



Voice

ATAK

V1.7.8

Purpose

The Voice plugin provides bi-directional, multiple user voice communication across a network with only a TAK device. This removes the need for additional hardware to communicate within a team.

The plugin can also connect to Mumble servers allowing TAK users to communicate with each other and to other mumble users via the server.

This plugin is optimised for Samsung Tactical Edition devices.
This plugin is not compatible with Samsung Galaxy Tab 2

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Types of missions

You can create 3 types of missions within Voice:

1. **Combined mission** – Multicast and Mumble connection

- (a) Requires user to set an IP and Port number for the multicast mission and then every channel within that mission
- (b) To use multicast all users have to be connected to the same network (Wi-Fi, mesh, radio etc.)
- (c) To use mumble all users must acquire a connection to a mumble server

2. **Multicast Only**

- (a) Only allows channel creation in multicast format (see Point 1. - a & b)

3. **Mumble Only**

- (a) Only allows channel creation in mumble format (see Point 1. - c)

Create a Combined Mission

1. Open the multicast voice plugin
2. Press the + button (figure 1)
3. Enter the Mission Name (figure 2)
4. Combined will be selected by default
5. Enter the Multicast Mission IP (From 225.0.0 to 239.255.255)
6. Enter the Multicast Mission Port (1204 to 65535)
7. Enter the default multicast protocol (UDP or RTP)
8. Select Save – Mission will be visible in the mission list (figure 3)

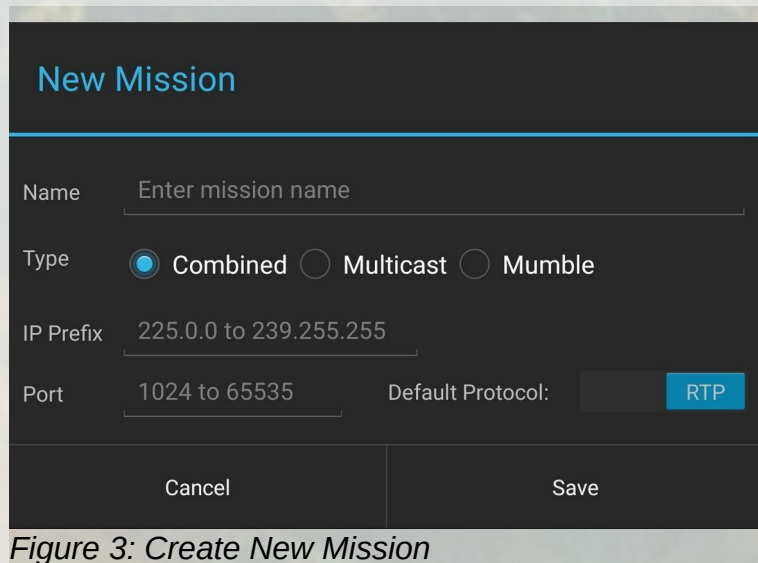
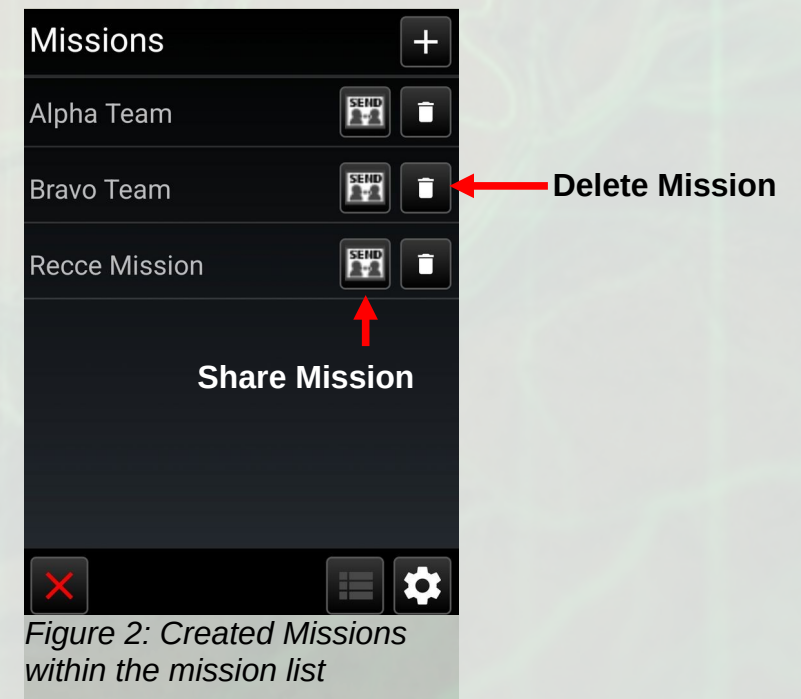
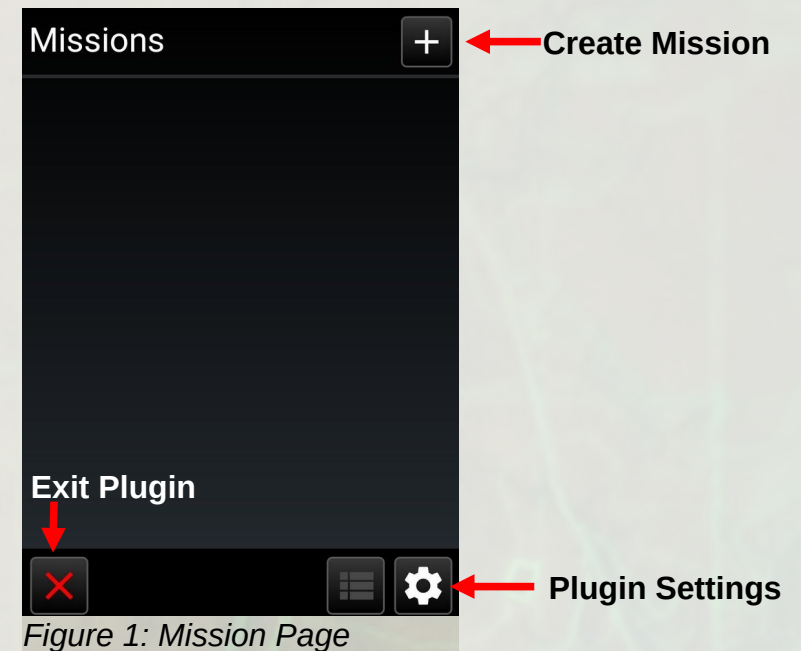


Figure 3: Create New Mission

Note: A connection to Mumble is not required to create a combined mission, though is required to create a Mumble channel.



Create a Multicast Only Mission

1. Open the Voice plugin
2. Press the + button (figure 4)
3. Enter the Mission Name (figure 5)
4. Select the radial button next to “Multicast Only”
5. Enter the Multicast Mission IP (From 225.0.0 to 239.255.255)
6. Enter the Multicast Mission Port (1204 to 65535)
7. Enter the default multicast protocol (UDP or RTP)
8. Select Save – Mission will be visible in the mission list (figure 6)

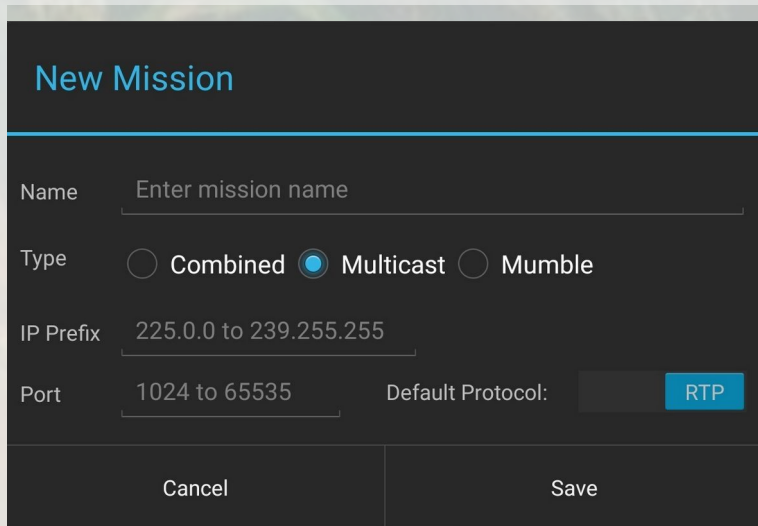
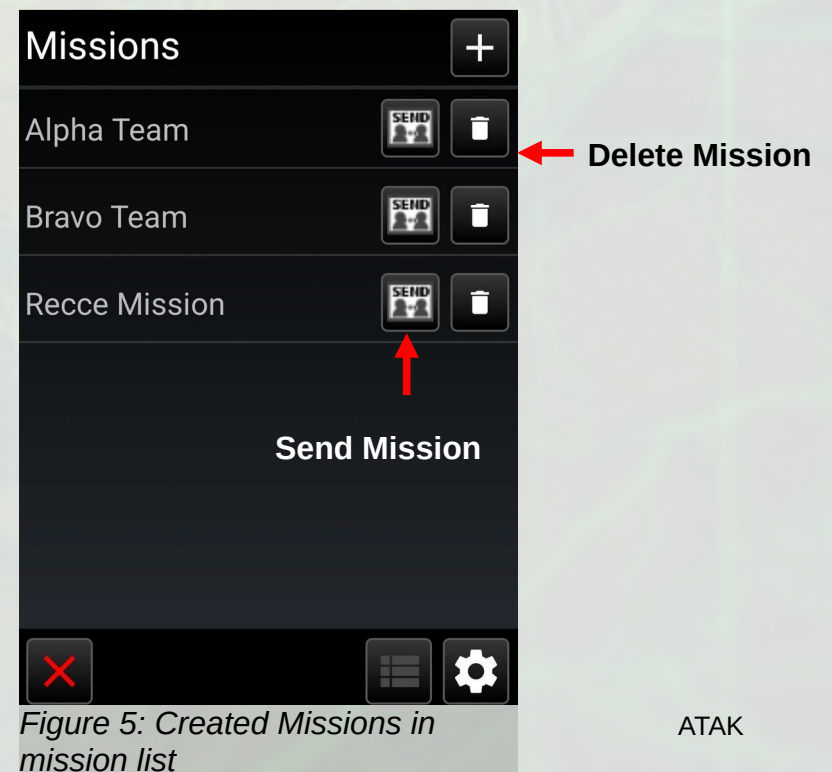
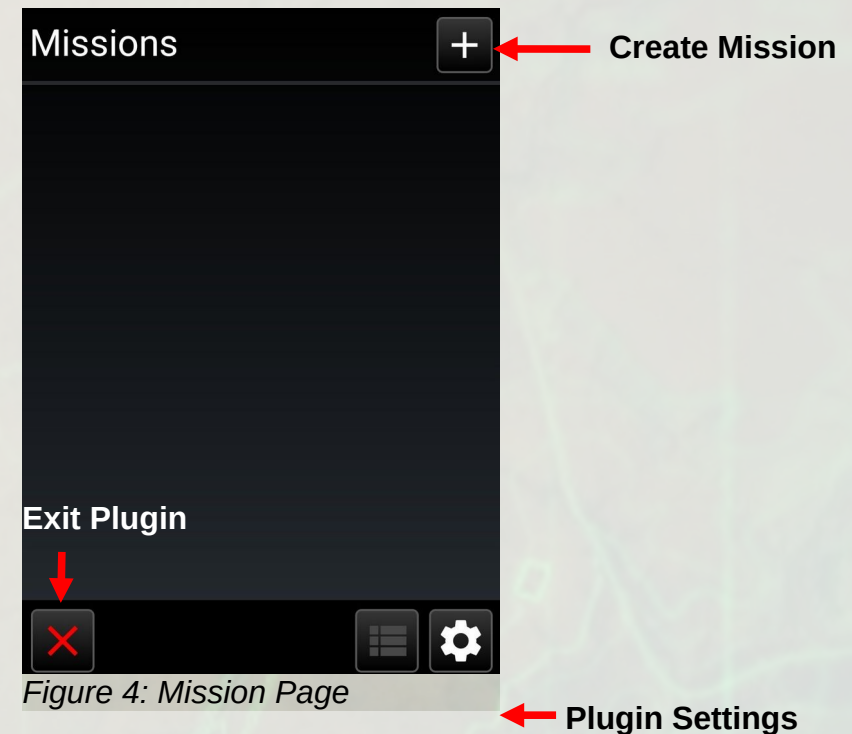
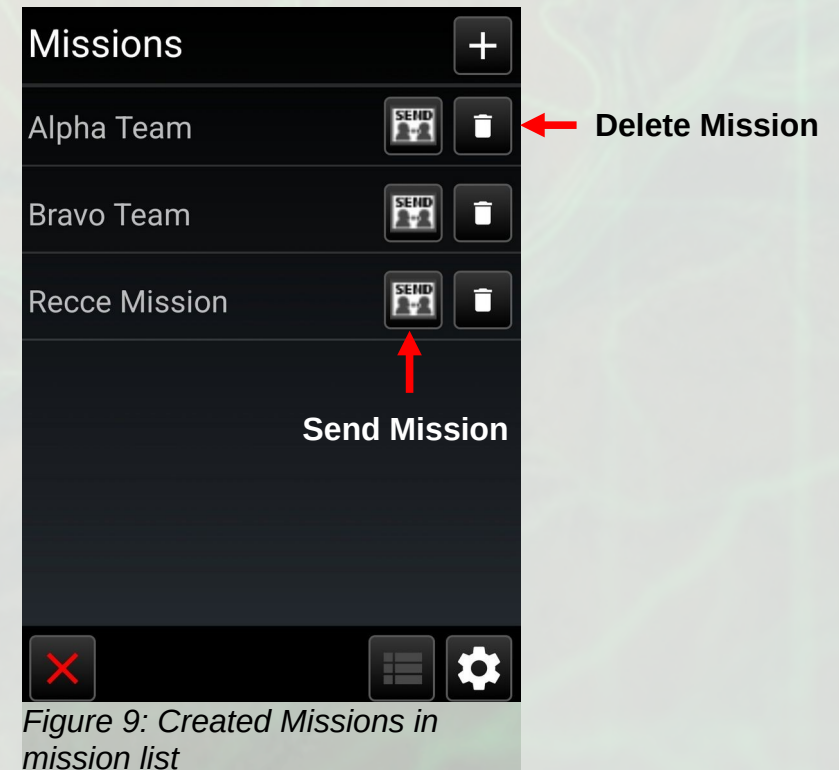
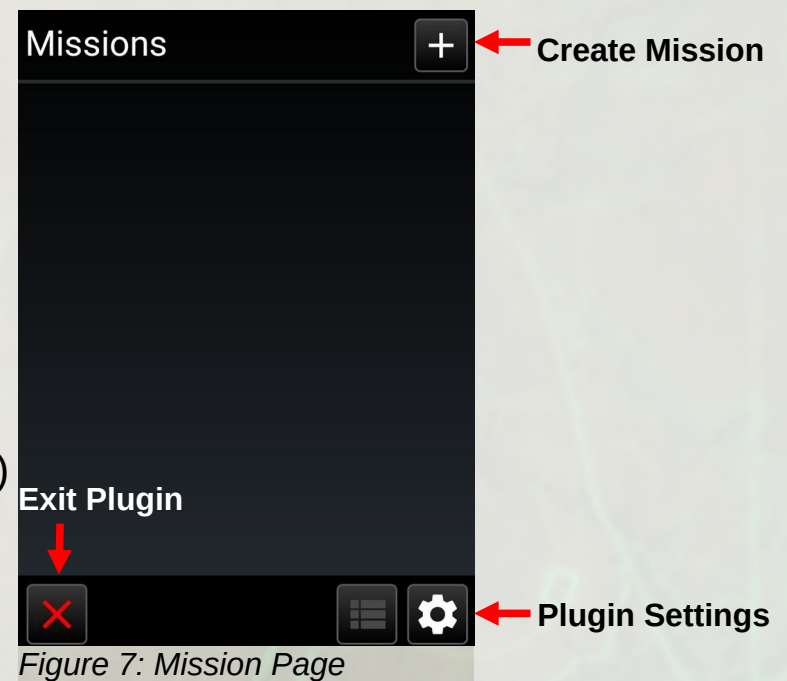
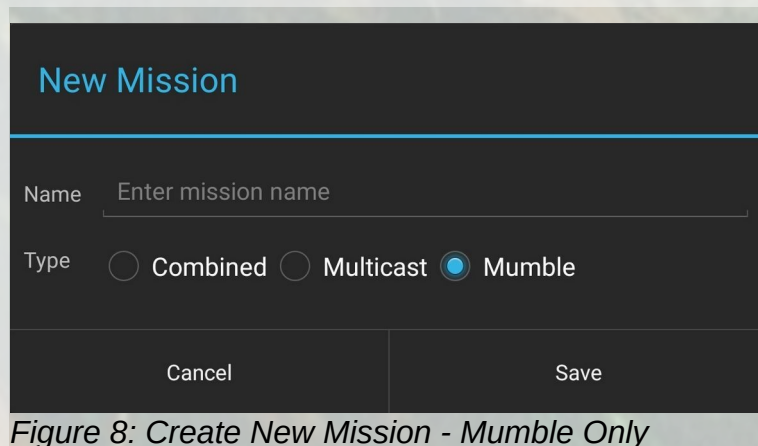


Figure 6: Create New Mission - Multicast Only



Create a Mumble Only Mission

1. Open the Voice plugin
2. Press the + button (figure 7)
3. Enter the Mission Name (figure 8)
4. Select the radial button next to “Mumble Only”
5. Select Save – Mission will be visible in the mission list (figure 9)



Note: A connection to Mumble is not required to create a combined mission, though is required to create a Mumble channel.

Editing a Mission

You can edit the following for each mission type:

Combined

- Mission Name, IP, Port and Default Protocol

Multicast Only

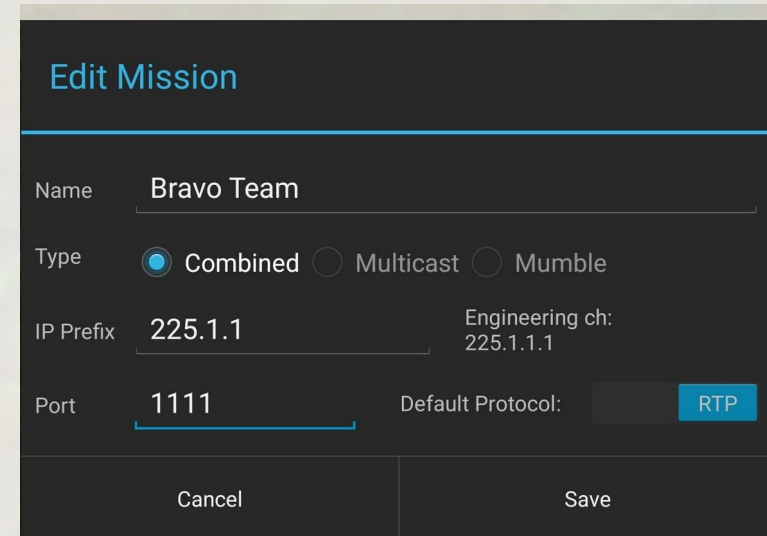
- Mission Name, IP, Port and Default Protocol

Mumble Only

- Mission Name

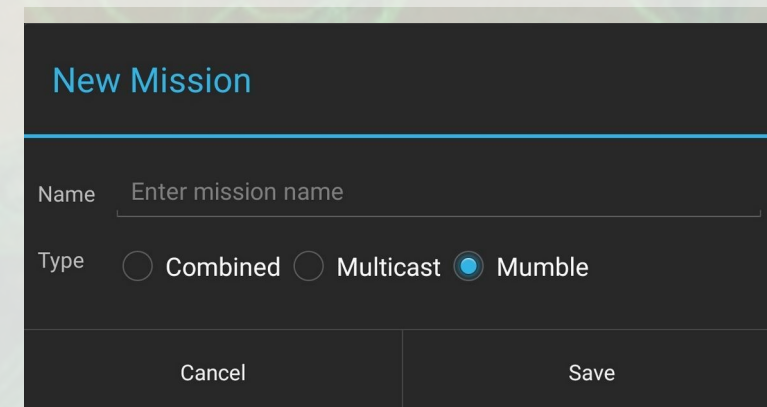
1. Go into the mission that you want to edit
2. Select the Pencil Icon at the top of the mission page
3. This will allow you to edit the mission

NOTE: You **CANNOT** edit the Mission Type in an existing mission



The 'Edit Mission' form has a dark theme. At the top, the title 'Edit Mission' is in light blue. Below it, the 'Name' field contains 'Bravo Team'. The 'Type' section has three radio buttons: 'Combined' (selected), 'Multicast', and 'Mumble'. The 'IP Prefix' field contains '225.1.1', and the 'Engineering ch:' field contains '225.1.1.1'. The 'Port' field contains '1111'. The 'Default Protocol' section has a dropdown menu set to 'RTP'. At the bottom, there are 'Cancel' and 'Save' buttons.

Figure 10: Edit Combined or Multicast Only Mission



The 'New Mission' form has a dark theme. At the top, the title 'New Mission' is in light blue. Below it, the 'Name' field contains the placeholder text 'Enter mission name'. The 'Type' section has three radio buttons: 'Combined', 'Multicast', and 'Mumble' (selected). At the bottom, there are 'Cancel' and 'Save' buttons.

Figure 11: Edit Mumble Only Mission

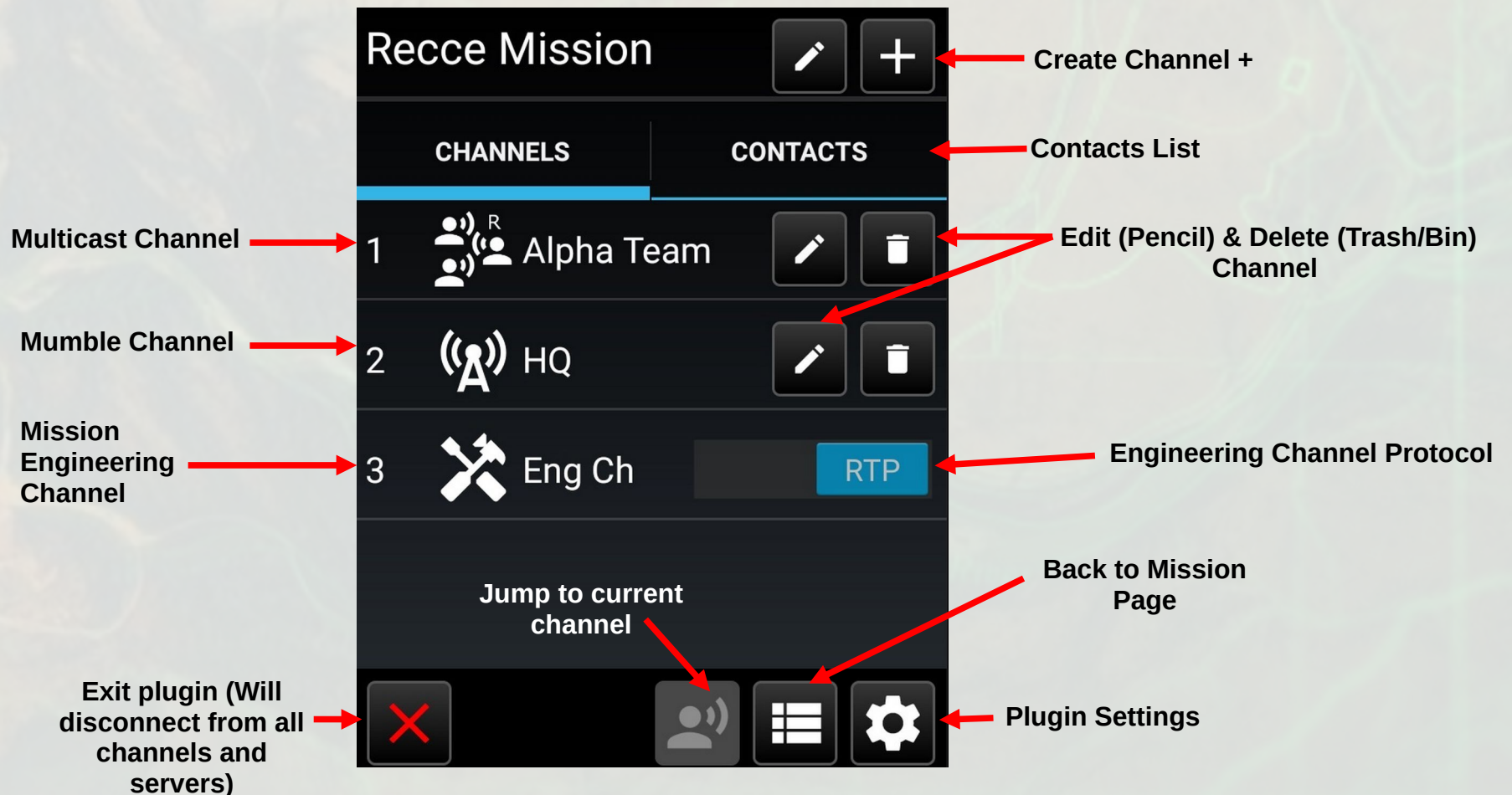
Channel List

When you select a mission you will see the channel list

This will enable receiving audio from the Engineering Channel for that mission (Engineering channels are only available in multicast channels, not mumble)

Depending on Mission Type the list can include Multicast and/or Mumble channels

Selecting a channel will open the channel for voice communication



Contacts List

The contacts tab will show you a list of contacts that are currently in the same mission

Each marker has a call button to initiate a direct call with that user and a pan-to button which will locate and zoom to their marker on the map (if they have GPS location or location manually set)

If a user joins mumble via their client/PC then their icon will be the letter “M” inside headphones and their pan-to and direct call buttons will be disabled.

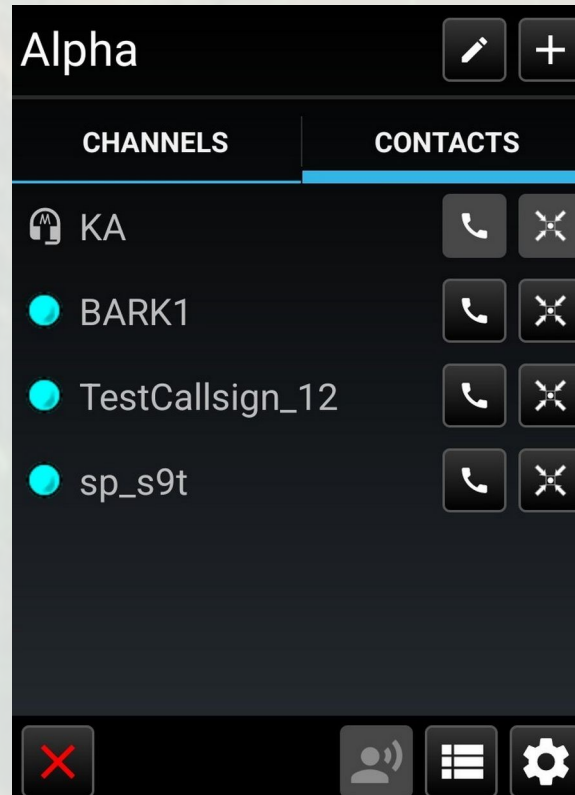


Figure 12: Contacts List

Creating a Channel

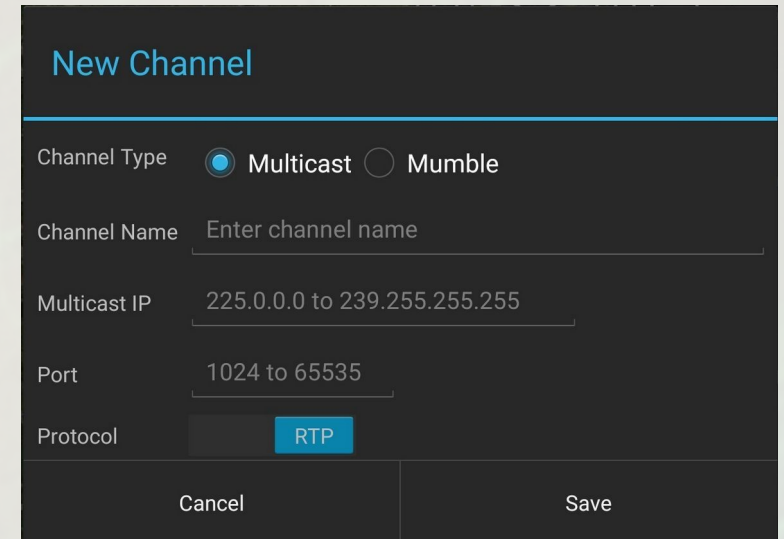
Creating a channel within a selected mission. If it is a 'Combined Mission' you will have the choice whether you want to create a Mumble or multicast voice channel. If you have a Mumble or Multicast channel you will not have this choice.

1. Select the + icon next to the mission name
2. Select the Channel Type and:
 - a) For **Multicast**:
 - i. Enter the Channel name
 - ii. Multicast IP (225.0.0.0 to 239.225.225.225)
 - iii. Port (1024 to 65535)
 - iv. Multicast protocol (UDP or RTP)
 - b) For **Mumble**:
 - i. Enter the Channel name
 - ii. Select channel from the drop-down

3. Select 'Save'

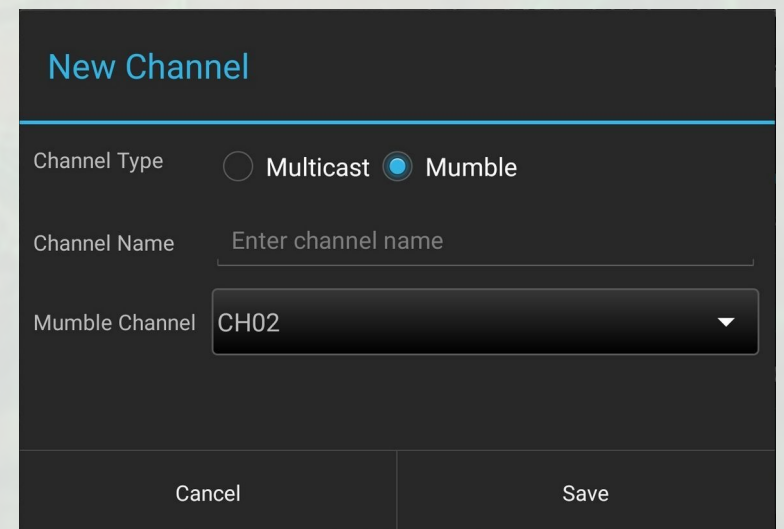
4. The channel will now be visible within the Channel List

Note: Mumble channel names are suffixed with (T) or (U) according to whether they are transmitting over TCP or UDP. This may dynamically change during a call without interruption to the user.



The screenshot shows the 'New Channel' dialog box with the 'Multicast' radio button selected. The fields are: Channel Name (placeholder: Enter channel name), Multicast IP (placeholder: 225.0.0.0 to 239.255.255.255), Port (placeholder: 1024 to 65535), and Protocol (RTP button is highlighted). At the bottom are 'Cancel' and 'Save' buttons.

Figure 13: Create Multicast Channel

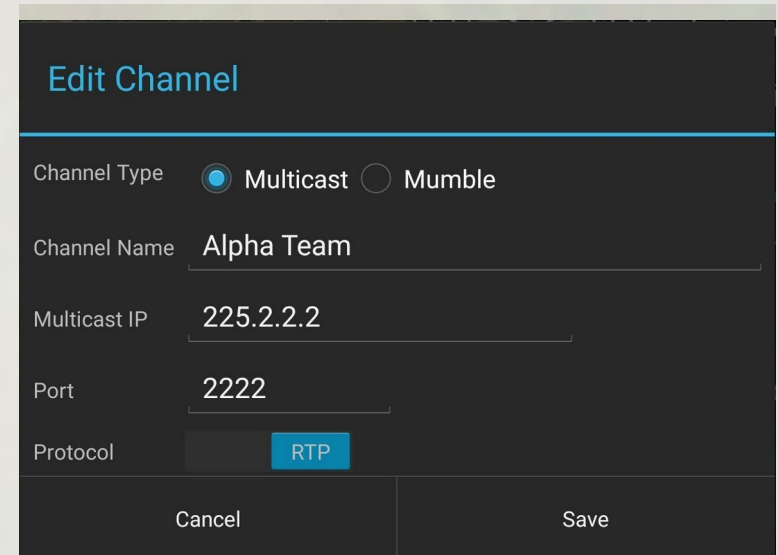


The screenshot shows the 'New Channel' dialog box with the 'Mumble' radio button selected. The fields are: Channel Name (placeholder: Enter channel name), Mumble Channel (dropdown menu showing 'CH02'), and a dropdown arrow. At the bottom are 'Cancel' and 'Save' buttons.

Figure 14: Create Mumble Channel

Editing a Channel

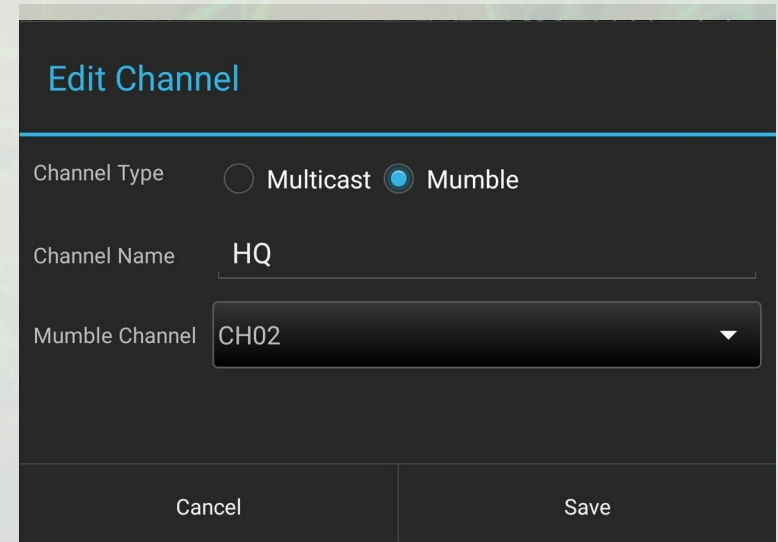
1. Select the mission that the channel is in
2. Select the Pencil icon on the desired channel
3. You can edit:
 - a) Channel Type (Only in combined Missions)
 - b) Channel Name
 - c) **Multicast** IP
 - d) **Multicast** Port
 - e) **Multicast** Protocol
 - f) **Mumble** Channel
4. Click 'Save' to save changes



The screenshot shows the 'Edit Channel' dialog with the following fields and options:

- Channel Type:** Radio buttons for 'Multicast' (selected) and 'Mumble'.
- Channel Name:** Text input field containing 'Alpha Team'.
- Multicast IP:** Text input field containing '225.2.2.2'.
- Port:** Text input field containing '2222'.
- Protocol:** A dropdown menu with 'RTP' selected.
- Buttons:** 'Cancel' and 'Save' buttons at the bottom.

Figure 15: Edit Multicast Channel



The screenshot shows the 'Edit Channel' dialog with the following fields and options:

- Channel Type:** Radio buttons for 'Multicast' and 'Mumble' (selected).
- Channel Name:** Text input field containing 'HQ'.
- Mumble Channel:** A dropdown menu with 'CH02' selected.
- Buttons:** 'Cancel' and 'Save' buttons at the bottom.

Figure 16: Edit Mumble Channel

Password Protected Channels (Mumble)

If a Mumble Server has password protected channels, there will be two icons to indicate the status of those channels:

- Lock icon – The channel is password protected, and the user needs to enter the password.
- Unlocked icon – This channel is password protected but the password has been entered.

Once the password has been entered, the user can freely enter/leave until they have disconnected from the server. Passwords are saved on the phone, and will be reused when the plugin or ATAK is loaded.

The user can input the channel password by pressing a locked channel and entering the password via the dialog. Passwords are stored locally and will be saved even when the plugin or ATAK is closed. The passwords can be deleted from the phone manually via the preferences → “Clear Mumble Channel Passwords”

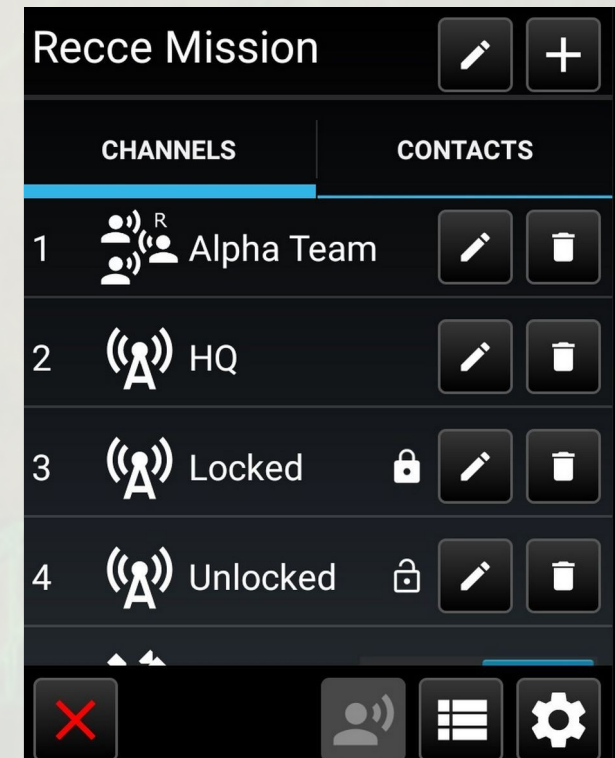


Figure 17: Password Protected Mumble Channels

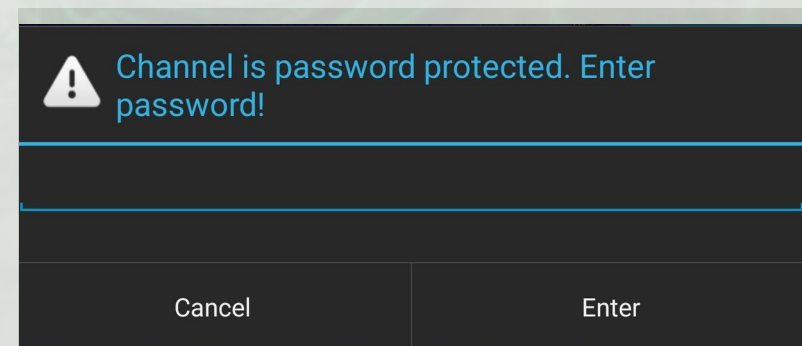


Figure 18: Password Entry Dialog

Engineering Channels

Combined or Multicast missions automatically have an Engineering Channel (Eng Ch) created.

Entering this channel and transmitting audio will send audio to ALL users in the mission, regardless of their current channel.

This channel will default to the bottom of the list of channels. The protocol can be switched at any time to allow communication with users on each protocol.

If a user is in a channel and does NOT want to receive audio from the Engineering channel then they can toggle the button at the bottom of the channel they are in



Engineering channel
ACTIVE (Will receive
audio)



Engineering channel
INACTIVE (Will NOT
receive audio)

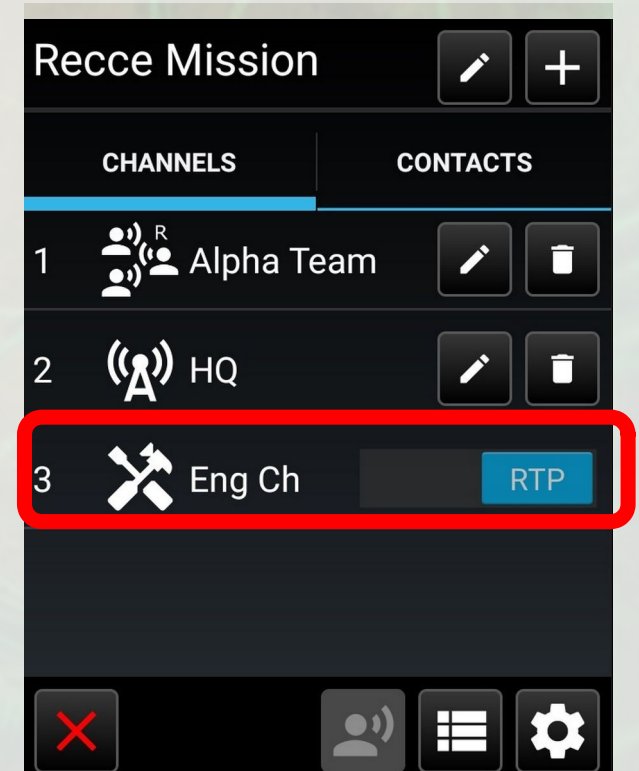


Figure 19: Engineering Channel
(highlighted)

Push To Talk (PTT)

When in an active voice channel a PTT button will appear on the map. By default there will be a floating PTT (can be moved around screen and is always visible even when ATAK is minimised) this can be edited in Settings/Tool Preferences/Specific Tool Preferences/Voice Preferences.

The PTT will turn green to indicate that you are transmitting audio.

Button Actions:

Hold Down – Transmit voice until released

You can also lock the button to constantly transmit voice even when not pressing the PTT button

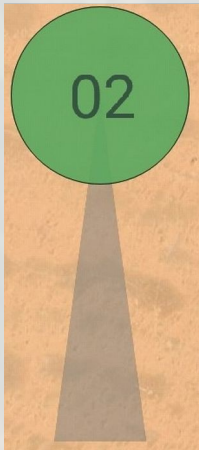


Figure 20:
Non-floating
PTT

PTT Locked on –
Drag the button to the
point of the triangle
and release

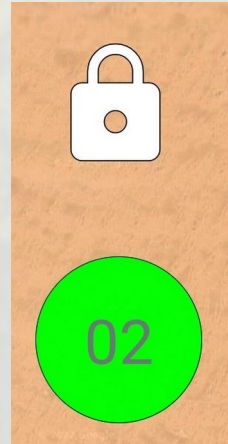


Figure 21:
Floating PTT

**Floating PTT
unlocked** - when
pressed a locked
padlock will appear.
Drag the button onto
the padlock to
constantly stream
audio

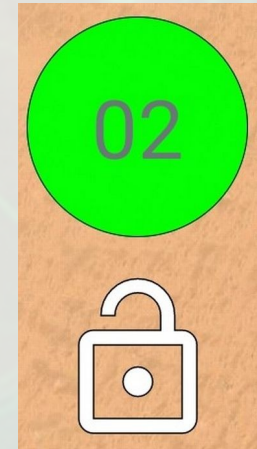


Figure 22:
Floating PTT
Locked

**Floating PTT locked
on** - constantly
streaming audio. To
unlock, drag PTT onto
the unlocked padlock

Bluetooth Push To Talk (PTT)

You are also able to connect a Bluetooth enabled hardware push to talk button to be used within the plugin.

After pairing with the device you can:

- **Hold PTT button down** – This will open the microphone and allow audio transmission in the same way as the map widget. Releasing will cease audio transmission.
- **Double Tap PTT for open Microphone** – To continuously transmit audio press the PTT button TWICE in quick succession (within half a second of each push).
- **Single Tap to unlatch continuous transmission** – To cease continuous transmission press the PTT button ONCE

Latching functionality can be edited within the plugin preferences which can be found:

Settings/Tool Preferences/Multicast Voice Preferences – External Buttons



Figure 23: Bluetooth PTT Button

Custom Bluetooth PTT Device Configuration

Although most Bluetooth PTT buttons are already supported by the plugin, it may be necessary to add additional devices. These can be configured by placing a file named ***custom_bt_ptt_config.xml*** in */atak/tools/multicastvoice* folder on the device.

The contents of the file should be as follows:

```
<bluetooth-ptt-config>
  <services>
    <service>supported service UUID identifier...</service>
  </services>

  <characteristics>
    <characteristic>supported characteristic UUID identifier...</characteristic>
  </characteristics>
</bluetooth-ptt-config>
```

Simply copy and paste the contents above into a text file (notepad), edit the service and characteristic UUID and save as .xml

Note:

- Multiple <service> elements can be placed inside the <services> element
- Multiple <characteristic> can be placed inside the <characteristics> element

The UUID identifiers for the PTT Device can be found by using a Bluetooth scanner app such as “nRF Connect for Mobile”

Volume Button PTT

The volume up/down buttons can be configured to act as PTT buttons by enabling the setting:

Settings → Tool Preferences → Specific Tool Preferences

→ Voice Preferences → Configure Hardware Volume PTT Buttons

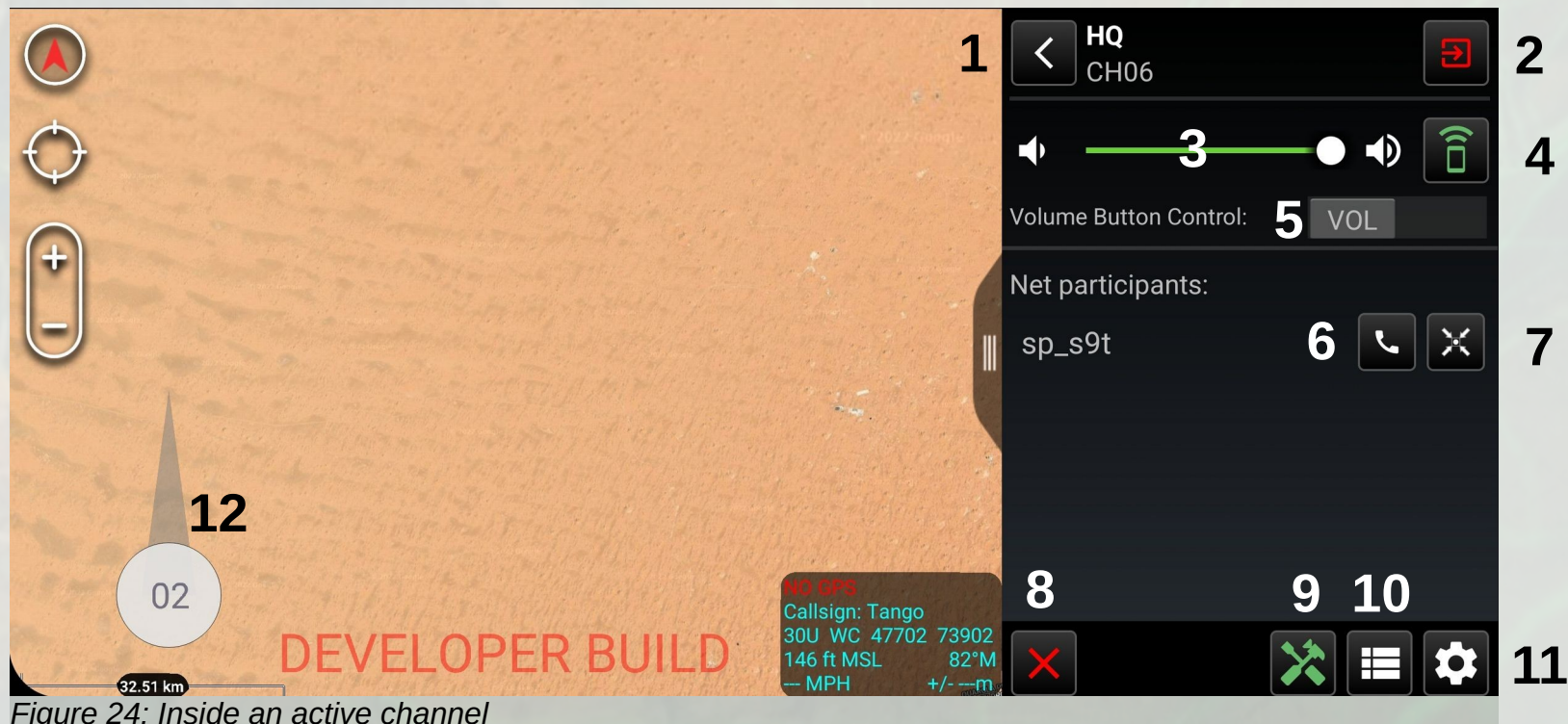
Once enabled, holding down either volume button will open the mic for PTT.

Active Channel

Key:

- 1 – Return to channel list (Will stay active in current channel & PTT will still be available)
- 2 – Exit Channel (Leaves active channel, removes PTT button and returns to channel list)
- 3 – Volume Slider Control
- 4 – Loudspeaker Output Control
- 5 – Volume Button Control (Volume/Map)
- 6 – Direct Call user

- 7 – Pan to user on map
- 8 – Exit plugin (will disconnect from channel & server)
- 9 – Get Well channel Mute toggle
- 10 – Back to channel list (Will stay active in current channel)
- 11 – Multicast Voice settings
- 12 – PTT button

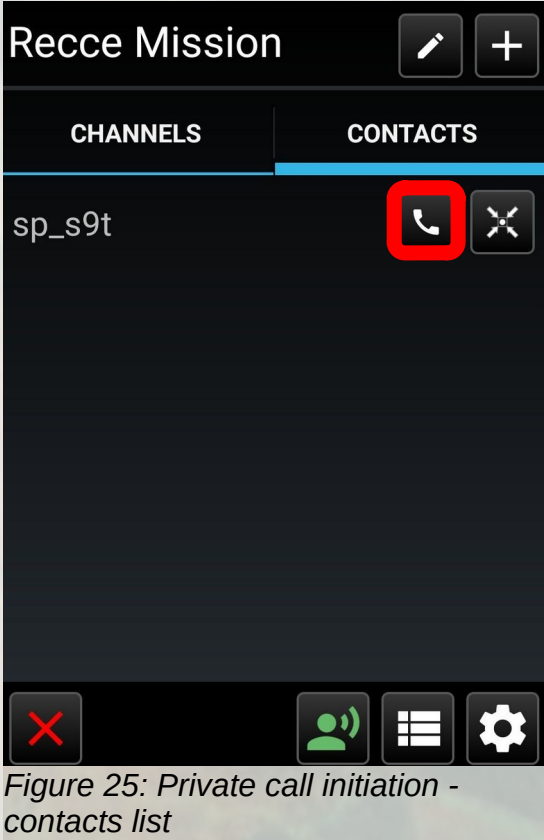


Private Calls

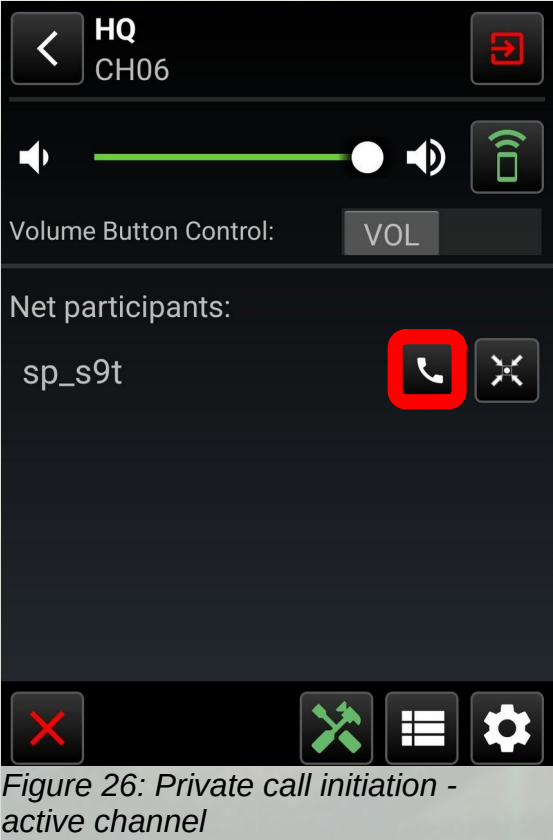
You can call users directly in a private call by Multicast or Mumble. This is subject to user availability, mission type and connection a mumble server.

You can call a user by 3 different methods:

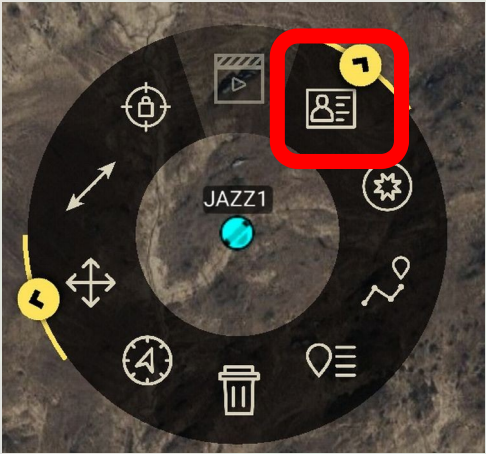
Select the phone button
(highlighted) next to the user you
want to call, then select call
method



Select the phone button
(highlighted) next to the user you
want to call in the channel, then
select call method



Select a users market and select
the contacts tab on the radial menu



Then select the Private Call button
(highlighted) then select call
method



Selecting Call Method

Once you have selected the call icon you will be prompted to choose a call method

Select the method you want to call the user

If a selection is greyed out it is because either you or the user cannot contact or be contacted via that method (see Multicast in Figure 21)

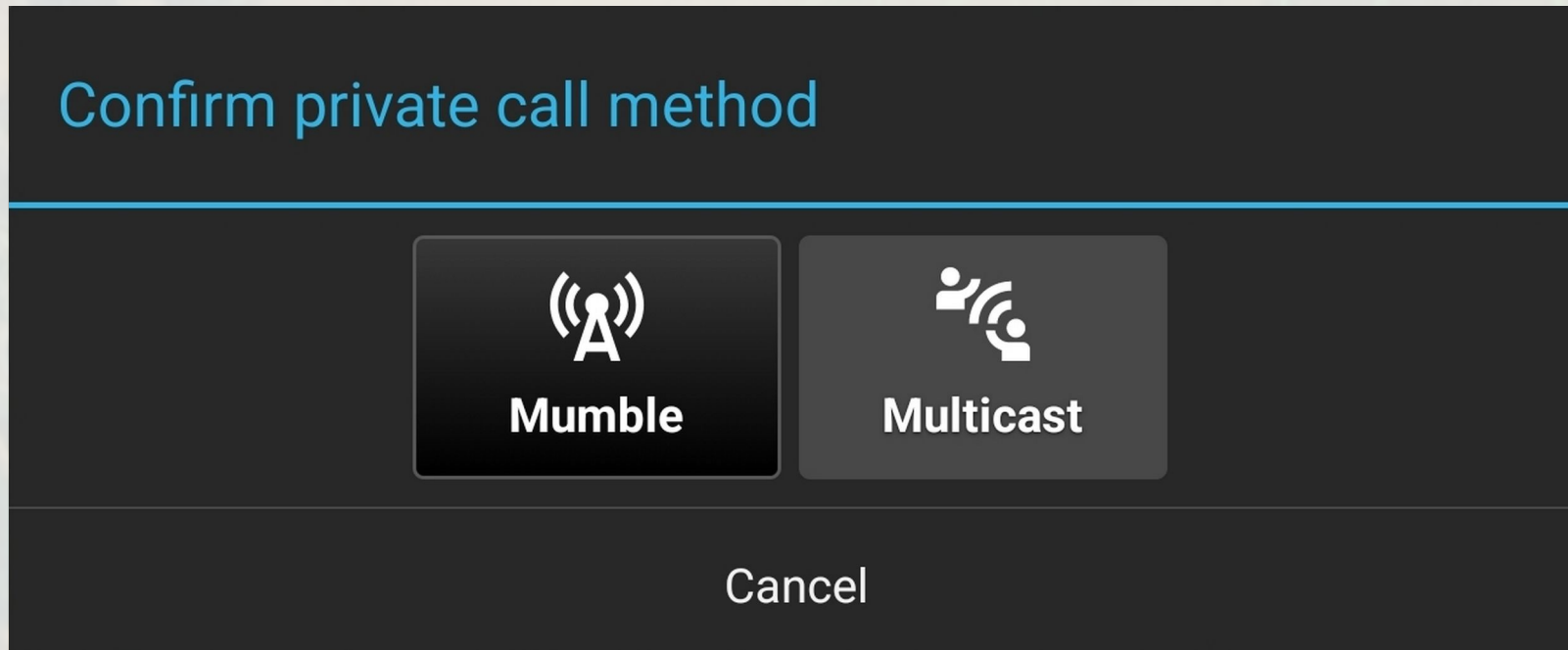


Figure 27: Private call method selection

Incoming Private Call

The user being called will be alerted using their ringtone or the phone vibration (however they have it set up in android)

You can answer or decline the call by 2 methods:

If the user is currently on ATAK this will pop up on the screen



Figure 28: Private call incoming within ATAK

Join/decline option within the notifications bar

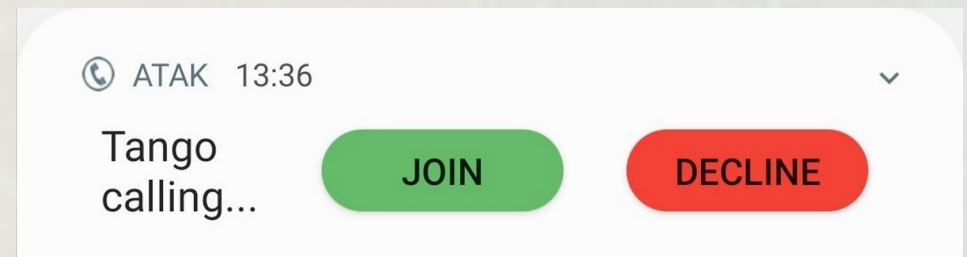


Figure 29: Private call incoming on Android 11 and older

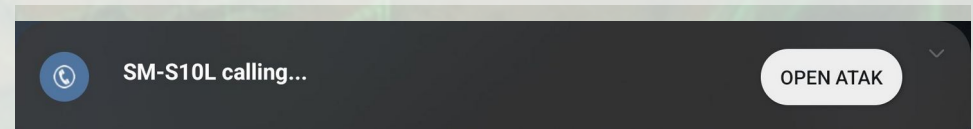


Figure 30: Private call incoming for Android 12 and later

Private call channel

If the user declines the call the user that initiated the call will get a pop-up of whether to re-join the channel they were in previously or leave the channel and go back to the channel list.

If the user accepts the call both users will be added into a private channel and the PTT icon will be updated (see Figure 25) to indicate this and the users can talk one-on-one.

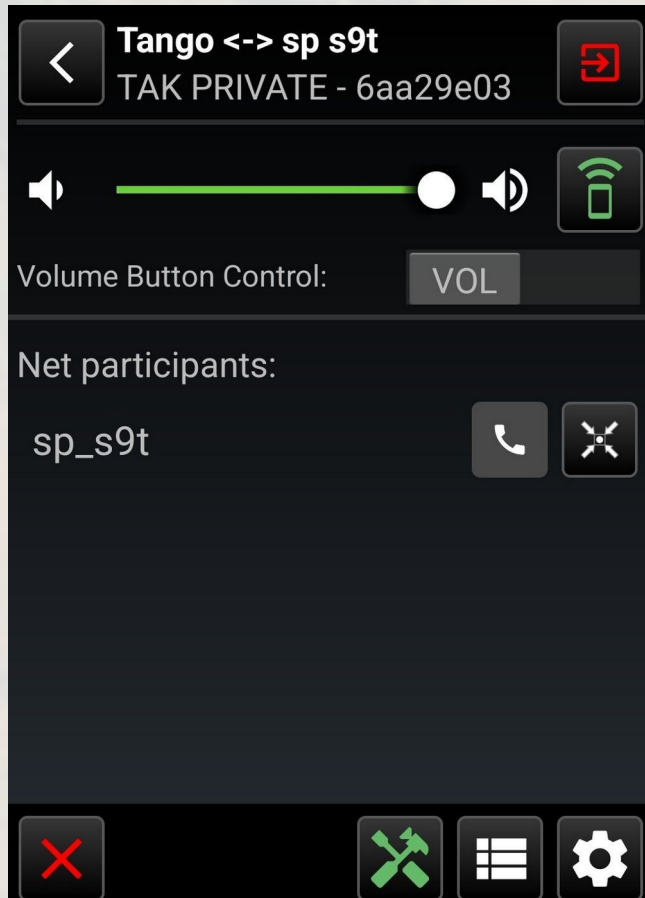


Figure 31: Private call interface

To end the call press the exit channel button

When one of the users ends the call both users will get a pop-up asking whether they want to re-join the channel they were in before taking the call, or leave and go to the channel list



Figure 32: Private call PTT button

User Lists

Each channel has a user list to see what users are in that channel and is able to hear and provide communication.

Mumble Channel User List

The mumble channel list will update whenever someone leaves or enters the channel or if you change to a different channel

Multicast Channel user List

The multicast channel user list refreshes proportional to the stale out value set in the preferences located here:

Settings/Tool Preferences/Specific Tool Preferences/Voice Preferences

Volume

The primary control for the volume is the Android “In-call” volume.

Within the plugin there is also a volume slider available within the channel you are using to communicate. This volume will be shared across all voice channels.

Speaker mode can be activated from within the plugin. When activated audio will be outputted through the phone’s loudspeaker. Speaker-phone mode should NOT be used when Voice users with their PTT/latch activated are within audible range of each other.

Receiving Audio

When audio is being received the PTT button will be highlighted with a red ring.

If audio is coming from a user that has a marker on the map then their marker will be highlighted with a dashed red line to indicate they are transmitting audio.

Mumble connection Dropping

If the connection to mumble is lost whilst in a mumble voice channel the PTT icon will show a dropped connection icon (see figure 28).

The plugin will attempt to reconnect ever 5 seconds.

During this period you will be unable to transmit voice or status tones over the network.

Once the plugin has reconnected you will be placed back into the same channel you were previously in.



Mumble Server

In order to ensure the security of your Mumble Server connection TLS is utilised to create a connection. Thereafter, voice data is sent using encrypted UDP packets. If required, TCP (and the TLS connection) can be used by enabling the Force TCP setting.

The Voice Plugin will only connect to Mumble Servers whose server certificate is trusted and contains the full certificate chain as the whole chain is validated.

To achieve this you must do one of the following (in order of preference):

1. Obtain a valid certificate for your Mumble Server from one of the Root Certificate Authorities (e.g. VeriSign, GoDaddy etc) which are trusted in Android by default;
2. Obtain a valid certificate for your Mumble Server from another Certificate Authority (e.g. your own) AND add their public certificate as a trusted CA certificate on your Android device;
3. Add the automatically generated self-signed certificate for your Mumble Server to the trusted User certificates on your Android device.

Share Missions

You are able to share created missions and their configured channels either as a data package to the TAK server or to certain users.

Share Via Data Package to Server

1. Go to the mission list & identify which mission you want to share
2. Select the “Send” button for that mission (See figure 28)
3. Select “Data Package” (See figure 29)
4. Press on which server you want to send it to
5. Ensure you get the “Successfully uploaded” toast (See figure 30)

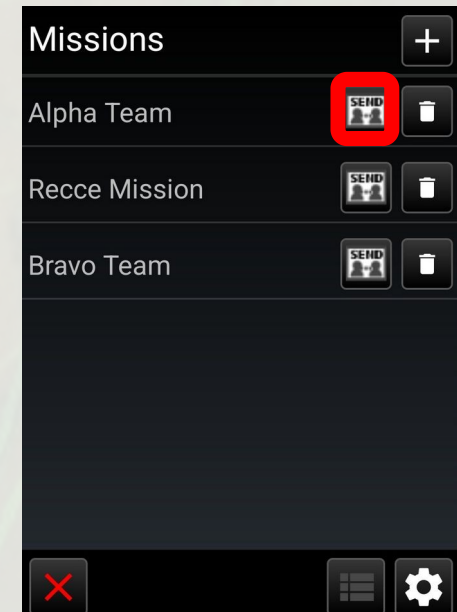


Figure 34: Mission List "Send" button

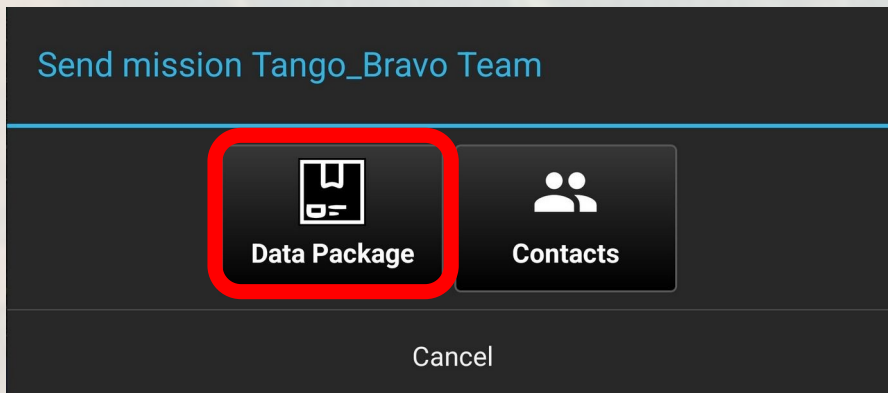


Figure 35: Select method of sending

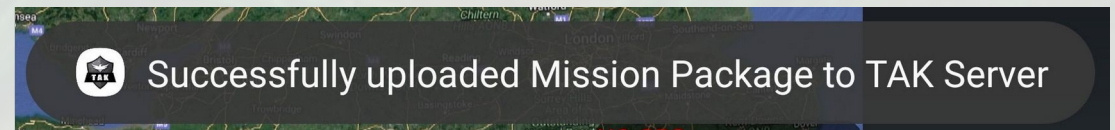


Figure 36: Successfully uploaded toast

Share directly to specified contact(s)

1. Go to the mission list & identify which mission you want to share
2. Select the “Send” button for that mission (See figure 28)
3. Select “Contacts” (See figure 32)
4. Select the contacts or groups
 1. Tick box at the top of the page is to “Select All”
 2. The name of colours (See figure 31, in this case Cyan) will forward to all contacts in that group
5. Select the send icon (Cloud with up arrow)
6. Ensure “Data Package sent” toast is pops up (Figure 33)

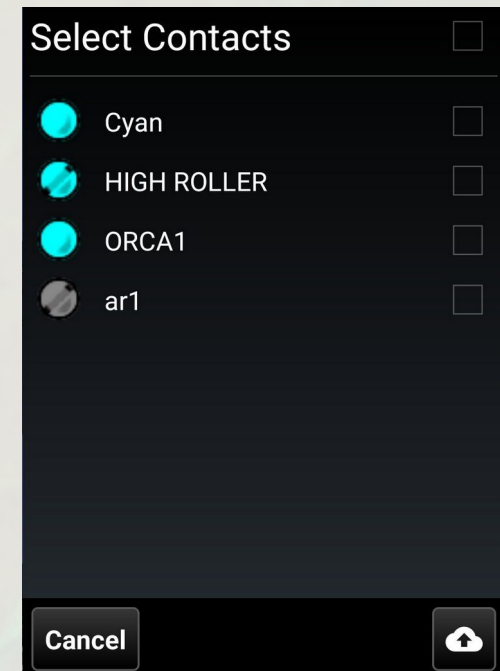


Figure 37: Select contacts to send to

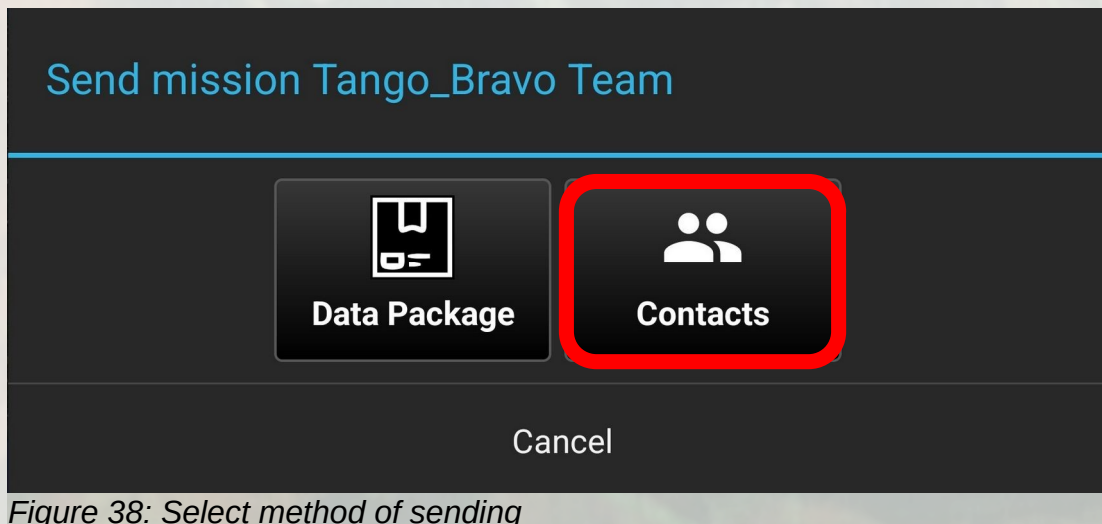


Figure 38: Select method of sending

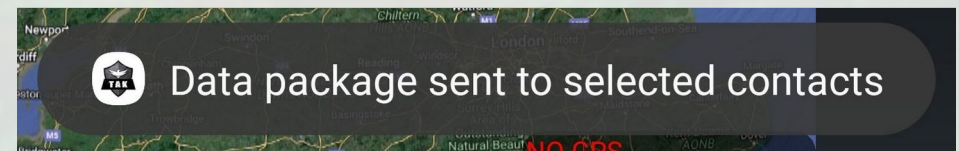


Figure 39: Successfully sent to contact(s) toast

Plugin Preferences

Preferences for the Voice plugin can be found under:

Settings/Tool Preferences/Specific Tool Preferences/Voice Preferences

Setting	Default Value	Description
Audio Quality	HIGH	Representation of bitrate and CPU power used for encoding recorded voice, higher values will use more bandwidth but will produce clearer voice data.
Mumble Host	N/A	The IP address or hostname of a mumble server.
Mumble Port	64738	The port of the mumble server.
Force TCP Connection	False	When enabled, all voice data is transmitted to the Mumble server over TCP rather than UDP.
Mumble Password	N/A	The password for the server you are trying to join (if appropriate) – if your server does not have a password then leave this field blank.
Clear Mumble Channel Passwords	N/A	This will clear all Mumble channel passwords stored on the phone.
Regenerate Mumble Certificates	N/A	When the plugin is first loaded a mumble client certificate will be automatically generated. Pressing this preference will discard that certificate and generate a new one. Depending on the configuration of the mumble server this may mean that your user account on the server will need to be reset or your callsign changed.

Set stale out time for the Multicast channels	15	The time it takes to detect whether other users are still in the same Multicast channel with you. The list will refresh every 1/3rd of the value inputted for this preference to detect users entering and leaving the channel. This also gives other users that may have disconnected, 3 windows (The full value of this preference) to re-ping the channel to indicate they are still in the channel.
Play Status Tones	True	Play tones on users joining/leaving the same channel as you or losing mumble connection.
Change Tone Volume	50%	The volume of the tone played when a user enters/leaves the same channel as you or losing mumble connection. Selecting a place on the slider will preview the new tone volume.
Send tones over RTP when in an RTP multicast channel	False	Send tones over the voice channel rather than as data packets. Used when sending tones to non-Voice plugin users.
Use Floating Push To Talk Button	True	Use the floating push to talk button instead of ATAK map widget button. This allows the PTT button to be dragged around the screen to the desired location.
Configure Hardware Volume PTT Buttons	Disabled	Allows volume up/down buttons to be configured as PTT buttons.
Assign Bluetooth Push To Talk Buttons	N/A	If you have an external button connected to the phone, it will be detected and listed on a pop-up. By selecting an external button, it will be unassigned to any plug-ins that it is connected to (if any), and will be used in the Multicast Voice plug-in instead.

Push To Talk buttons latch on double press	True	With this preference set to true, any external push to talk devices will toggle the microphone open or closed when double pressed.
User Guide	N/A	Opens this user guide in new window.
Export plugin preference	N/A	Export current plugin preference settings to a file. This will not export passwords or certificates.
View change log	N/A	This opens a dialog that shows notable changes implemented on the plugin since release.

Known Issues:

Issue	Cause	Workaround
Interference heard over multicast voice app.	Multiple users talking at once or have latched open the mic.	Single user should be broadcasting at any time.
Echo between multicast voice handsets	Multiple users within audible range of each-other with PTT on at the same time.	Single user within close range should have PTT active at a time. Use a headset. Reduce output volume. Do not use speaker-phone mode in close proximity.
Intermittent voice reception.	Networking hardware built into device.	Prevent screen from turning off using TAK setting "Disable Screen Saver / Screen Lock". Issue not present on Tactical Edition.
Plugin can not load on Samsung Galaxy Tab 2	Incompatibility with 32bit CPUs	An alternative, 64bit, device must be used.
Voice cannot share to versions of Voice that is older than 1.4.0	Incompatibility with older versions	Update Voice to the latest version.

Contact Details

Contact this email if you require support or would like to submit a bug report: t1swdev@outlook.com

Please note, this email will not be monitored on a daily basis and we will not be able to take action on all requests.