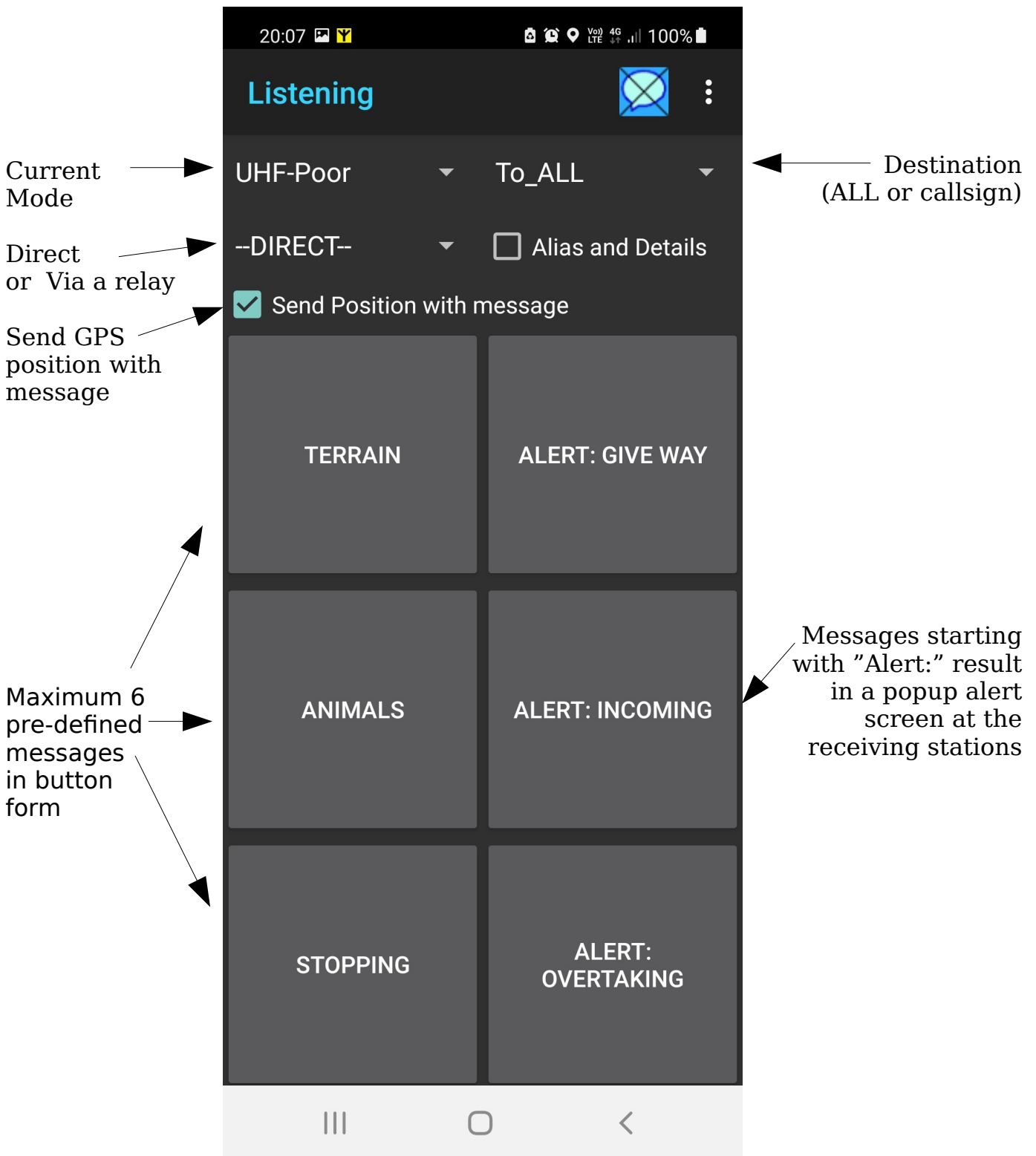| NEXT MODE | SQLCH UP | MODEM ON/OFF | STOP TX |
| PREV MODE | SQLCH DOWN | TUNE | W.FALL ON/OFF |

Keeping the squelch low or at zero allows for decoding of weak signals.

RSID means Reed-Solomon ID, a short mode identification signal about one second long.

It is recommended to keep the RSID boxes On (ticked) as they allow for ad-hoc mode selection to match the conditions, help in the identification of incoming messages and prevent talk-overs.
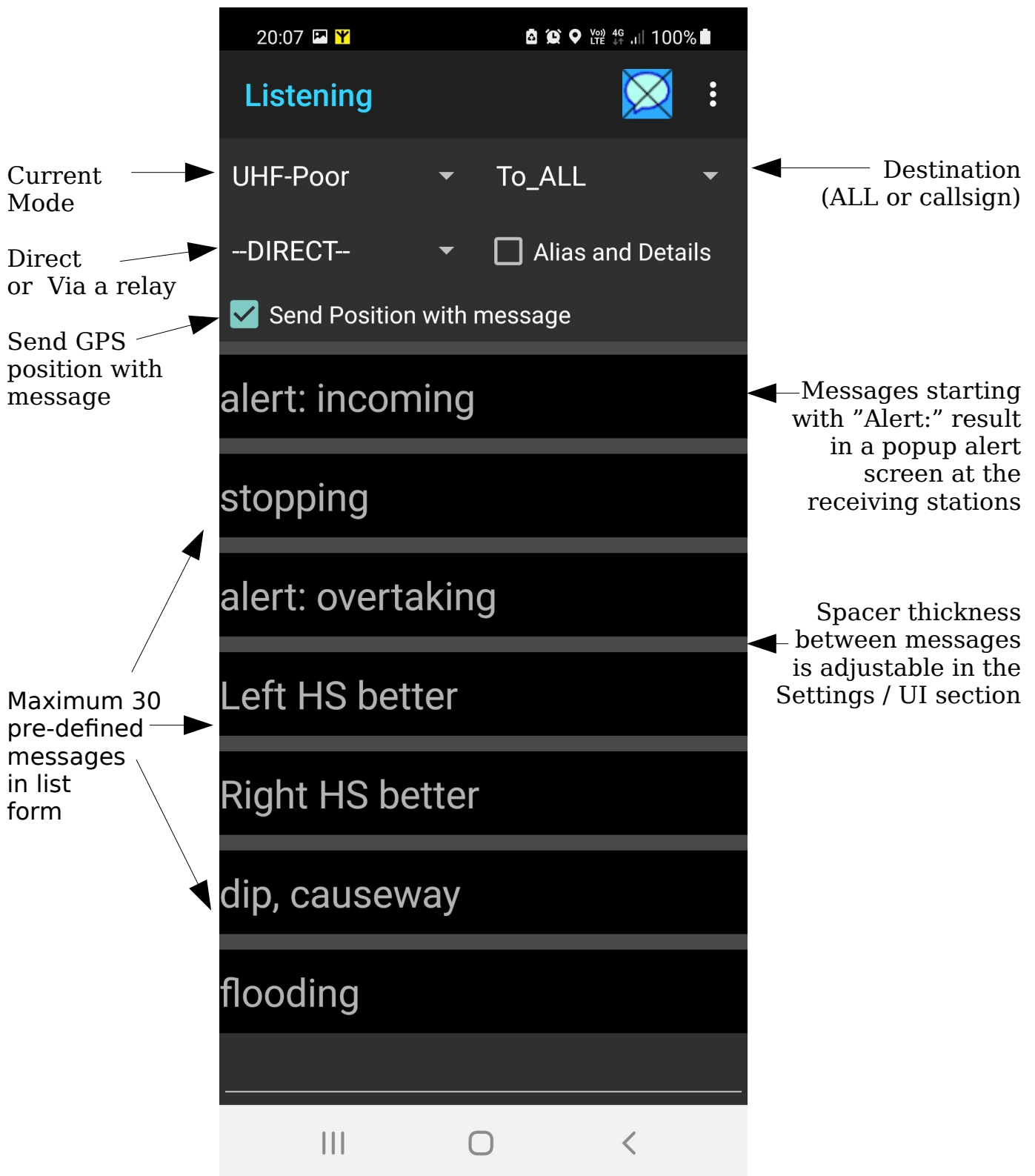
4.3 Quick Message Buttons screen

This screen is shown when swiping right from the Messages screen.

Current Mode → | **Listening** screen

Current Mode → UHF-Poor | To_ALL ← Destination (ALL or callsign)

Direct or Via a relay → --DIRECT-- | ☐ Alias and Details

Send GPS position with message → ☑ Send Position with message

TERRAIN | ALERT: GIVE WAY

Maximum 6 pre-defined messages in button form → ANIMALS | ALERT: INCOMING ← Messages starting with "Alert:" result in a popup alert screen at the receiving stations

STOPPING | ALERT: OVERTAKING

Single short press on a button to send.

4.3 Quick Message List screen

This screen is shown when swiping right from the Quick SMS Button screen.

Current Mode → UHF-Poor

Destination (ALL or callsign) → To_ALL

Direct or Via a relay → --DIRECT--

Alias and Details

Send GPS position with message → Send Position with message

alert: incoming ← Messages starting with "Alert:" result in a popup alert screen at the receiving stations

stopping

alert: overtaking

Spacer thickness between messages is adjustable in the Settings / UI section

Maximum 30 pre-defined messages in list form → Left HS better

Right HS better

dip, causeway

flooding

Long Press on a Message to send.

4.4 Picture screen

This screen is shown when swiping left from the Quick SMS List screen (or right from the Modem screen).

- Current Mode
- Direct or Via a relay
- New picture button to take picture or select from gallery
- Image mode: The wider the more resolution, but the lower the SNR is.
- Send GPS position with image
- Picture shown with maximum resolution as sent. Noise in the channel will deteriorate the picture further.

- Destination (ALL or callsign or email/alias)
- The faster the speed, the least details are received
- Current selection and image transmit time
- Selection of image definition
- Optional text sent with image

The choice of speed and image transmission mode are pre-set for a given "current mode".
As a rule of thumb, the noisier the channel, the narrower should be the image mode and thereby the slower the sending speed to retain acceptable resolution. E.g. for HF use MFSK32 or MFSK16 with X1 or X2 speeds, and for VHF/UHF FM quieted channels use MFSK128 or 64 with X4 to X8 speed.
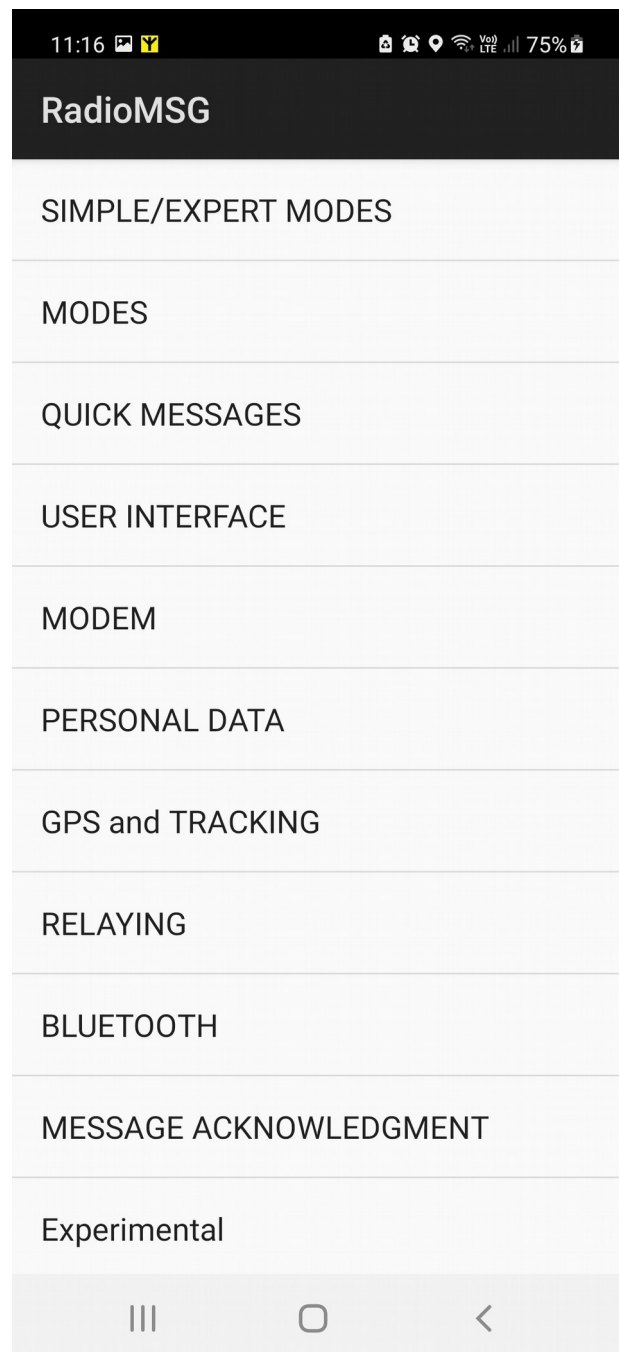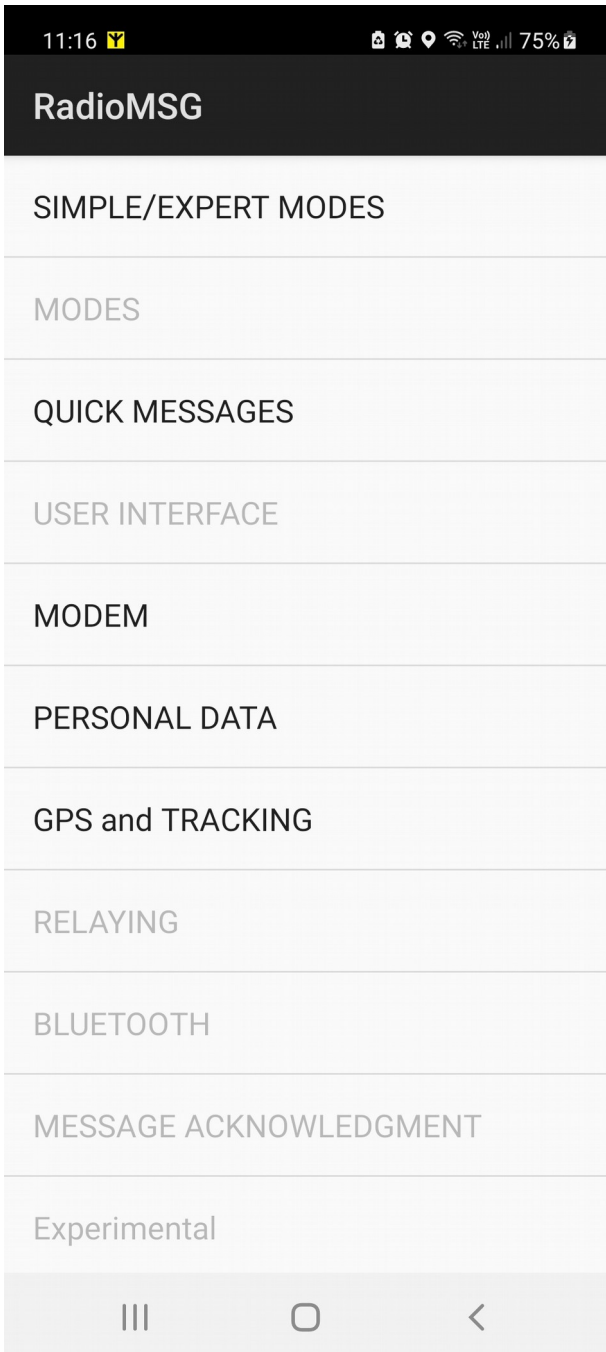Color pictures are 3 times slower than gray scale pictures.

Images cannot be forwarded as MMS due to the Android OS restrictions.

5. Settings Screens

Open this window by clicking on "Settings" in the Main Menu (3 dots).

Simple mode (default)   **With Expert Mode enabled**

Simple mode	Expert mode
11:16 ▣ 75%	11:16 ▣ 75%
RadioMSG	**RadioMSG**
SIMPLE/EXPERT MODES	SIMPLE/EXPERT MODES
MODES	MODES
QUICK MESSAGES	QUICK MESSAGES
USER INTERFACE	USER INTERFACE
MODEM	MODEM
PERSONAL DATA	PERSONAL DATA
GPS and TRACKING	GPS and TRACKING
RELAYING	RELAYING
BLUETOOTH	BLUETOOTH
MESSAGE ACKNOWLEDGMENT	MESSAGE ACKNOWLEDGMENT
Experimental	Experimental

The app's "Simple mode" of operation allows new users to quickly use the basic functions of the app. There is no relaying and the modes are preset.

The essential settings required for various tasks are explained with the task instruction.

The appendix contains information on the remaining settings.

6.1 Reference Sheet 1 – Exchanging Short Messages between two or more stations:

6.1.1 Settings required:

Found in Section	Name	Usage	Examples
Personal Data	Station Callsign	Your messages will be sent as originating from this call sign and received "To" this call sign.	VK2ETA, vk2eta-9, vk2eta/p (**MUST** be unique to each station)
Optional Settings (Simple Mode):			
Quick Messages	Message 1 to 30	For fast send of messages in Quick Message button or Quick Message list screens. The shorter the message, the faster it will transmit and the more chances it will arrive intact. Messages starting with "Alert:" will result in a immediate popup screen at the receiving end.	"Stopping here", "Animals on Road", etc..
Personal Data	List of Contacts	Allows to send messages to one station instead of ALL	vk2dyz-2,vk2fww/m
Optional Settings (Expert Mode):			
Modes	Mode name	For each of the 6 Modes categories (HF-Poor, etc...)	MFSK32
Message Acknowledgment	Acknowledgment position	Provides an audible beep sequence to the message sender, in sequence (station 1 then 2, etc..). Not Morse code.	2 or 3
Message Acknowledgment	Highest Acknowledgment position (in the group)	Make the station wait for that number of acknowledgments before transmitting.	3
GPS and Tracking	Run GPS at Regular Intervals	Keeps the GPS "warm"	
GPS and Tracking	Time between automatic fixes	Compromise between battery consumption and GPS acquisition delay when a position is sent.	60 (seconds)

6.1.2 How to send messages directly to other stations:

Free text messages can be sent from the Message screen, while pre-defined messages are sent from the Quick Message buttons or Quick Message list screens.

By default the "To Station" is set to All (= un-directed messages).

To send a short text message to all listening stations, simply type a message at the bottom of the message screen and click on the "SMS" button.

The station's GPS position can be sent by pressing the "Send Pos" button.

To direct a message to a specific station, add the station's callsign in the Settings/Personal Data/List of Contacts.

Then back in the message screen select the station in the "To" list and proceed as above.

Note that callsigns are **not case sensitive**.

The current GPS position can be requested from a selected "To" station by pressing the "Req. Pos" button. We can't request positions from All stations at the same time.

Request a repeat of the last message (again must be from a selected To station) by pressing the "Resend" button (= Resend Last Message please).

For requesting multiple messages or from specific sources long-press the "Resend" button and select the requested list of messages.

The receipt of a new message can be signaled to the operator by sound or vibration or both. To enable, click on the menu (3 dots), then select Alarms.

In Expert Mode, the default status of the Quick messages screens "Send Position with message" can be selected in the settings "User Interface"/"Send Pos with Msg default ON" tick box.

6.1.3 How to send messages via a relay station (Expert Mode ONLY):

Enable Expert Mode in the settings.

To use a relay station, add that station's call sign in the Settings/Personal Data/List of Relay stations.

The selected Via call-sign must match the relay station's "Station's Callsign" in the preferences. The call signs are **not** case sensitive.

The relay station will retransmit the relayed message in the same mode as it received it, independent of it's default listening mode. TxRSID and RxRSID must be enabled in the Modem screen (default).

Only one hop relaying is permitted as in practice the HF bands are a poor medium for multi-hop routing of messages.

Relay station preferences required:

Found in Section	Name	Usage	Examples
Personal Data	Station Callsign	The messages will be marked as being relayed by this call sign.	VK2ETA, vk2eta-9, vk2eta/p (**MUST** be unique to each station)
Relaying	Relay Messages over Radio	Must be ticked.	
Optional preferences:			
Message Acknowledgment	Acknowledgment position	Provides an audible beep sequence to the message sender, in sequence (station 1 then 2, etc..). Not Morse code.	1
Message Acknowledgment	Highest Acknowledgment position (in the group)	Make the station wait for that number of acknowledgments before transmitting.	3
Relaying	Access Password	Leave blank for access to all. Requires the matching password to be set in the relay list of the sending station.	vk2eta-1:mypass

Note that relayed messages could be heard by the selected relay AND by the destination at the same time. Since the relay station will forward that message to the destination this would result in a duplicate message.

The app tries to detect these duplicate messages when the contents are identical and the time stamps are the same (+ or – 10 seconds).

An overlay message will advice the receiving station that the message just heard is a duplicate and will not record it in the message list.

6.1.4 Tracking GPS positions from other stations in real time:

GPS positions can be sent either by themselves (the Send Position button), or together with pre-defined messages (the Quick message button or list screens), or even with a picture.

When received, these Points of Interest (POIs) can be displayed in a tracking mode. To activate, click on the menu (3 dots) and select Track POIs.

A green Tracking icon is then displayed at the top:

The messages are then sorted by descending distance to the nearest POI, but only when the device is moving (> 1km/h). Messages filtered so that only POIs the device is moving towards to (reducing distance) are shown.

When the POI's distance from the device crosses one of the three warning distances, the color is changed in that order:
- further than first warning distance: normal display
- if less than 1st warning distance, green background
- if less than 2nd warning distance, red background
- if less than 3rd warning distance, yellow background

When the device's movement drops below 1KM/h, the display order and warning highlights freeze.

Optional Settings:

| Found in Section	Name	Usage	Examples
GPS and Tracking	Time between GPS fixes when tracking	If tracking in a driving vehicle is typically between 1 and 3 seconds to provide real time POI tracking.	1 or 2
GPS and Tracking	1st Warning Distance	When tracking, when to highlight the message in Green	350 (in meters)
GPS and Tracking	2nd Warning Distance	When tracking, at what distance to highlight the message in Red	200 (in meters)
GPS and Tracking	3rd and last Warning Distance	When tracking, at what distance to highlight the message in Yellow	70 (in meters)

The shorter the time between GPS fixes when tracking, the more often the message list will be updated.
Battery consumption, if not connected to a charger, need to be taken into consideration if using fast updates.

To exit the tracking mode, press on the Tacking icon.

A simple test and demonstration with a single device is to drive "around the block" sending quick messages with GPS positions and following the same path a second time with the Tracking function On and by selecting the Message screen.

Example of Message screen while tracking:
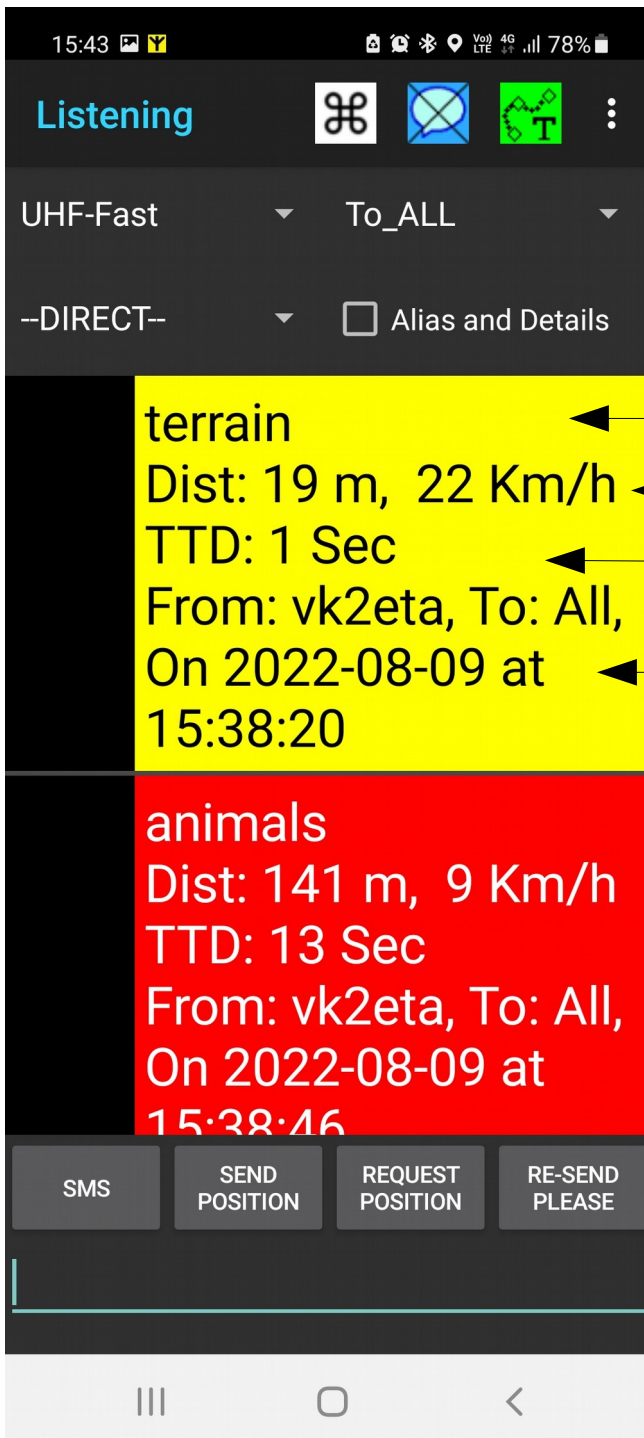
Message text

Distance to POI and speed of sender at POI

Time To Destination (at current speed) *

Origin and time of message

* Note: GPS messages contain a "X seconds late" information. This is the delay in seconds between the press of the message button and the time the message got the GPS location.

It is displayed here only if larger than 1 second, and is for information only and is currently **not** included in the calculations of "Time To Destination" nor in "Distance to POI".

6.2 Reference Sheet 2 – Exchanging Short Messages between a station and a cellular phone as SMS (Expert Mode only):

This requires two stations: a) the sender (client) and a relay station (server) connected to the internet.

A SIM card from a cellular provider with SMS credits.

6.2.1 Preferences required at the sender (client). As in 6.1, plus:

Found in section	Name	Usage	Examples
Personal Data	List of Contacts	Defines the cellular number to send to	0412345678,+61412345679,joecell=0412345670

6.2.2 Preferences required at the relay (server). As in 6.1.3, plus:

Found in section	Name	Usage	Examples
Relaying	Relay Outgoing Messages as SMS over Cellular Network	Must be ticked	
Relaying	Listen for Incoming Cellular SMS Messages	Must be ticked	
Optional preferences:			
Relaying	Immediately Send SMSs over the Radio	Tick if replies from the phone recipient are to be forwarded immediately when received from the phone.	
Relaying	How many Hours to Keep a Link between Sender and SMS/Email Recipient	Allow the SMSs replies to be directed to the right callsign, a link is maintained for that period between the sender and the phone number.	336 (in hours = 2 weeks)
Relaying	Cellular SMS filter for forwarding over radio	Can be used to manually make permanent links between call signs and cellular numbers	Explained in appendix

6.2.3 How to send cellular SMS messages:

Add the desired cellular number in the settings "Personal Data"/"List of Contacts". E.g. 0412345678. Separate entries by a comma.

From any messaging screen except the picture screen (Android does not allow sending MMS messages from non-system apps anymore), select the desired number (E.g 0412345678) from the drop down "To".

Select the relay station in the "Via" drop down and send the message, or GPS position.

The relay will only reply to the message with the acknowledgment as set in 6.1.3 above.

No acknowledgment means the the message was not received or damaged beyond recovery and a low tone acknowledgment means the message was damaged. In this later case the message is still stored at the relay but is not forwarded to the cellular network as the phone number could be wrong.

Aliases are also available for cellular numbers to prevent spamming and reduce message size.

Aliases are optional but highly recommended.

In the settings "Personal Data"/"List of Contacts" use the following format to enter an alias: joecell=0412345678.

The first time a message is sent to a cellular recipient, tick the "Alias and Details" check box. The "To" drop down will be shown in red as a reminder.

Select the cellular recipient in the "To Station" list. Only the Alias will be shown.

The **subsequent** messages are then sent with the "Alias and Details" **unticked**. That way only the alias will be sent to the relay as the destination (E.g "joecell" instead of the cellular number).

The relay station will convert the alias into the cellular number as it remembers the full cellular details as previously sent.

The relay also maintains a table linking the sender of the message to the destination cellular number.

If the cellular recipient sends an SMS response, it is automatically associated with the sender and stored at the relay providing the RadioMsg app was running at that time.

And if the "Immediately Send SMSs over the Radio" is set in the preferences, the relay will transmit the message back to the station that sent the message to that cellular number **providing that the original sending station was**

heard in the last hour.

This is to avoid sending data when a station has long since stopped communicating with the relay.

Again, only the Alias will be sent back from the relay station as the destination station can convert it back to the original cellular number.

To correct a cellular number associated with an alias, send a new message with "Alias and details" which include the new number.

To query past SMS replies from the relay, ensure the "Via" is set to the relay station and long-press the "Resend Please" button. Choose "All since last query" or "Last X messages" plus the "Emails and SMSs" option.

You are responsible for following the third party traffic rules in your country.

6.3 Reference Sheet 3 – Exchanging Short Messages between a station and an internet email recipient:

This requires two stations: a) the sender (client) and a relay station (server) connected to the internet.

6.3.1 Preferences required at the sender (client). As in 6.1 plus:

Found in section	Name	Usage	Examples
Personal Data	List of Contacts	Defines the email recipient to send to	joeblogs@hismail.com,jeomail=joeblogs@hisemailtoo.com

6.3.2 Preferences required at the relay (server). As in 6.1.3, plus:

Found in section	Name	Usage	Examples
Relaying	Relay Messages as emails over Internet	Must be ticked	
Relaying	E-Mail address, username and password	To access the email account	gateway.mycall@gmx.com in email and username fields
Relaying	Imap and smtp host	Tested with Hotmail/Outlook/Office365, GMX, Yahoo, AOL.	imap.gmx.com & smtp.gmx.com
Relaying	Imap and smtp security protocol and ports		SSL/TLS and 993
Optional preferences:			
Relaying	Listen for Incoming Cellular SMS Messages	Tick to enable on the receiving of reply emails into the app as they are sent.	
Relaying	How often (in Seconds) to check for new emails	Normally not required as most providers have an alert system.	60 seconds
Relaying	Immediately Send Received emails over the Radio	Tick if replies from the email recipient are to be forwarded immediately when received.	

Relaying	How many Hours to Keep a Link between Sender and SMS/Email Recipient	Allow the SMSs replies to be directed to the right callsign, a link is maintained for that period between the sender and the phone number.	336 (in hours = 2 weeks)
Relaying	Email filter for forwarding over radio	Can be used to manually make permanent links between call signs and email addresses	Explained in appendix

6.3.3 How to send short E-mail messages (max 150 characters):

Add the desired email address in the settings "Personal Data"/"List of Contacts". E.g. joe.blogs@hismail.com. Separate entries by a comma.

From any messaging screen, including the picture screen, select the desired email address (E.g joe.blogs@hismail.com) from the drop down "To".

Select the relay station in the "Via" drop down and send the message, GPS position or image.

The relay will only reply to the message with the acknowledgment as set in 6.1.3 above.

No acknowledgment means the the message was not received or damaged beyond recovery and a low tone acknowledgment means the message was damaged. In this later case the message is still stored at the relay but is not forwarded to the cellular network as the email address could be wrong.

Aliases are also available for email addresses to prevent spamming and reduce message size.

Aliases are optional but highly recommended.

In the settings "Personal Data"/"List of Contacts" use the following format to enter an alias: joemail=joe.blogs@hosmail.com.

The first time a message is sent to a cellular recipient, tick the "Alias and Details" check box. The "To" drop down will be shown in red as a reminder.

Select the cellular recipient in the "To Station" list. Only the Alias will be shown.

The **subsequent** messages can be sent with the "Alias and Details" **unticked**. That way only the alias will be sent to the relay as the destination (E.g "joemail" instead of the email address).

The relay station will convert the alias into the email address as it remembers the full email details as previously sent.

The relay also maintains a table linking the sender of the message to the destination email address.

If the email recipient sends an email response, it is automatically associated with the sender and stored at the relay providing the RadioMsg app was running at that time and the app was set to listen to incoming emails.

And if the "Immediately Received Emails over the Radio" is set in the preferences, the relay will transmit the message back to the station that sent the message to that cellular number **providing that the original sending station was heard in the last hour.**

This is to avoid sending data when a station has long since stopped communicating with the relay.

Again, only the Alias will be sent back from the relay station as the destination station can convert it back to the original email address.

To correct am email address associated with an alias, send a new message with "Alias and details" which include the new address.

To query past email replies from the relay, ensure the "Via" is set to the relay station and long-press the "Resend Please" button. Choose "All since last query" or "Last X messages" plus the "Emails and SMSs" option.

You are responsible for following the third party traffic rules in your country.

6.4 Using a relay station for messages store and forward :

There are cases where real-time communication is not the preferred or even a possible option for exchanging messages.

Example: a group of outdoor enthusiasts have battery operated radios with limited capacity and want to check on each other but cannot be listening 24 Hours a day. Scheduled exchanges are one option but it is easy to either forget and miss the scheduled time or it may not practical to do so at that time.

Using one station as a relay that has 24 hours listening capability allows for store and forward (query on demand) of the messages.

Remembering that any RadioMsg capable station can be configured as a relay there are a number of commands that permit the collection of messages awaiting at that relay station.

For the set-up see section 6.1.3 "How to send messages via a relay station" (Expert mode only).

The exchanges could be for example:

1. Station A wants to leave a message for everyone on station B (the Relay): in the messages screen, in the bottom field type the text of the message, select the destination as "To_ALL" and "Station B" call sign in the via field, and press "Send Position". Assuming acknowledgments are enabled at station B, the proper reception of the message will be heard as beeps at station A.

2. Later, station C wants to check its messages:

The Via Selection must be "Station B" and the "To selection" can be anything (All or any specific station, it will be ignored in that specific request).

In the message screen, **press and hold** the "Re-Send Please" button. A new screen is displayed with two selections: a) "How many or how long" and b) the type of messages to request.

If previous requests have been made for sending pending messages the easiest is to use the defaults: a) All messages since the last "Resend" request, and b) Last X Messages of any type.

Station B, the relay, will check in its history to see when the last resend request was made from station C and send any messages that **it sent to, or received for station C,** after that time. This includes messages received over radio **but also emails and SMS messages if so enabled**. Messages resent will either be **for station C specifically, or for "All stations"**.

At present there is a hard limit of 20 messages maximum built in the app when replying to such requests.

Other filters for the type of messages are:
- "Email replies only", means also SMS replies but Not radio messages. The "Long version allows up to 500 characters instead of the usual 150 characters for the short version.
- "Radio only" excludes SMS and email replies.
- "Positions only" is only for messages which contain GPS data.
- Minutes, Hours and Days options are for timed bases requests (any message type).

The receiving app (at station C in that case) will try to detect duplicate messages to avoid confusion in case the same message is resent more than once.

The raw message text will be displayed in the Modem screen, but the message will not be recorded in the messages list. A short popup overlay message will indicate that the message just received is a duplicate.

Duplication is detected by having the new message and a previously recorded message being identical in content AND with the same timestamp (plus or minus 10 seconds).

The bottom checkbox in the resend screen named "Force Via Station to relay the re-send request" results in the relay forwarding the re-send request to the original station (must be a unique station, not All). It will relay the reply as well.

Example Station C suspects that station B, the relay, has not received all the messages from station A for the last 1 hour.

To request the latest messages from station A, targeted at station C or All, station C makes a Resend please request for "All messages for the last 1 hour" **with this checkbox ticked,** and with the To selection as "Station A" and the Via selection as "Station B".

Station B will relay that request to station A as-is and will, in return, relay all resent messages from station A to station C.

6.5 Using passwords to limit access to the relaying functions:

The access password found in the Relay section of the settings restricts the relaying of messages between RF stations and towards SMS and email recipients from this relay station.

Direct messages including position requests and "Inquire" requests will still be replied to if addressed to the relay station.

The password IS case sensitive and can contain any character except a comma.

At the sending station, the password has to match the relay's one, and is entered in the settings / Personal Data / List of relay stations field.

The format is the following: callsign:password. Entries are separated by a comma like for example: vk2eta-1:password1,vk2eta-3,vk2dyz-5:password2

This results in password1 being used for all messages via relay vk2eta-1, password2 for messages via vk2dyz-5, but no password for messages via vk2eta-3.

If the password is missing the relay replies with "Access Password?", but if the password is not correct the relay station, if enabled as such, issues a low tone acknowledgment.

6.6 Controlling the behavior of a server/RadioMsg relay station

Pskmail apps version 3.0 and above (requires Java under Windows/Linux/Raspberry OS or Chromium device) include the RadioMsg services.

The Pskmail app has a scanning facility since they can control the rig frequency. This feature is not available in the Android RadioMsg app.

The Pskmail app (working as a server) will instruct Fldigi to change the Rig's frequency every minute, on the minute, according to this schedule:
- Minute "zero"   (E.g. at 11:00:00, 11:05:00, …): first channel's frequency.
- Minute "one"   (E.g. at 11:01:00, 11:06:00, …): second channel's frequency.
- Minute "two"   (E.g. at 11:02:00, 11:07:00, …): third channel's frequency.
- Minute "three" (E.g. at 11:03:00, 11:08:00, …): fourth channel's frequency.
- Minute "four"   (E.g. at 11:04:00, 11:09:00, …): fifth channel's frequency.

The RadioMsg devices need to start transmitting the messages in that minute. Once a valid message header is being received, the server will maintain that frequency until the message is fully received or discarded. It then restarts the scanning sequence afterwards.

Therefore a message can be received past the next minute(s) providing the relay or server has detected a message start within the current minute.

In the RadioMsg app menu there is a "Commands" section that opens a dialog page with the following functions:

A. Time Sync: Allows the RadioMsg app to synchronize it's app clock to the server with 1 second accuracy. This is of value for long portable operations where time synchronization is not possible either with a GPS unit or cellular network.

Time synchronization is of value for detecting duplicate Radio messages when a "Resend" request is sent to a server.

It will be of extra value when access passwords will be time based (future feature) to prevent hacking into a server.

There are no parameters when sending such a command. Upon receipt of the time information the client displays the difference of time and adjusts the internal application clock.

B. Stop Scanning: (Only to a Pskmail server) Stops the server scan function (the 5 frequencies in a 5 minutes cycle). Requires the length of time the server must stop scanning for.

.Useful for exchanging a few messages back and forth or waiting for a reply on the current frequency.

Upon reception of the command, the server replies with a "Scan Stopped for x amount of time" and stays on the current frequency for that period.

On HF bands, too long periods can lead to "loosing" the link with the server due to propagation changes.

C. Start Scanning:

Upon reception of the command, the server restarts the scan sequence at the next turn of a minute. It does not wait for the time specified in the last "Stop Scanning" command.

D. Mute Auto-forward:

Upon reception of the command, the relay/server stops auto-forwarding email and SMS replies. Replies are kept at the relay station for future queries (see the "Resend" button in the Message screen).

Requires a specified period of time for the mute to expire.

E. UnMute Auto-forward:

Re-allows auto-forwarding from this point onward. Does not automatically send replies previously received at the server/relay. Use the "Resend" button in the Messages screen to get past messages.

F. Unsubscribe from emails/SMS:

When a station sends an email or sms via a server/relay station, the server/relay keeps a link between the station and the destination.

This allows for the replies to be routed (directed) to the proper originator's station callsign and provides a "virtual mail box" for each station that uses the server/relay.

This unsubscribe command breaks (deletes) that link made between the supplied station call-sign and the email address/SMS cellular number/Alias.

This can be of value to stop unwanted replies being forwarded from a specific email or cellular number.

If an Alias was used with the email address or cellular number, that alias can be used in place with the same effect. All are case insensitive.

6.7 Menu items

The app menu is accessed by clicking on the three dots at the top of the app window.

Screens: for direct selection of a screen. As the list of swipable screens is user defined, some screens may only be accessible by this menu item.

Bluetooth Audio: mainly for older devices to enable routing audio input and output through a Bluetooth device.

Manage Messages: Select incoming messages or outgoing messages then select the messages individually or use the first row of buttons for pre-selecting them, then apply the action on the 2nd row of buttons. Archived messages are moved the "Archive" folder under the "RadioMSG.files" top folder.

Settings: Access preferences as detailed above.

Save/Restore Settings: "Save Settings to File" and "Restore Settings from File": allow for a quick restore of settings after an app un-install/re-install, or for sharing common messages and settings with a group. Restore to Default as per after intallation.

Commands: Explained in 6.5 above.

Alarms: The receipt of a new message can be signaled to the operator by sound or vibration or both.

Track POIs (Points of Interest): Explained in 6.1.4 above.

7.1 Appendix - Hints and Tips.

7.1.1 Using GPS time:

Devices internal clock are normally synchronized to the cellular network's time or via WIFI time servers. It is possible to get tens of seconds of drift per day when no network is available.

Time accuracy to about 10 seconds is of value for three purposes:

1. Identifies duplicate messages. Two situations generate duplicate messages:

    a) When a radio message is sent via a relay station but the final station copies the original message as well as the relayed one.

    b) When a station requests a re-send of message(s).

To help identifying duplicates the replying station adds a time identification to it's relayed messages, but to minimize the data transmitted it is sent as the number of seconds since the original message was sent.

At the receiving end a comparison is done with a leeway of 10 seconds since it is very unlikely that two exactly identical messages would be sent within a 10 seconds time frame.

3. Allow proper timing when sending messages to or via a scanning station. Valid only for Java Pskmail servers/relays which can be configured to cyclically scan five frequencies, one per minute.

2. Allow for upcoming time based passwords to increase relay station security if desired.

Time synchronization can be done to the GPS time, using the internal GPS of the device. This is the preferred option. Alternatively time can synchronized to a RadioMsg relay / Pskmail server over the air.

In both cases only the app internal clock is adjusted, not the system wide one.

To enable GPS time go to settings / "GPS and Tracking" and tick the "Use GPS Time when Available".

To synchronize over the air, select the relay or server in the "Via" pull down, then in the menu click on Commands, select Time Sync, then click send.

To verify which time source is used, go to the Messages screen, press on the Display Options button until the current time (minutes and seconds) is displayed: ⌘

The time is displayed in White if the internal clock is used, Green is the GPS time is used and Red if the time is synchronized to a server.

7.1.2 Non-task specific settings:

Found in section	Name	Usage	Examples
User Interface	Swipeable screens	Circular list of screen to access by swiping right or left. Requires start of the app.	
User Interface	Buttons Text Size	Self explanatory	12
User Interface	App Theme	Default or light or Dark themes	Default
User Interface	Allow Single click on Message List	Brings up the detail message window on short press rather than long press on a message	
User Interface	Allow Single click on Quick Message List	Sends the selected message on a short press rather than long press. Not suitable if in movement.	
User Interface	Quick Messages Spacing	The size of the separator line between pre-defined messages. Minimizes the "fat-fingers" syndrome.	
User Interface	Send pos with msg default ON	If ticked, presets the "Send Position with message" check box in quick messages screens.	
User Interface	Keep screen On	When The RadioMsg app is displayed, prevents the device from going to sleep.	
User Interface	Allow Text Selection on Back Swipe	In the Modem screen, allows a back swipe to stop the automatic scrolling to the last characters received. Experimental.	Recommend unticked.
Modem	Internal Volume	Normally 80 or Max (pre-attenuation before sending to sound system).	Rarely used.
Modem	Auto Adjust Media Volume	Resets the media volume before each transmission. The "Vol" slider in the Modem screen sets the volume level.	
Modem	Audio Frequency	The signals center frequency in Hertz	1500
Modem	Transmit Tone Before Data	Tone length to send before data (or RSID) at the center frequency. Allows for slow VOX keying or manual keying. In milliseconds.	300 for VOX keying or 10000 for manual keying (10 secs)

| Modem	Tune Button Tone Duration	In modem screen: Zero = Toggle tune on/off, otherwise the duration in seconds to send a tune for.	0 or Non-zero if touch screen locks up during tunes.
Modem	Slow CPU	Similar to Fldigi, reduces the processing at the expense of a small deterioration in decoding.	
Modem	Save Battery	If ticked, the modem will stop decoding after 1 minute of inactivity to save battery and will wake-up on receipt of an RSID. Must have Tx RSID On at the sender's end.	
RIG Control	RST as PTT Control	If a USB serial converter is connected via a USB OTG cable to the device, sets the Request To Send signal before sending transmit audio.	
RIG Control	RST as PTT Control	If a USB serial converter is connected via a USB OTG cable to the device, sets the Data Terminal Ready signal before sending transmit audio.	
RIG Control	RST as PTT Control	Not Available Yet	
RIG Control	Start of Audio Delay	Delay in milliseconds between the PTT signal and the start of audio sending	0 by default, max 5,000 = 5 seconds
RIG Control	PTT Release Delay	Delay in milliseconds between the end of audio sending and the release of the PTT signal	0 by default, max 5,000 = 5 seconds
Relaying	Works as Unattended Relay	Prevents image ans Alerts pop-ups as well as crash reporting	
Bluetooth (Audio)	When Bluetooth Device is Present	Auto-connects if the Bluetooth device listed below is connected. Requires a Hands free or Headset Bluetooth device.	
Bluetooth (Audio)	Name of Bluetooth Device for Audio	Copy name from the phone/tablet device's Bluetooth list of paired devices	POR 1007BT (spaces are allowed)
Experimental	Restore Settings at start	Automatically performs a "Restore Settings From File" when the app is launched. Mainly for buggy devices which loose	

		the app settings.	
Experiment al	Auto Restart the App at Intervals.	Zero = disabled, otherwise restarts the app at that interval (in minutes). Waits for idle times before restarting. **Requires** "Works as Unattended Relay" in the Relaying section AND, if on Android 8 and above, also needs to have "Keep screen On" in the User Interface section due to newer Android versions restrictions.	60

7.1.3 "Where is it?" complementary app:

In the Message Detail window which opens after a long press on a message, there is a button named "Where is it?".

It will be made active if this companion app is installed AND the message contains a GPS position.

The window below explains the information displayed when the button is pressed:
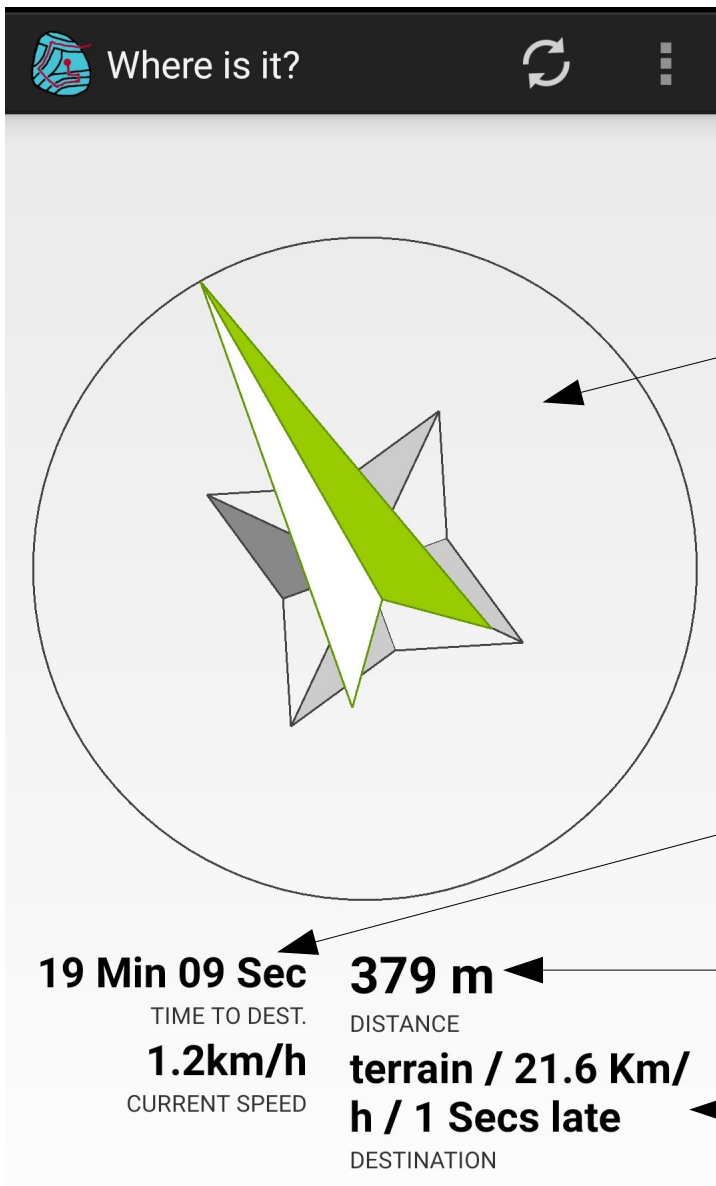
The green arrow is the direction to the POI, while the compass rose indicates North.

Update speed and sensors usage can be adjusted in the settings (use the Menu - three dots).

Time to destination at the current speed, and current speed (below).

Distance to POI in a strait line.

Message text if any / speed of sender at POI/ delay in GPS acquisition.

To install this app, download from the web site at:
https://bitbucket.org/VK2ETA/radiomsg/downloads/

Using a file manager app, select and install.

Credits: This app is basically a copy of the "Get Back GPS" app by Dieter Adriaenssens with a few modifications to make it usable by RadioMsg.

Many thanks to Dieter. His GPL license is maintained here of course.

7.1.4 Compatible application Pskmail for Windows/Linux (inc. Rapsberry Pi OS) and Chromium:

http://pskmail.wikispaces.com

http://www.freelists.org/archive/pskmail

Installers, manuals and source code at :
https://bitbucket.org/VK2ETA/javapskmailserver/downloads/

Please note that the pskmail.org web site is unfortunately not maintained at present due to ill health of the owner. We wish his all the best in recovery.