VBS Radio

VBS4 24.1.1

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The BISim Wiki is the primary resource on VBS4 scripting:

https://sqf.bisimulations.com/display/SQF/VBS+Scripting+Reference

PhysX

VBS4 uses the PhysX physics engine. For more information on PhysX visit the Nvidia site.

https://gameworksdocs.nvidia.com/simulation.html

Contents

1. VBS Radio Overview

VBS Radio simulates radio and other communication within VBS4 and as part of larger cross-product integrations.

Before using VBS Radio, review VBS Radio Concepts and to understand the terminology and infrastructure of VBS Radio.

VBS4 includes a free version of VBS Radio, with certain limitations. VBS Radio Pro is available with separate licenses and provides more features and functionality. For more information, see VBS Radio Licensing.

To see how VBS Radio Pro works, watch the video at https://www.youtube.com/watch?v=tPj-oqwo3mY.

> **NOTE**
> Videos may not show the latest versions of the features they demonstrate.

To setup and use VBS Radio, use the following process:

1. Start VBS4 as an Administrator with VBS Radio enabled, and use VBS Editor to setup the Communication Channels and Radio Types for your mission.

   See Setting Up VBS Radio (on page 12).

2. If necessary, make adjustments to Direct Talk, volume, and other settings in the configuration `.xml` file.

   See VBSRadioSettings Configuration File (on page 39).

3. Setup any radio jamming required for the scenario.

   See Radio Jamming Device (on page 43).

4. The Administrator and Trainees use VBS4 to start and join a networked mission with VBS Radio enabled by default. Optionally, use the **Advanced > Radio** tab in VBS Launcher to specify standalone Pitch Servers or Multicast.

   See Starting VBS Radio (on page 50).

5. Units in the mission communicate using the assigned Radio Types and Communication Channels.

   See Using VBS Radio (on page 58).

6. Instructors running the mission can monitor and communicate on all channels using the VBS Radio Control panel.

   See Monitoring VBS Radio (on page 67).

7. Non-VBS users can communicate with users in a VBS Radio scenario using a separate client application.

   For more information, see VBS Radio Standalone (on page 89).

8. After a mission ends, radio usage is available for review as part of an After Action Review (AAR) recording.

   See VBS Radio Playback in AAR (on page 87).

Review VBS Radio Troubleshooting (on page 95) if you encounter issues while using VBS Radio.

FEATURE NOTICE

VBS Radio uses Pitch Talk, created by Pitch Technologies, as its communication and networking layer. Pitch Talk uses Pitch pRTI as its infrastructure for the networking layer which is an implementation of the HLA 1516-2010 communication standard. VBS Radio also includes the Pitch DIS Gateway implementation to enable integrated communication with products that use the DIS communication standard.

For more information about Pitch Talk, see http://pitchtechnologies.com/products/talk/.

1.1 VBS Radio Concepts

VBS Radio enables communication using the following concepts:

- **Radio Types**

  Radio Types represent the capabilities of physical communication devices, defining the parameters of a radio system, such as the number of channels, range, and bandwidth.

- **Communication Channels**

  VBS Radio uses Communication Channels to provide the following types of communication:

  - **VoIP Networks**

    Voice over IP (VoIP) networks can be used for exercise control communication.

    > **NOTE**
    > Distance degradation and Jammer effects are not available for VoIP Networks.

  - **Radio Channels**

    Radio Channels have frequency assignments and are used to simulate radio communication, including distance-based degradation and Jammer effects.

  - **Vehicle Intercom Mode**

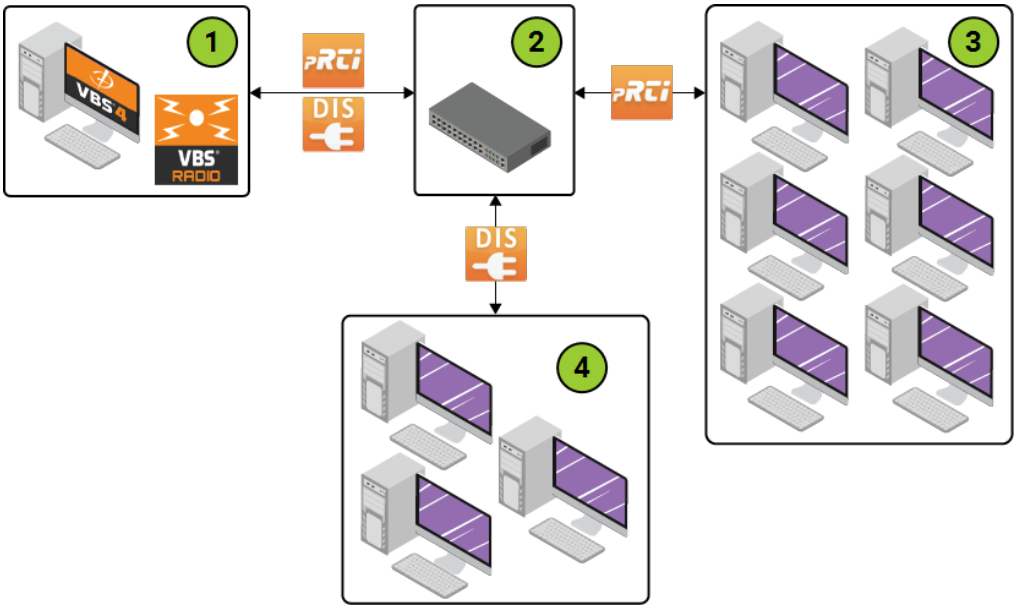
    Vehicles can be assigned a Vehicle Intercom Mode (PTT / VOX) for communication between the crew, see Advanced Settings and Presets (on page 31).

  - **Global Text Network**

    Players can communicate by text using the Radio Messenger dialog, see Communications Panel (on page 61).

1.2 VBS Radio Architecture

VBS Radio consists of several components across several computers on the network.



No.	Computers	Description
1	**Admin Client / Dedicated Server**	The computer hosting the VBS4 mission, running VBS Radio in Server Mode, the Pitch Talk Admin Server, and the optional Pitch DIS Gateway.
2	**Router / Switch**	Shared network infrastructure.
3	**User Clients**	The trainee computers connected to the VBS4 mission, running VBS Radio in Client Mode, communicating with the host using Pitch pRTI.
4	**DIS Products**	**Optional:** Other simulation products using the DIS protocol, communicating with the host using Pitch DIS Gateway.

VBS Radio Component

VBS Radio is a core component of VBS4, which enables mission designers to define Radio Types, and Communication Channels, and save them as part of a VBS4 mission. The component communicates with the Pitch Talk Admin Server about the communication setup.

Pitch Talk Admin Server

The Pitch Talk Admin Server runs on the computer hosting the VBS4 mission by default, or on a separate dedicated machine, and manages communication between VBS4 clients using Pitch pRTI.

Pitch DIS Gateway

Pitch DIS Gateway is an optional application that connects to Pitch pRTI and translates the HLA protocol communication to the DIS protocol, to enable integrated communication with DIS-compliant products.

1.3 VBS Radio Licensing

VBS4 includes VBS Radio as standard, which provides out-of-the-box communication functionality.

FEATURE NOTICE

VBS Radio Pro may be subject to additional licensing. For more information, contact sales@bisimulations.com.

The base version of VBS Radio has the following limitations:

- VBS4 is limited to five Radio Channels which are pre-defined as defaults in VBS4, and cannot be changed.

  NOTE

  The preset Radio Channel frequencies are restricted to VHF bandwidths only.

- VoIP networks that are pre-configured as defaults, and cannot be changed.

VBS Radio Pro provides the following additional capabilities:

- Creation of Radio Types with custom parameters.
- Unlimited channels. The Administrator can create any amount of channels, and choose any frequency for them.
- Radio Types can be assigned to any group of units. This means that:
  - Trainees can speak on one channel and also monitor audio on other channels.
  - Trainees can switch between radios in 1st / 3rd person view, enabling them to quickly communicate on multiple frequencies.
- HF and UHF frequencies are available in addition to VHF. Radio Types can be configured to support any of these frequency bands.
- Individual Communication Channel monitoring using Left and Right output channels.
- Simulation of weather degradation.

VBS Radio Standalone (on page 89) is a separate product, available on an additional per-seat license basis. It enables non-VBS users to communicate with participants in a VBS Radio scenario.

FEATURE NOTICE

For more information about VBS Radio Standalone, contact sales@bisimulations.com.

2. Setting Up VBS Radio

Set up VBS Radio as part of your mission design process using the VBS Editor in Prepare Mode.

VBS Radio enables vehicles, units, and groups to communicate with each other.

TIP

Add these objects to the scenario before configuring VBS Radio.

Access **Radio Admin** from the VBS Editor Tools Menu.

WARNING

This menu option is not accessible in Execute Mode.

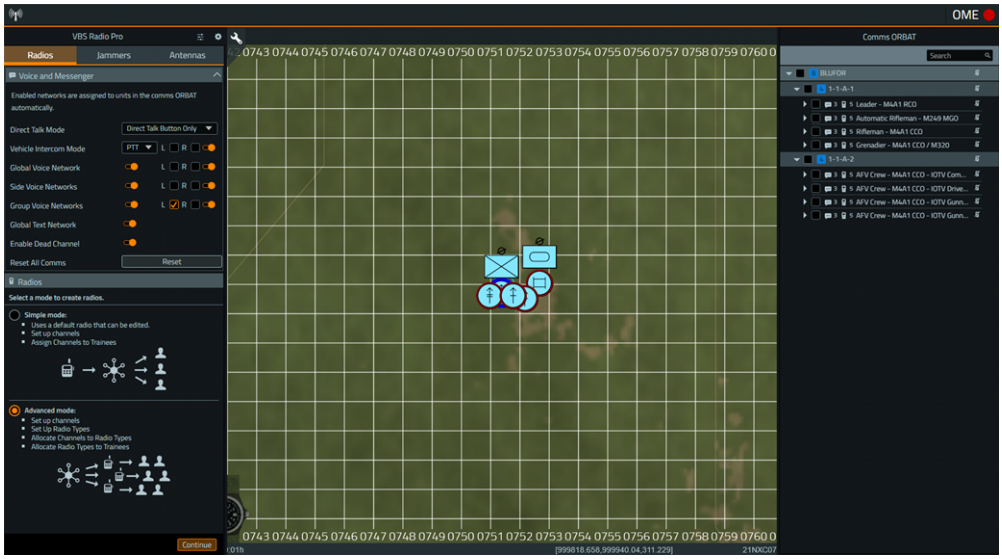
Follow these steps:

1. Start VBS4 as the Administrator:
   - In VBS Launcher, select **-admin** in the Client tab.
   - In a command-line, start VBS4 using the `-admin` parameter.

   NOTE

   VBS Radio is enabled by default.
2. Select a **Battlespace** and in the Battlespace Functions panel, select **Editor** then **Create**.

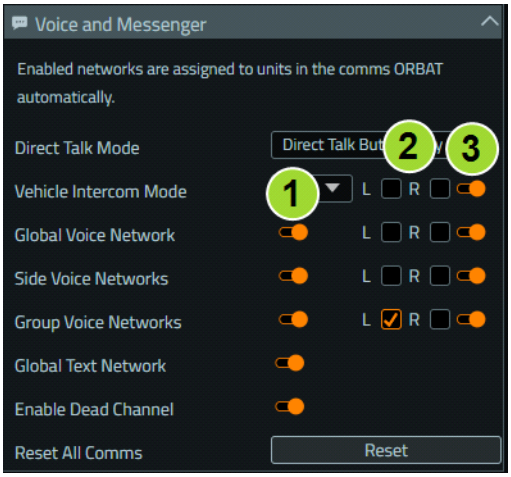
   The VBS Editor opens in Prepare Mode.
3. Go to **Tools > Radio Admin** to open the VBS Radio UI.



4. Setup the **Voice and Messenger** settings.

Setting	Description
Direct Talk Mode	Use the drop-down select the Direct Talk Mode for your scenario. Direct Talk simulates natural speech, by allowing users to hear others who are in close proximity. Select from the following options: • Off (Default) • Direct Talk Button Only • VOX • With Radio Transmissions • With VoIP Transmissions • With Radio / VoIP Transmissions
Vehicle Intercom Mode	Use the drop-down to select from the following intercom options for communication within vehicles: • Off • PTT • VOX
Global Voice Network	Click to enable / disable the Global Voice Network.
Side Voice Networks	Click to enable / disable the Side Voice Networks.
Group Voice Networks	Click to enable / disable the Group Voice Networks.
Global Text Network	Click to enable / disable the Global Text Network.
Enable Dead Channel	Click to enable / disable the Dead Channel.
Reset All Comms	Click **Reset** to return VBS Radio to its default state: • Removes all custom Radio Types and assignments. • Removes all custom Channels and assignments. • Resets all VBS Radio settings.
Switches and Default Monitoring	For more information, see Switches and Default Monitoring (on the next page).

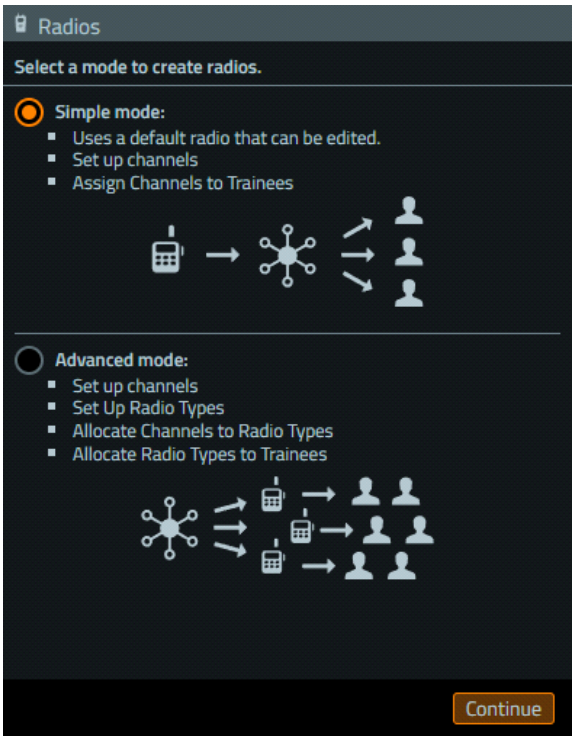
Switches and Default Monitoring



	Feature	Description
1	**Network Enable Switches**	Click to enable / disable VoIP Networks for all units in the mission.
2	**Default Monitoring**	Select **L** (Left) / **R** (Right) to set the initial left / right ear monitoring of a channel at the start of a mission.
3	**Default Power Switches**	Click to enable / disable Default Power (enabled by default). If a switch is enabled for a specific channel, that channel is powered on at mission start.

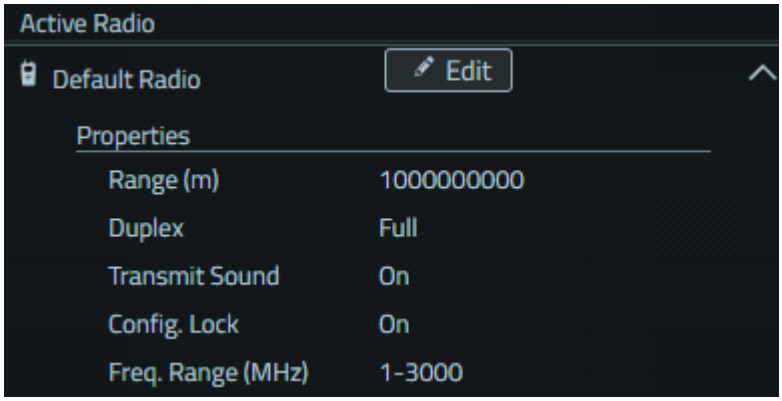
2.1 Modes

The first time that you open the VBS Radio UI, information about the capabilities of **Simple Mode** and **Advanced Mode** is displayed in the **Radios** section.



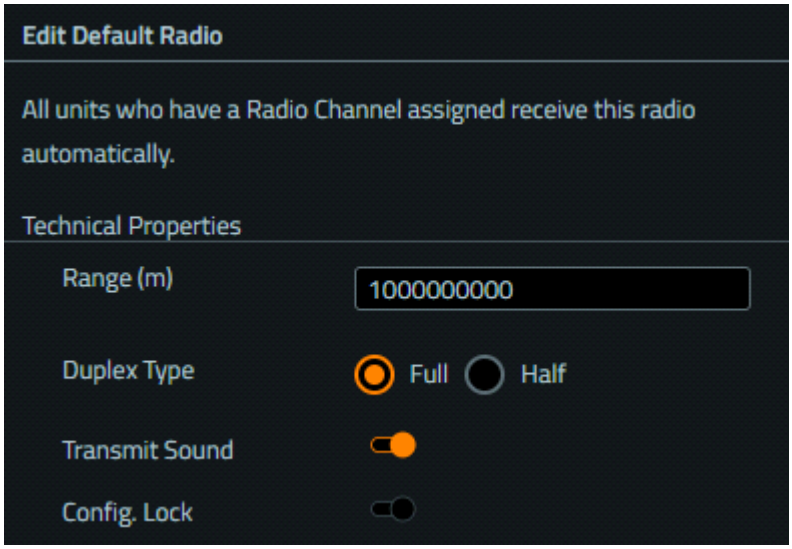
Follow these steps:

1. Click **Continue** to open the Active Radio and Available Channels lists.
2. In the Active Radio section (in **Simple Mode**), click the **down arrow** to see the properties of the Default Radio.



3. **Optional:** Click the **Edit** button to make changes to the Default Radio settings.

   The Edit Default Radio panel opens.



4. Click **Save** to save the changes, or **Cancel** to discard them.
5. Use the Radio Admin Settings to do the following:

   Simple Mode:

   - Assign Channels and Radio Types (on page 27)

   Advanced Mode:

   - Configure Communication Channels (on page 18)
   - Configure Radio Types (on page 22)

     FEATURE NOTICE
     New Radio Types can only be created using VBS Radio Pro.

   - Assign Channels and Radio Types (on page 27)

   Optional:

   - Advanced Settings and Presets (on page 31)
6. Click the **spanner** icon at the top-right of the VBS Radio Pro panel to exit VBS Radio setup.

7. Click the **Main Menu** in the VBS4 Toolbar, and under **Battlespaces** select one of the following options:
    - **Save** - Saves changes into the currently open Battlespace.
    - **Save As** - Creates a new Battlespace, or overwrites the existing one, based on the name you enter in the dialog.
8. If your mission requires communication with other DIS-compliant radio products, see Configure DIS (on page 37).

The mission is ready to use for VBS Radio communication.

2.2 Configure Communication Channels

VBS Radio provides various Communication Channels, including five default Radio Channels with fixed VHF frequencies, three VoIP Networks (Global, Side, Group), and a Global Text Network. If necessary, you can create custom Radio Channels if you want to use specific radio frequencies.

> **NOTE**
>
> VoIP Networks cannot be configured, only switched on and off. When switched on, they are applied to all units in the scenario at the start of the mission.

The VBS Radio UI enables you to do the following:

- Create Radio Channels (below)
- Edit Radio Channels (on page 20)
- Delete Radio Channels (on page 21)

These functions are available in both **Simple Mode** and **Advanced Mode**.

To assign Communication Channels to units or groups, see Assign Channels and Radio Types (on page 27).

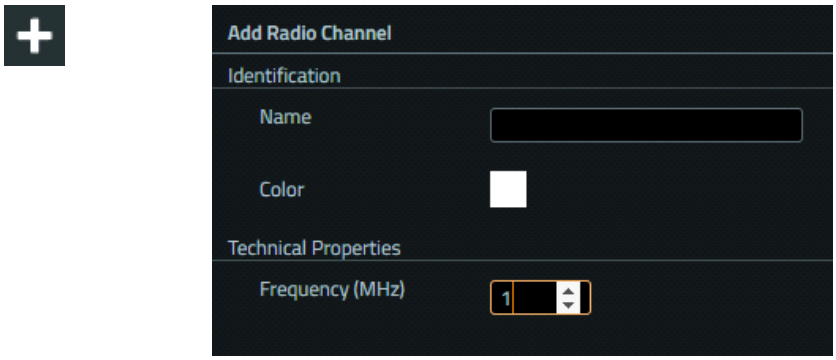
2.2.1 Create Radio Channels

Create Radio Channels using the VBS Radio UI.

> **FEATURE NOTICE**
>
> This feature is part of VBS Radio Pro, a licensed product. For more information, contact sales@bisimulations.com.

Follow these steps:

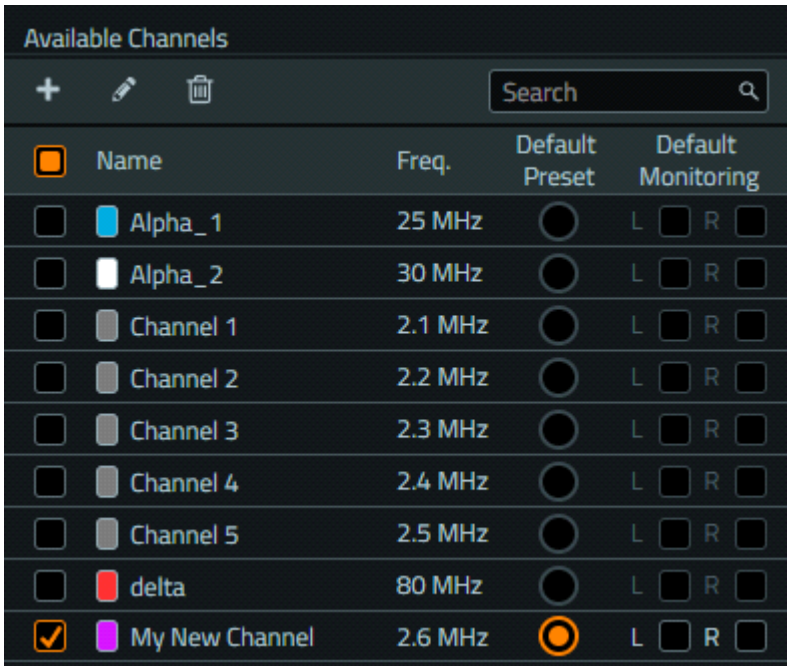
1. In the VBS Editor, go to **Tools > Radio Admin** to open the VBS Radio UI.
2. In **Radios**, select **Simple Mode** or **Advanced Mode**, and click **Continue**.
3. Click the **plus** icon to open the **Add Radio Channel** panel.



4. Fill-in the properties.

Property	Description
Name	Enter a name for the channel.
Color	Select a color for the channel using the color picker, and click **OK**.
Frequency (MHz)	Enter a frequency for the channel.

5. Click **Save** to add your new radio channel to the Available Channels list.
6. Select **boxes** in the first column to select the channels you want to use in your mission.



7. **Optional:** To change the Default Preset channel, click a radio button in the **Default Preset** column, in the row of the channel you want to be the Default Preset.
8. **Optional:** Select the **L** (Left) / **R** (Right) options to set the initial left / right ear channel Default Monitoring at the start of a mission.

For monitoring of radio channels during a mission, see Monitoring VBS Radio in the VBS4 Instructor Manual.

2.2.2 Edit Radio Channels

Modify Radio Channels in the **Radios** section of the VBS Radio UI.

> **WARNING**
> The default Radio Channels are not editable.

Follow these steps:

1. In the VBS Editor, go to **Tools > Radio Admin** to open the Radio Admin Settings dialog.
2. In the **Radios** section, select **Simple Mode** or **Advanced Mode**, and click **Continue**.
3. In the channels list, check the **box** next to the Radio Channel you want to edit.
4. Click the **edit** icon.

5. In the **Add Channel** panel, modify the properties, as required.

Property	Description
Name	Enter a name for the channel.
Color	Select a color for the channel using the color picker, and click **OK**.
Frequency (MHz)	Enter a frequency for the channel.

6. Click **Save**.

The Radio Channel properties are updated.

> **TIP**
> You can also edit Default Presets / Power / Frequency / Monitoring L (Left) / R (Right) properties after a radio has been assigned to a unit. For more information, see Override Assigned VBS Radio Properties (on page 30).

2.2.3 Delete Radio Channels

Delete Radio Channels in the **Radios** section of the VBS Radio UI.

FEATURE NOTICE

Default Radio Networks can only be deleted using VBS Radio Pro.

Follow these steps:

1. In the VBS Editor, go to **Tools > Radio Admin** to open the VBS Radio UI.
2. In **Radios**, select **Simple Mode** or **Advanced Mode**, and click **Continue**.
3. In the channels list, check the **box** next to the Radio Channel you want to delete.
4. Click the **trash** icon.

The Radio Channel is removed from the channels list.

NOTE

To save your VBS Radio configuration as part of a mission, exit the VBS Radio UI, click the **Main Menu** in the VBS Editor, and select one of the following options under **Battlespaces**:

- **Save** - Saves changes into the currently open Battlespace.
- **Save As** - Creates a new Battlespace, or overwrites the existing one, based on the name you enter in the dialog.

2.3 Configure Radio Types

Radio Types are a combination of radio device properties and Communication Channels set up to define specific radio devices, which are then assigned to units in a scenario.

NOTE

Radio devices themselves are not present as physical objects in VBS4, but Trainees have access to their settings during a mission.

You can create custom Radio Types, or edit existing ones.

FEATURE NOTICE

Custom Radio Types are only available in VBS Radio Pro, a licensed product. For more information contact sales@bisimulations.com.

NOTE

There is a default Radio Type which is not directly assigned to units. When you assign a channel to a unit in Simple Mode, the default Radio Type is automatically assigned to that unit. It cannot be edited or deleted.

The VBS4 Radio UI enables you to do the following:

- Create Radio Types (on the next page)
- Edit Radio Types (on page 25)
- Delete Radio Types (on page 26)

To assign Radio Types to units, see Assign Channels and Radio Types (on page 27).

NOTE

To save your VBS Radio configuration as part of a mission, exit the VBS Radio UI, click the **Main Menu** in the VBS Editor, and select one of the following options under **Battlespaces**:

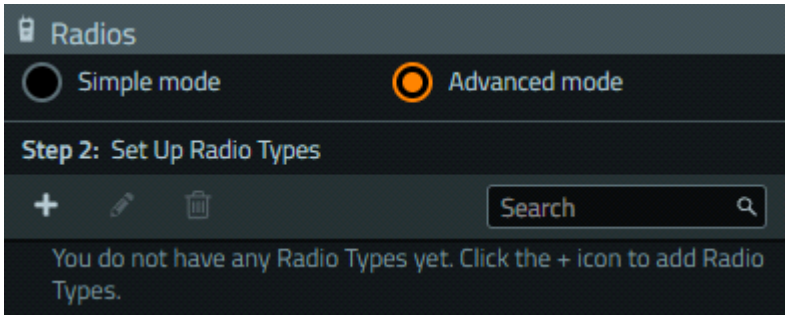
- **Save** - Saves changes into the currently open Battlespace.
- **Save As** - Creates a new Battlespace, or overwrites the existing one, based on the name you enter in the dialog.

2.3.1 Create Radio Types

Create custom Radio Types using **Advanced Mode** in the VBS4 Radio UI.

Follow these steps:

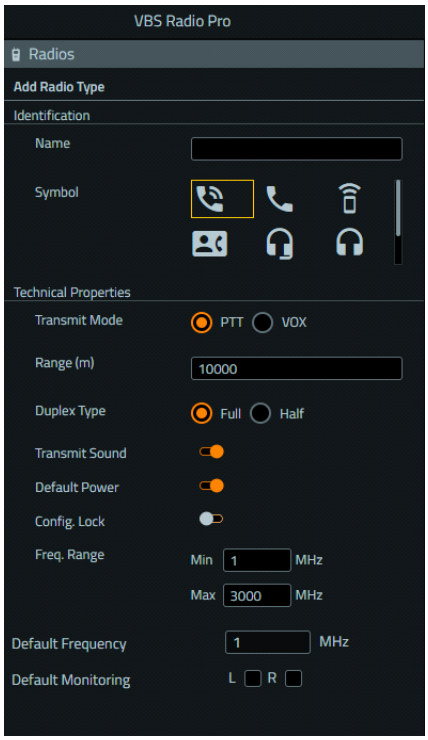
1. In the VBS Editor, go to **Tools > Radio Admin** to open the VBS4 Radio UI.
2. In **Radios**, click **Advanced Mode**, and then **Continue**.
3. Click the **Radio Types** button at the bottom of the **Radios** tab to open the **Set Up Radio Types** panel.



4. Click the **plus** icon to open the **Add Radio Type** panel, and configure the Radio Type properties (see Radio Type Properties (on the next page)).

Config. Lock enabled

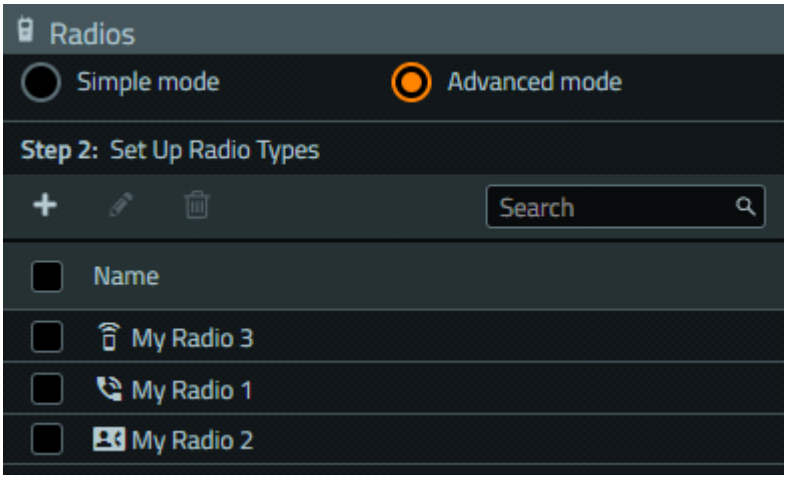
Config. Lock disabled



5. Select the Communication Channels you want to be available for the Radio Type you are creating.

6. **Optional:** Configure the Default Preset and Default Monitoring options for your selected channels. For more information, see Configure Communication Channels (on page 18).
7. Click **Save**.

Your new Radio Type is added to the list in **Set Up Radio Types**.



Radio Type Properties

Configure the following properties for specific radios.

Property	Description
Name	Enter a name for the Radio Type, as you want it to appear in the Radio UI.
Symbol	Click a **symbol** to specify a unique icon for the Radio Type. This is displayed next to units assigned with the Radio Type in the Assigned Units panel.
Transmit Mode	Select either the **PTT** (Push to Talk) or **VOX** (Voice-Operated Exchange) format. **WARNING** Combining VOX with Half-Duplex (see **Duplex Type**) is not supported.
Range (m)	Enter the communication range, in meters.

Property	Description
Duplex Type	Select **Full** to enable simultaneous broadcast and reception, or **Half** to block reception while broadcasting. If you broadcast using a Half-Duplex radio profile, you are not able to hear incoming transmissions on that radio. If you are receiving a transmission on a Half-Duplex radio profile, you are not able to broadcast on that radio - pressing PTT changes the HUD icon to **red**, instead of showing the broadcasting indication. **WARNING** Combining Half-Duplex with VOX (see **Transmit Mode**) is not supported.
Transmit Sound	Select whether to play a sound when PTT is pressed. The default sound may be replaced with an alternative `beep.wav` file: `\VBS_Installation\components\VBSPitchRadio\beep.wav`
Default Power	Click to switch the Default Power on / off.
Config. Lock	Select **Config. Lock** to enable direct Radio Channel selection for the user. Disable **Config. Lock** to require VBS Radio users to input the channel frequency to use.
Freq. Range	Available if the **Config. Lock** switch is disabled. Enter a Minimum and Maximum frequency range. Limits the frequency range for the radio, which can be used in the mission.
Default Frequency	Available if the **Config. Lock** switch is disabled. Sets the initial frequency shown at the start of the mission.
Default Monitoring	Available if the **Config. Lock** switch is disabled. Select options **L** (Left) / **R** (Right) to set the initial left / right ear monitoring of a given channel at the start of a mission.

2.3.2 Edit Radio Types

Modify existing Radio Types.

Follow these steps:

1. In the VBS Editor, go to **Tools > Radio Admin** to open the VBS4 Radio UI.
2. In **Radios**, click **Advanced Mode**.
3. In **Set Up Radio Types**, check the **box** next to the Radio Type you want to edit.

4. Click the **edit** icon to open the **Edit Radio Type** panel.

5. Modify the properties, and click **Save**.

The modified Radio Type is saved.

TIP

You can also edit Default Presets / Power / Frequency / Monitoring L (Left) / R (Right) properties after a radio has been assigned to a unit. For more information, see Override Assigned VBS Radio Properties (on page 30).

2.3.3 Delete Radio Types

Delete existing Radio Types.

NOTE

The default Radio Type cannot be deleted.

Follow these steps:

1. In the VBS Editor, go to **Tools > Radio Admin** to open the VBS4 Radio UI.
2. In **Radios**, click **Advanced Mode**.
3. In **Set Up Radio Types**, check the **box** next to the Radio Type you want to delete.
4. Click the **trash** icon.

The Radio Type is deleted and removed from the list.

2.4 Assign Channels and Radio Types

To enable units to communicate during a mission, assign Radio Types to them.

> **NOTE**
>
> It is only possible to assign Radio Channels and Radio Types to playable units.
>
> Assign Radio Types supporting at least one shared Communication Channel to multiple units to enable them to communicate with each other.

> **NOTE**
>
> To save your VBS Radio configuration as part of a mission, exit the VBS Radio UI, click the **Main Menu** in the VBS Editor, and select one of the following options under **Battlespaces**:
>
> - **Save** - Saves changes into the currently open Battlespace.
> - **Save As** - Creates a new Battlespace, or overwrites the existing one, based on the name you enter in the dialog.

Follow these steps:

1. In the VBS Editor, go to **Tools > Radio Admin** to open the VBS Radio UI.
2. In **Voice and Messenger**, use the switches to enable / disable the VoIP networks for all players in the scenario.

   > **NOTE**
   >
   > **Side Voice Networks** is enabled by default (**orange**).

3. In **Radios**, do one of the following:
   - Assign Radio Channels to Units (below)
   - Assign Radio Types to Units (on the next page)
   - Assign Radio Channels to Radio Types (on the next page)

Assign Radio Channels to Units

a. Click **Simple Mode**, and check the **box** next to the channel you want to assign to the units.

b. In the **Comms ORBAT** panel, check the **boxes** next to the units you want to assign the Radio Channel to. Alternatively, click **Select All** to apply the Radio Channel to all units in the scenario.

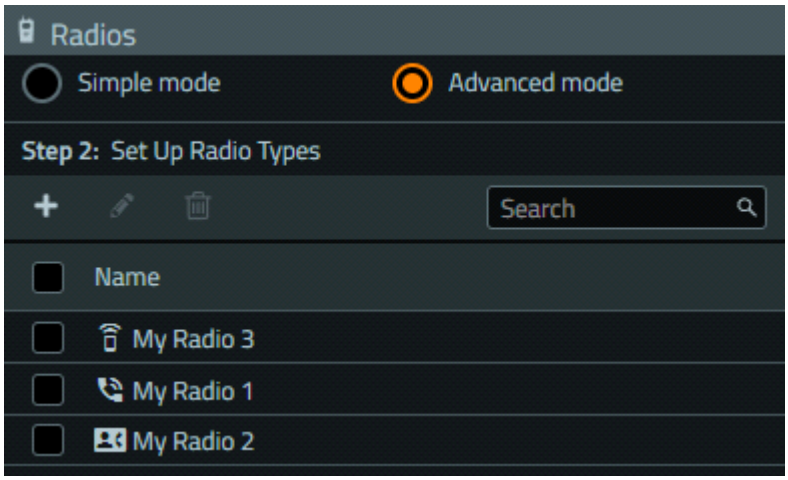
c. Click **Assign**.

The Radio Channel is assigned to the selected units.

Assign Radio Types to Units

a. Click **Advanced Mode**, and click **Continue**.

b. In **Set Up Radio Types**, check the **box** next to the Radio Types you want to assign to the units.



c. In the **Comms ORBAT** panel, check the **boxes** next to the units you want to assign the Radio Type to.

d. In the **Radios** panel, click **Assign**.

The Radio Type is assigned to the selected units, and the symbol you selected in Create Radio Types (on page 23) is displayed next to the unit names that have the Radio Type assigned.

Assign Radio Channels to Radio Types

Do one of the following:

- Assign Radio Channels during Radio Type creation, see Configure Radio Types (on page 22).
- Assign Radio Channels during Radio Type editing, in **Channels** in the Edit Radio Type panel, see Edit Radio Types (on page 25).

> **NOTE**
> If you have two or more Radio Types with the same Channel assigned, units assigned the different Radio Types can communicate using the shared Channel.

2.4.1 Unassign Radio Types

Radio Types can be unassigned from units or Radio Channels. Do one of the following:

- **Unassign from Units**

  Follow these steps:

  1. Go to the **Comms ORBAT** panel (right panel).
  2. Expand the ORBAT structure to view the units to unassign.
  3. Click the **unassign** icon next to unit name.

  The Radio Type is unassigned from the unit.

- **Unassign from Radio Channels**

  Follow these steps:

  1. Select **Advanced Mode**, and click **Continue**.
  2. Click **Radio Types** at the bottom of the VBS Radio Pro UI.
  3. In **Set Up Radio Types**, check the **box** next to the Radio Type you want to edit.
  4. Click the **edit** icon.

  5. In **Channels**, uncheck the Radio Channels you want to unassign, and click **Save**.

The Radio Types are unassigned from units / Radio Channels.

2.4.2 Override Assigned VBS Radio Properties

The following properties can be changed for assigned radios at any time, meaning that you can override the properties you configured to be present at the start of the mission:

- Default Presets
- Default Power
- Default Frequency
- Default Monitoring L (Left) / R (Right)

Follow these steps:

1. In the **Comms ORBAT** panel, click the **arrow** next to a unit to show the radio / channel properties for that specific unit.

2. Make any changes.

An information icon shows in front of the radio you made changes to.

EXAMPLE

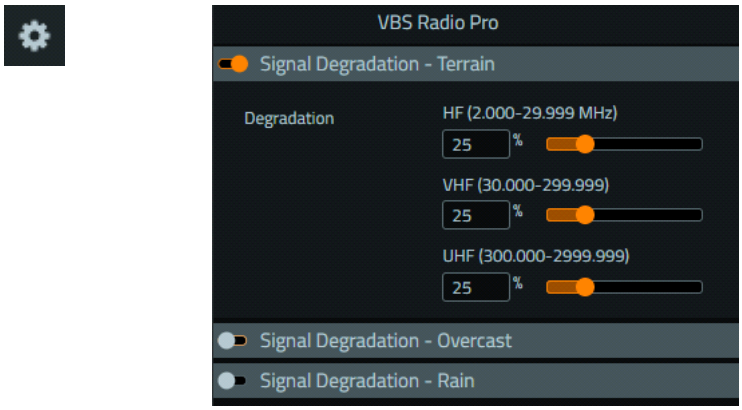
To revert your changes, click the **Information icon**.

2.5 Advanced Settings and Presets

Advanced Settings enable Administrators to import channels from older versions of Radio, and apply Degradation (on page 33) settings.

Follow these steps:

1. In Prepare Mode, go to **Tools > Radio Admin** to open the VBS Radio UI.
2. Click the **settings** icon to open the Advanced Settings panel, and adjust the settings.



3. Adjust the **Signal Degradation** settings.

Setting	Description
Terrain / Overcast / Rain	Click the buttons to expand each section, and use the sliders to adjust HF / VHF / UHF degradation level percentages for different frequency bands: • Signal Degradation (SD) is set as a percentage, independently for each of the three frequency bands (HF, VHF, UHF). • The default SD level is 25%, meaning the effective range of the transmitter is reduced by 15% of the original range (due to the non-linear effect of degradation), and noise starts at 25% of the maximum value. • Changing the percentage level quadratically affects range and linearly affects noise.

   For more information, see Degradation (on page 33).

4. Click **Save**.

VBS Radio applies the selected settings.

VoIP settings for the mission are shown in the Radios tab of the VBS Radio Pro panel (see Setting Up VBS Radio (on page 12)).

> **NOTE**
>
> To save your VBS Radio configuration as part of a mission, exit the VBS Radio UI, click the **Main Menu** in the VBS Editor, and select one of the following options under **Battlespaces**:
>
> - **Save** - Saves changes into the currently open Battlespace.
> - **Save As** - Creates a new Battlespace, or overwrites the existing one, based on the name you enter in the dialog.

2.5.1 Presets

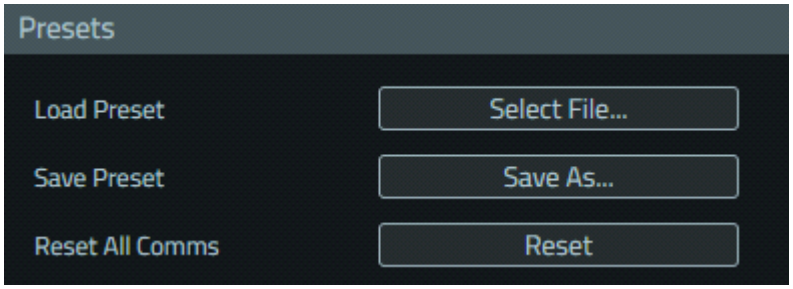
VBS Radio Presets enable you to save custom Radio Types / Channels and Advanced Settings (excluding Voice chat settings).

> **NOTE**
>
> Saved Presets enable you to retrieve VBS Radio settings and channels, for example, if they are lost by using `-disableVBSRadio`.

Presets are loaded, and saved in the Presets panel.

Follow these steps:

1. In the main Radio UI panel, click the **presets** icon to open the Presets panel.



2. Do any of the following:
    - Click **Select File...** to open your Explorer and load a preset.
    - Click **Save As...** to open your Explorer and save a preset.

      > **TIP**
      > Presets are saved in the VBSRadioSettings Configuration File (on page 39).

    - Click **Reset** to return VBS Radio to its default state:
        - Removes all custom Radio Types and assignments.
        - Removes all custom Channels and assignments.
        - Resets all VBS Radio settings.
3. Click **Back** to return to the main VBS Radio UI.

2.5.2 Degradation

VBS Radio signal degradation is determined by the range parameters of the transmitting Radio Type. Radio signals gradually (quadratically) decrease when the distance increases between the transmitter and the receiver, with zero signal being reached at the maximum range of the transmitter.

In addition, noise is used to degrade the radio signal. Ambient interference noise gradually increases when the distance between the transmitter and the receiver increases, until the maximum range of the transmitter is reached. At this point the receiver can only hear ambient interference noise.

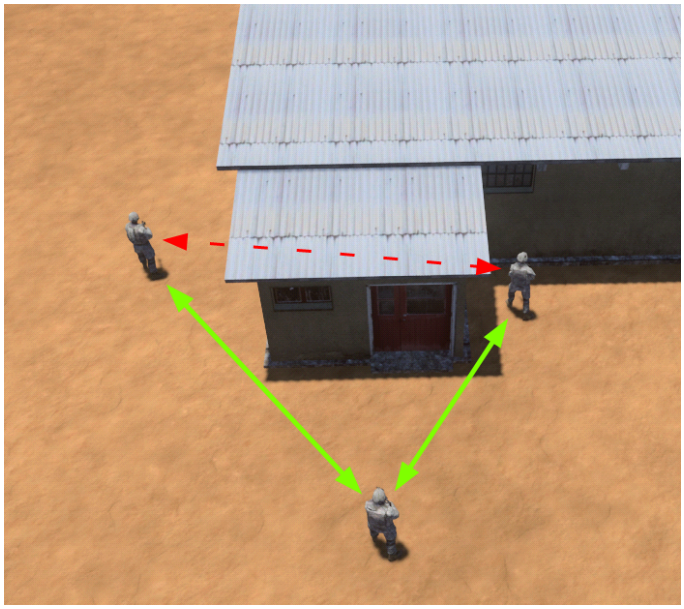
If the receiver is beyond the maximum range of the transmitter, there is no signal and no noise is heard.

Specific Degradation

Specific Degradation (SD) is configurable in Advanced Settings, and refers to the affects of terrain (including buildings), overcast weather, and rain, or a combination of all three, on signal quality. SD further reduces the range of transmissions in specific frequency bands.

- **Terrain**

  Terrain degradation is determined by line-of-sight. It is applied when there is no line-of-sight between the transmitter and the receiver. The following screenshot illustrates terrain degradation:

  The **red** dashed line shows a blocked line-of-sight, meaning that terrain degradation affects radio communication.

  The **green** lines indicate clear lines-of-sight, meaning that terrain degradation does not affect radio communication.

- **Overcast**

  Degradation due to overcast weather conditions shortens the effective signal range and increases noise, using a combination of the selected percentage value and the overcast level set in the Weather Settings in the VBS4 Editor Manual.

  The final strength of overcast degradation is calculated by multiplying the percentage value selected for degradation and the percentage value for overcast weather.

  > **NOTE**
  >
  > The overcast level ranges from 0 to 1 (0 to 100%).
  >
  > The degradation percentage (set using the slider) can range from 0% to 200% to allow for more control over the effect of overcast weather conditions.

- **Rain**

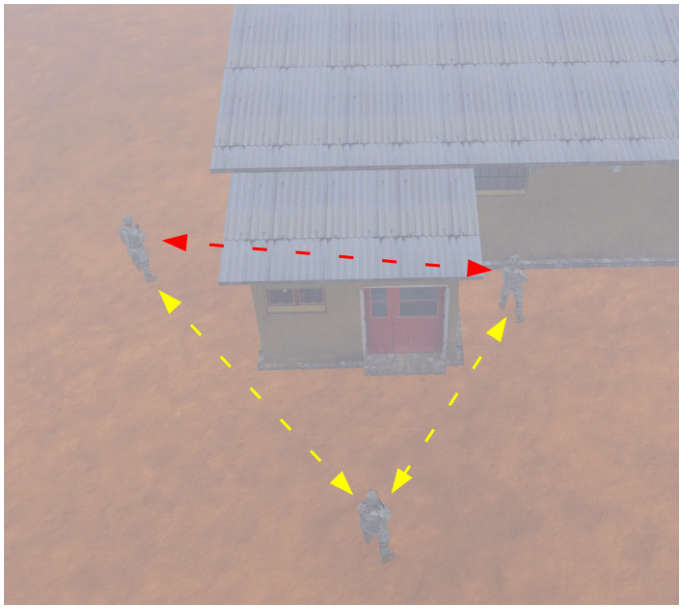
  Rain degradation is similar to overcast degradation. It shortens the effective signal range and increases noise, using the selected percentage value and the rain level set in the Weather Settings in the VBS4 Editor Manual.

  The final strength of rain degradation is calculated by multiplying the percentage value selected for degradation and the percentage value for rain.

  > **NOTE**
  >
  > The rain level ranges from 0 to 1 (0 to 100%). The degradation percentage (set using the slider) can range from 0% to 200% to allow for more control over the effect of overcast weather conditions.

- **Cumulative Effect**

  When multiple types of degradation are combined, their effect is cumulative. For example, if terrain degradation is set to 25%, overcast degradation has a final value of 25%, and rain degradation has a final value of 10%, the overall applied degradation is 60%. The effect is shown in the following screenshot as a **red** dashed line:

  The **red** dashed line shows a blocked line-of-sight + overcast + rain, meaning that cumulative degradation affects radio communication.

  The **yellow** dashed lines indicate clear lines-of-sight + overcast + rain. In this case, terrain degradation does not affect radio communication, but cumulative overcast and rain degradation does.

Degradation Examples

Overcast degradation 200% * 0.5 overcast = 100% degradation strength. Radio is blocked, noise is 100%

Degradation Examples

Overcast degradation 150% * 0.75 overcast = 100% degradation strength. Radio is blocked, noise is 100%

Overcast degradation 100% * 0.75 overcast = 75% degradation strength (assuming no terrain or rain degradation). If the transmitter range is 1000 m, the effective range is ~500 m due to the non-linear effect of degradation.

Overcast degradation 50% * 1.0 overcast = 50% degradation strength (assuming no terrain or rain degradation). If the transmitter range is 1000m, the effective range is ~700m.

Overcast degradation 50% * 1.0 overcast. Rain degradation set to 50% * 0.5 rain level. Total degradation strength = (0.5*1)+(0.5*0.5) = 0.75 = 75%.

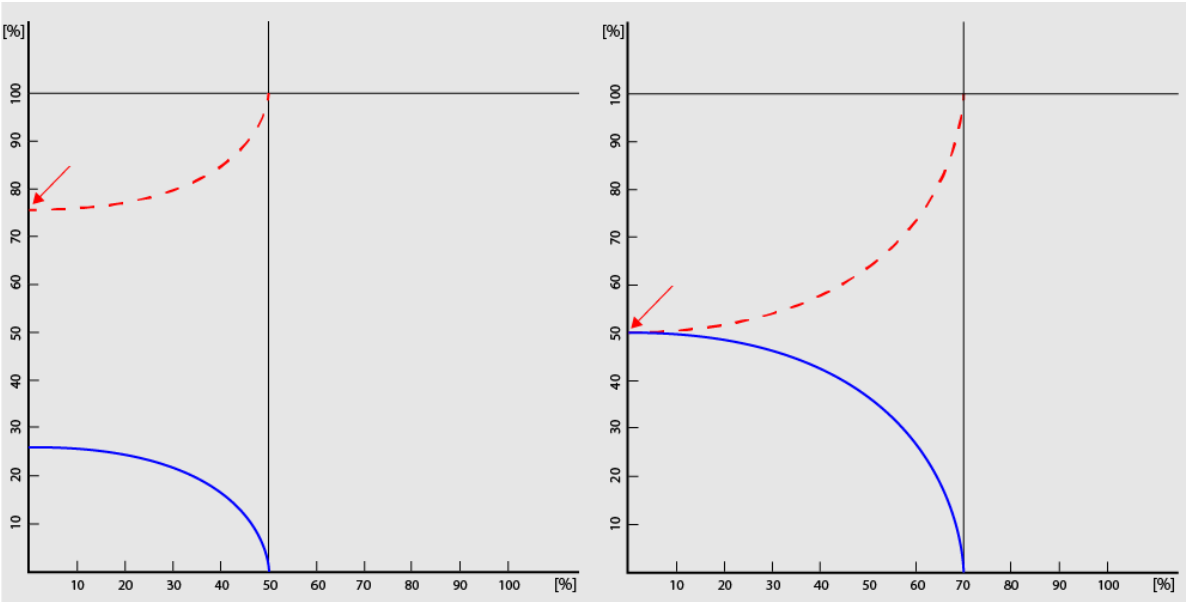
If a terrain degradation of 25% or higher is added, the final degradation is 100% or higher without line-of-sight, therefore communication is only possible with a line-of-sight.

Degradation Formula

Range values are converted to percentage values using the following formula:

$$\frac{transmission\ range}{range\ between\ transmitter\ and\ receiver} = percentage\ value\ between\ 0\ and\ 100\ [\%]$$

The following graphs show quadratic and signal strength functions, which depend on the converted transmitter ranges of Radio Types, and a percentage level of SD. They illustrate the interchange between Radio Signal and Ambient Interference noise.



The second observable outcome of degradation, is the shortening of the transmitter range. This is represented by the **Degraded Range** line, which emphasizes the impact of different starting percentage levels of SD.

50% = Degraded range ~ 0.70 of original transmitter range

75% = Degraded range ~ 0.50 of transmitter range

2.6 Configure DIS

VBS Radio enables communication with other DIS-compliant radio products using the Pitch DIS Gateway.

The default DIS settings are stored in the following files:

- `\VBS_Installation\lib64\pitchTalk\pitchtalk\conf\rprdisgateway.settings`
- `\VBS_Installation\lib64\pitchTalk\pitchtalk\conf\rprdisgatewaychannels.settings`

Create a copy of these files in the missions folder, located at:

`\Documents\VBS4\Battlespaces\Battlespace_Name\Missions\Scenario_Name\`

When the scenario runs, these settings are used instead of the default settings.

Open the mission settings files in a text editor to specify DIS communication with other radio products:

`rprdisgateway.settings`

Parameter	Setting	Command
`lsd`	Specifies the address of the PRTI server. Defaults to `localhost`, but must be specified if the PRTI server runs on another computer.	`lsd="crcHost=<address>:<port>"`
`gatewaymode`	Specifies the protocol to use, DIS, or RPR.	`gatewaymode = "<protocol>"`
`encoding`	Specifies the encoding codec format to use, ULAW, CVSD, or PCM16.	`encoding = <format>`

WARNING

Bohemia Interactive Simulations does not recommend changing any other parameters or editing `rprdisgatewaychannels.settings`.

3. VBS Radio Advanced Configuration

To make adjustments to the VBSRadioSettings configuration `.xml` file, or diagnose and fix issues you may encounter when using VBS Radio, review the following topics:

- VBSRadioSettings Configuration File (on the next page)
- VBS Radio Troubleshooting (on page 95)

3.1 VBSRadioSettings Configuration File

This file is generated on startup and enables Administrators to adjust Direct Talk, volume, and other settings. You can find the file at the following location:

`%LOCALAPPDATA%\VBS4\Settings\VBSRadioSettings.xml`

For more information, see the Settings table in Communications Panel (on page 61).

The following table lists the settings and explains what they are for:

Parameter	Description
Version	Version of the settings file.
DirectTalk_CutoffDistance	The distance, in meters, beyond which Direct Talk is not heard at all.
DirectTalk_Volume	Applied as a multiplier to the volume of Direct Talk. This setting does not change how quickly volume drops off with distance (the shape of the falloff curve). Therefore, if this value is increased, the cut-off distance needs to be increased also.
DirectTalk_Mode	Default Direct Talk Mode (Off / Ptt / Vox / WithRadio / WithVoice / WithAll).
DirectTalk_WhisperingDistance	Distance (in meters) beyond which Direct Talk whispering is not heard.
DirectTalk_TalkingDistance	Distance (in meters) beyond which Direct Talk talking is not heard.
DirectTalk_ShoutingDistance	Distance (in meters) beyond which Direct Talk shouting is not heard.
Voice_Volume	Volume multiplier for the voice channels.
Voice_GlobalChannelEnabled	Defines if the Global channel should be enabled by default (true / false).
Voice_SideChannelsEnabled	Defines if Side channels should be enabled by default (true / false).
Voice_GroupChannelsEnabled	Defines if Group channels should be enabled by default (true / false).
Voice_DeadChannelEnabled	Defines if the Dead channel should be enabled by default (true / false).
Voice_Intercom	Default Intercom settings (Ptt / Vox / Off).
Radio_Volume	Volume multiplier for the Radio Channels.
Radio_Height	Height from ground where the radio is situated (meters).
Radio_FadeoutDistance	Range in which the receiver still hears noise on the radio from the sender (meters).
Radio_NoiseVolume	Used to reduce the strength of the noise, otherwise it can be quite loud (0 - No noise / 1 - No reduction).

Parameter	Description
Radio_NoiseRedness	0 - More sharp, 1 - More deep.
Radio_JammerNoiseRedness	0 - More sharp, 1 - More deep.
Radio_ DefaultIsTransmitSoundEnabled	Defines if the radio microphone click sound should be enabled by default (true / false).
Radio_DefaultSendingMode	Defines the default Sending Mode selected in the Editor (Ptt / Vox).
Radio_DefaultRange	Defines the default radio range set in the VBS Editor (meters).
Radio_DefaultIsHalfDuplex	Defines the default Duplex Mode set in the VBS Editor (true - Half duplex / false - Full duplex).
Radio_DefaultIsConfigLocked	Default configuration lock value set in the VBS Editor.
Chat_GlobalChannelEnabled	Defines if the Global chat channel should be enabled by default (true / false).
Diag_ZipTimeout	Defines the interval after which the zip file is generated and the user no longer has to wait for other diagnostic files to arrive (seconds).
Ui_DrawRadioIconInMission	Defines if the VBS Radio icons should be visible above units in the scenario (true / false).
Ui_ShowHud	Defines if the VBS Radio HUD should be visible (true / false).
Ui_ShowIncomingTraffic	Defines if incoming traffic should be visible in the VBS Radio HUD (true / false).
Ui_ShowIncomingTrafficUnits	Defines if player names should be visible with incoming traffic in the VBS Radio HUD (true / false).
Audio_InputResetTimeout	Defines the interval after which the active microphone device is reset, if the default Microsoft Windows input device has changed (seconds). **WARNING** The value must be higher than 0.

Parameter	Description
Radio_TransmissionStartSound / Radio_TransmissionEndSound	Defines the start- and end-transmission sound effects. The following considerations apply: • The settings are optional (but defined by default). If they are not defined, or the values are left empty, no sound is played before / after the transmission. • The sound effects (setting values) can be specified using absolute or relative paths to the sound-effect files. • The sound effect files must be in WAV format, with a bit rate of 128 Kbps. • The sound effects are audible on the Global, Side, Group, Dead, Admin Announcement, and Speak to Trainee channels, in both PTT and VOX Modes.

NOTE

For in-game switching between Direct Talk whispering, talking, and shouting, defined by `DirectTalk_WhisperingDistance`, `DirectTalk_TalkingDistance`, and `DirectTalk_ShoutingDistance`, respectively, see **Cycle Direct Talk Volume Level** in the VBS4 Controls Reference in the VBS Radio Manual.

Default VBS Radio Settings:

```
<?xml version="1.0"?>
<VBSRadioSettings>
  <Version>1</Version>
  <DirectTalk_CutoffDistance>80.00000000000000000</DirectTalk_CutoffDistance>
  <DirectTalk_Volume>5.00000000000000000</DirectTalk_Volume>
  <DirectTalk_Mode>Ptt</DirectTalk_Mode>
 <DirectTalk_WhisperingDistance>5.00000000000000000</DirectTalk_WhisperingDistance>
  <DirectTalk_TalkingDistance>20.00000000000000000</DirectTalk_TalkingDistance>
  <DirectTalk_ShoutingDistance>40.00000000000000000</DirectTalk_ShoutingDistance>
  <Voice_Volume>1.00000000000000000</Voice_Volume>
  <Voice_GlobalChannelEnabled>false</Voice_GlobalChannelEnabled>
  <Voice_SideChannelsEnabled>true</Voice_SideChannelsEnabled>
  <Voice_GroupChannelsEnabled>false</Voice_GroupChannelsEnabled>
  <Voice_DeadChannelEnabled>false</Voice_DeadChannelEnabled>
  <Voice_Intercom>Ptt</Voice_Intercom>
  <Radio_Volume>1.00000000000000000</Radio_Volume>
  <Radio_Height>1.00000000000000000</Radio_Height>
  <Radio_FadeoutDistance>20.00000000000000000</Radio_FadeoutDistance>
  <Radio_NoiseVolume>0.50000000000000000</Radio_NoiseVolume>
  <Radio_NoiseRedness>0.80000001192092896</Radio_NoiseRedness>
  <Radio_JammerNoiseRedness>0.50000000000000000</Radio_JammerNoiseRedness>
  <Radio_DefaultIsTransmitSoundEnabled>true</Radio_DefaultIsTransmitSoundEnabled>
```

```
  <Radio_DefaultSendingMode>Ptt</Radio_DefaultSendingMode>
  <Radio_DefaultRange>10000.0000000000000000</Radio_DefaultRange>
  <Radio_DefaultIsHalfDuplex>false</Radio_DefaultIsHalfDuplex>
  <Radio_DefaultIsConfigLocked>true</Radio_DefaultIsConfigLocked>
  <Chat_GlobalChannelEnabled>false</Chat_GlobalChannelEnabled>
  <Diag_ZipTimeout>5.0000000000000000</Diag_ZipTimeout>
  <Ui_ShowHud>true</Ui_ShowHud>
  <Ui_ShowIncomingTraffic>true</Ui_ShowIncomingTraffic>
  <Ui_ShowIncomingTrafficUnits>false</Ui_ShowIncomingTrafficUnits>
  <Audio_InputResetTimeout>1.0000000000000000</Audio_InputResetTimeout>
  <Ui_DrawRadioIconInMission>true</Ui_DrawRadioIconInMission>
  <Audio_TransmissionStartSound>
    Components/VBSPitchRadio/beep.wav</Audio_TransmissionStartSound>
  <Audio_TransmissionEndSound>
    Components/VBSPitchRadio/beep.wav</Audio_TransmissionEndSound>
</VBSRadioSettings>
```

TIP

If any of the settings are missing from the configuration, delete the `VBSRadioSettings.xml` file, and restart VBS.

To apply the settings, do one of the following:

- Restart VBS.
- Use the following script command in the Developer Console in Prepare Mode, and save the scenario:

```
_result = componentFunction ["VBSPitchRadio", "Settings_Reload"];
```

WARNING

VBS Radio settings can only be applied to newly created scenarios, and only in Prepare Mode. Existing scenarios are not affected.

4. Radio Jamming Device

VBS Radio includes a Jamming Device (Jammer) that can be applied to units, vehicles, and locations. Once the Jamming Device is applied to an entity or location, both the transmitters and receivers of units within the range of the Jamming Device are affected. The signal strength of Radio Channels is weakened, based on the strength of the Jammer. Volume is decreased, and units experience varying degrees of white (ambient interference) noise.

FEATURE NOTICE

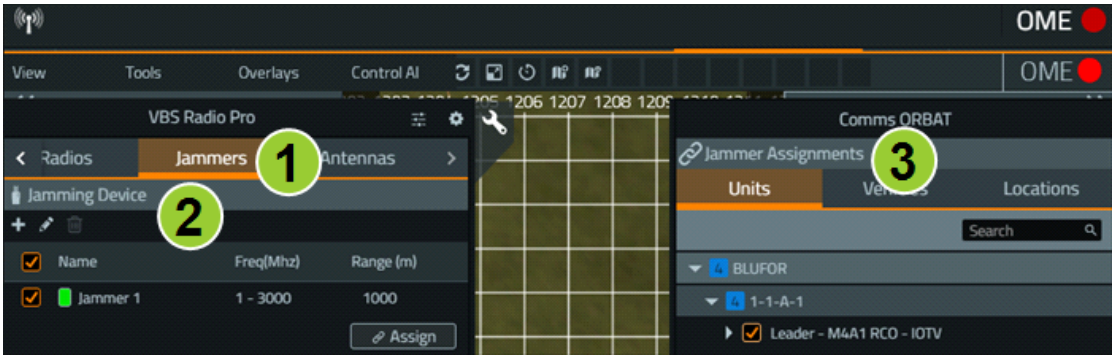
This feature is part of VBS Radio Pro, a licensed product. For more information, contact sales@bisimulations.com.

NOTE

Jammers affect only Radio Types, see VBS Radio Concepts (on page 9).

This topic discusses the following aspects of Jammer creation and management:

In the VBS Editor, go to **Tools > Radio Admin** to open the Radio UI, and click the **Jammers** tab.



The Jammers UI has the following features:

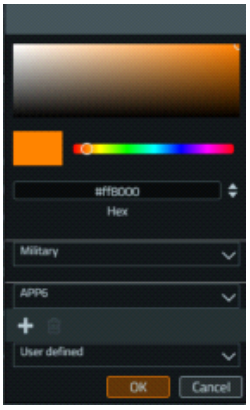
Number	Description
1	Jammers Tab.
2	Jamming Device Panel.
3	Jammer Assignments Panel.

4.1 Create a Jammer

Jammers are created in the Jamming Device panel.

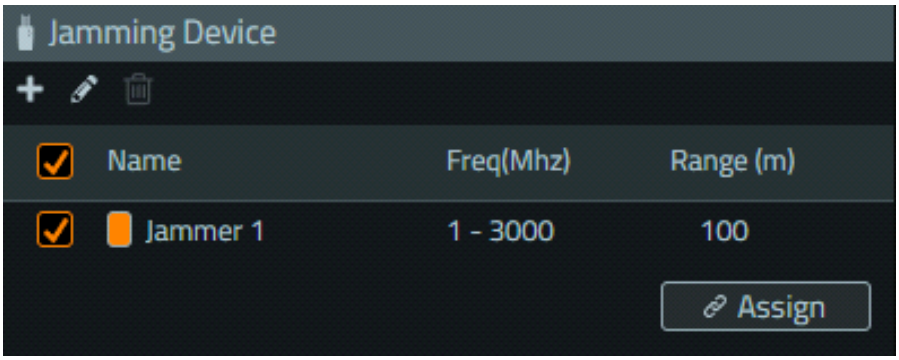
Click the **plus** icon to open the Add Jamming Device dialog.

Adjust the following settings, and click **Save**.

Setting	Description
Name	Enter a name for the Jammer. **NOTE** Each Jammer must have a unique name.
Color	 Click the **color** icon to open the color picker, select a predefined color (Military, APP6, User Defined), or create a customized color for Jammer identification, and click **OK**. The color you select is also used for the Jammer Range Visualization (on the next page).
Range	Enter the range (in meters) of the area that the Jammer affects the radio of the sender / receiver (see also Jammer Range Visualization (on the next page)).

Setting	Description
Strength	Maximum percentage value by which the radio signal is reduced. The applied **Strength** of the jamming decreases linearly based on the range from the Jamming device, reaching zero at the **Range** value. The volume is lowered by the specified percentage, with added ambient interference (white) noise. The effect is cumulative. If multiple Jamming device area effects overlap, all signal reductions are applied.
Frequencies	Click a **radio button** to select the frequency type that is affected by the Jammer: **All**, **HF**, **VHF**, **UHF**, **Custom** (**Min.** - Minimum value in MHz, **Max.** - Maximum value in MHz).

Your new Jammer is added to the Jamming Device panel, and can be assigned to entities, see Assign Jammers (on page 47).



Jammer Range Visualization

The range of the Jammer can be visualized in VBS, using the Color (on the previous page) you designated for Jammer identification.

Image-1: 2D range visualization

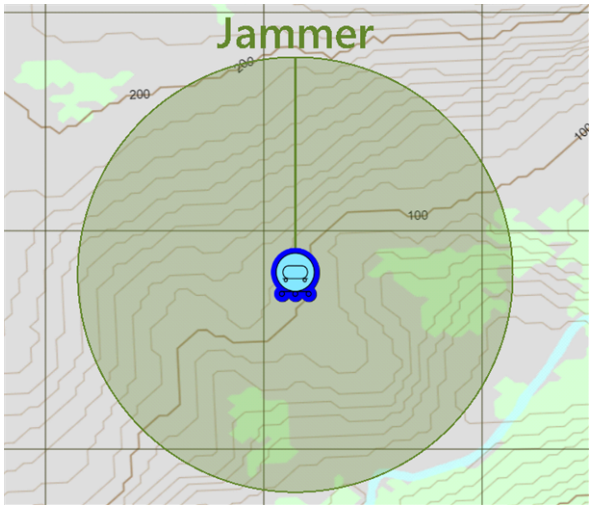
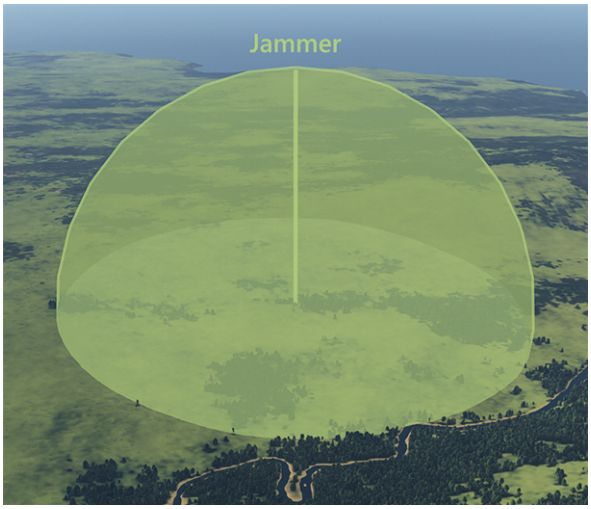


Image-2: 3D range visualization



NOTE

Use the Range Visibility Settings in the VBS4 Administrator Manual to enable / disable the entire range visualization or individual elements of it.

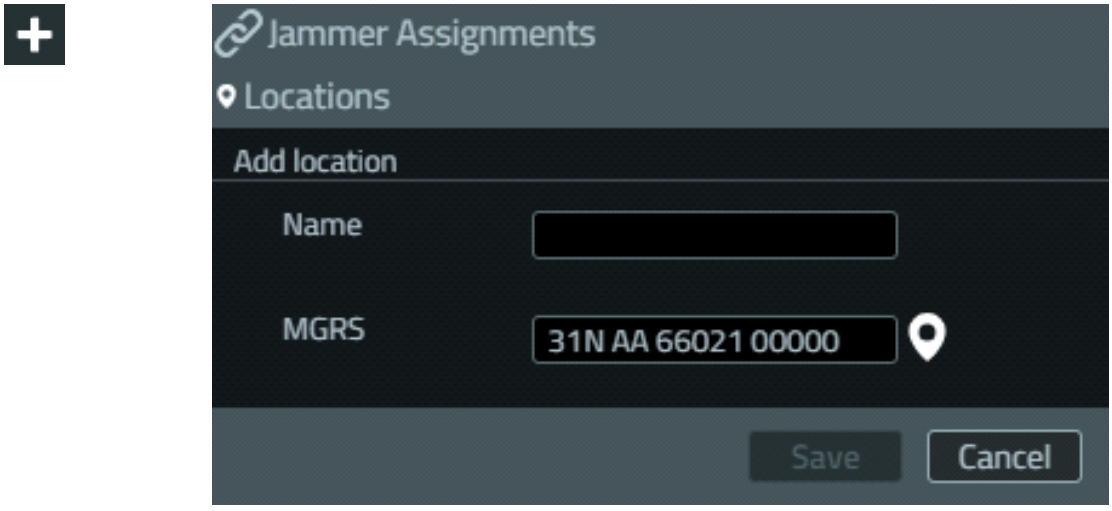
Range visualizations can only be seen by scenario Administrators and Instructors, not Trainees.

4.2 Define a Location

Jammers can be applied to specific **locations**, but first you must define the location on the map.

Follow these steps:

1. In the Jammer Assignments panel, click the **Locations** tab.
2. Click the **plus** icon to open the Add Location dialog.

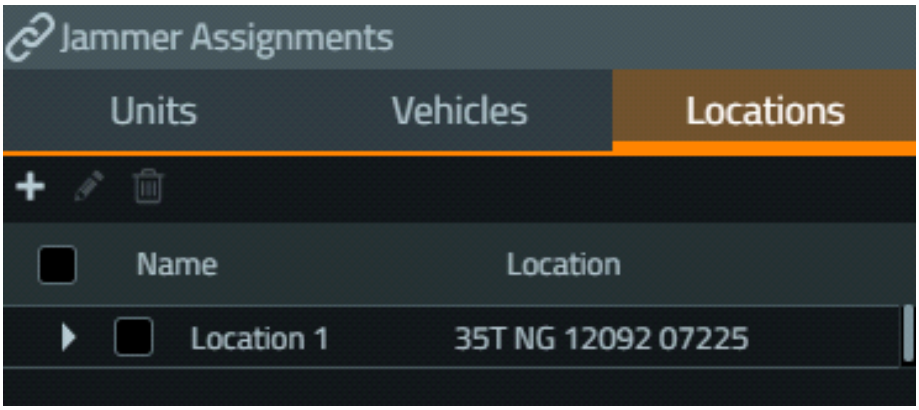


3. Enter a **Name** for the location. Each location must have a unique name.
4. Do one of the following:
   - Manually enter the MGRS coordinates in the **MGRS** field.
   - Click the **location picker**, and click a **location** on the map.

     The coordinates are automatically entered into the MGRS field.
5. Click **Save**.

The location is added to the list in the Locations Tab.



To edit a location, follow these steps:

1. Check the **box** next to a specific **location** in the list.
2. Click the **edit** icon to open the Add Location dialog.

3. Make your adjustments, and click **Save**.

To delete a location, follow these steps:

1. Check the **box** next to a specific **location** in the list.
2. Click the **trash** icon to remove the Location from the list.

4.3 Assign Jammers

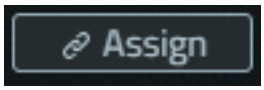
Jammers are assigned to **units**, **vehicles** (manned or unmanned), and **locations** in the Jammer Assignments panel.

Follow these steps:

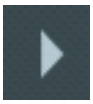
1. In the **Jamming Device** panel, check the **box** next to a specific **Jammer** in the list.

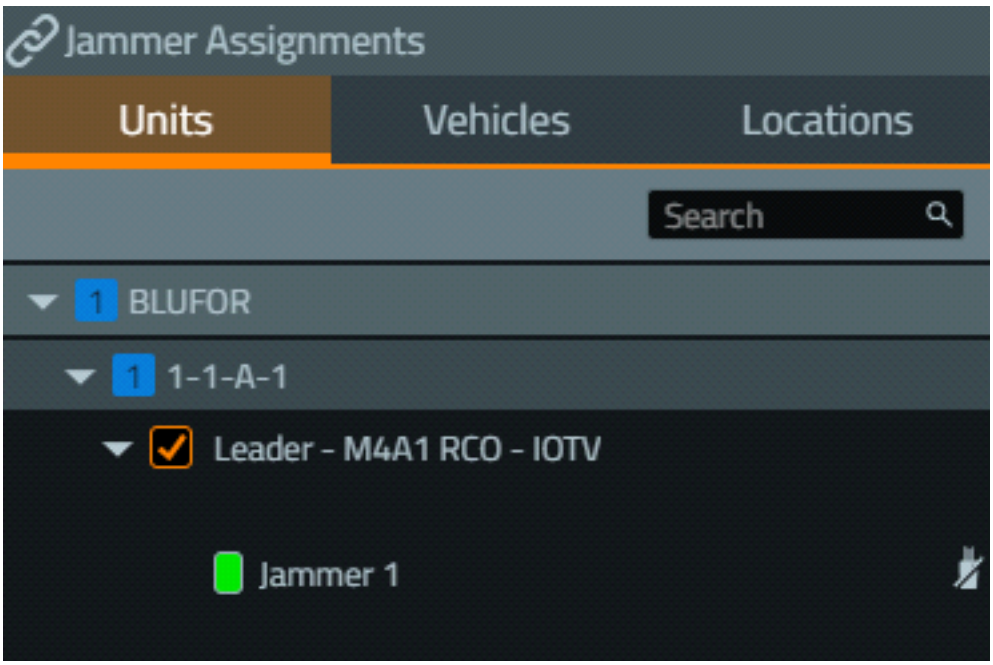
   > **NOTE**
   > If necessary, you can use the **Search Bar** to look for a specific Unit.

2. In the **Jammer Assignments** panel, click the **tab** of the entity type you want to apply the Jammer to (units, vehicles, locations).
3. Check the **box** next to a specific **unit** / **vehicle** / **location** in the list.
4. In the **Jamming Device** panel, click **Assign**.

The Jammer is assigned to the selected entity. This can be confirmed by expanding the corresponding line in the **Jammer Assignments** panel, and reviewing the list of assigned Jammers.





4.4 Edit Jammers

Jammers are edited using the **edit** icon in the **Jamming Device** panel.

Follow these steps:

1. Click the **box** next to the Jammer you want to edit.
2. Click the **edit** icon at the top of the list, to open the Add Jamming Device dialog.

3. Make your adjustments, and click **Save**.

4.5 Delete Jammers

Jammers are deleted using the **trash** icon in the **Jamming Device** panel.

> **WARNING**
> Jammers previously assigned to entities must be unassigned before you delete them.

Follow these steps:

1. In the **Jammer Assignments** panel, click the **Units** / **Vehicles** / **Locations** tab.
2. Click the **arrow** next to the entity you want to unassign the Jammer from.

   The Jammer is shown.
3. Click the **unassign** icon.

   
4. In the **Jamming Device** panel, check the **box** next to the **Jammer** you want to delete.
5. Click the **trash** icon.

The selected Jamming Device is deleted.

5. Starting VBS Radio

VBS4 provides VBS Radio to support communication in networked missions. The VBS4 mission is usually hosted on a Dedicated Server, but can be hosted on an Admin Client.

VBS Radio uses Pitch Talk technology to manage communication and starts a number of Pitch components. The Pitch Server components may run on the VBS4 Host or on their own dedicated machine.

- **Pitch Talk Admin Server**

  The Pitch Talk Admin Server manages communication between the VBS4 Host and VBS4 Clients using Pitch pRTI. By default, the server starts on the same computer as the VBS4 Host, but can be deployed on a dedicated machine.

- **Pitch pRTI Server**

  The specific Federation passing messages between the VBS4 Clients. By default, the server starts on the same computer as the VBS4 Host.

- **RprDisGateway**

  Controls the communications protocols, enabling communication between the VBS4 Clients and other connected radio products. The Gateway runs on the server computer.

  > **NOTE**
  >
  > On mission start, VBS Radio checks the mission folder for the `rprdisgateway.settings` file. If the file does not exist, it checks the following file and uses the settings there:
  >
  > `\VBS_Installation\lib64\pitchTalk\pitchtalk\conf\rprdisgateway.settings`

- **Pitch Talk Client**

  Part of the VBS Radio product, the client runs on every VBS4 Client, and controls client communication.

> **NOTE**
>
> VBS Radio is enabled by default. Use the VBS Launcher Radio Tab (on page 55) to set up communication with specific Pitch Talk servers or to specify specific VBS Radio settings.

5.1 Scenario Preparation with VBS Radio

To prepare a Scenario with VBS Radio, start a VBS4 Client using VBS Launcher, or use the equivalent command-line startup parameters.

Use VBS Launcher to start a VBS4 Client as an Administrator in either Online or Offline Mode.

Follow these steps:

1. In the **VBS4 > Client** tab, the **Configuration** to use:
   - **VBS4 Online**

     Starts VBS4 Clients connected to a VBS World Server hosting the Whole-Earth Terrain.

     Click **Refresh**, and select or input the IP Address of a VBS World Server.
   - **VBS4 Offline**

     Starts VBS4 Clients without a connection to a VBS World Server.

     > **WARNING**
     > Do not select or input the **Server IP** address to connect to a Dedicated Server.
2. In the **Client** tab, select the following options:
   - Select **admin** (`-admin`) to enable access to Battlespace Management and VBS Editor.
3. Click **Launch Modules**.

VBS4 starts with VBS Radio enabled by default.

For more information, see Starting VBS4 in the VBS4 Administrator Manual.

Configure VBS Radio using the **Tools > Radio Admin** option in VBS Editor. For more information, see Setting Up VBS Radio (on page 12).

5.2 Scenario Execution with VBS Radio

To Execute a Scenario with VBS Radio, start VBS4 on each computer using the appropriate options in VBS Launcher, or use the equivalent command-line startup parameters.

> **NOTE**
> VBS Radio is on by default. Follow this procedure to use specific settings for VBS Radio.

Specify Pitch Talk Servers

On the VBS4 Server use the VBS Launcher Radio Tab (on page 55) to specify if the Pitch Talk Servers run on separate computers (leave blank to run them directly on the VBS4 Server).

If the Pitch Talk Servers run on separate computers, select **Custom Server IP** (`-pitchcustomserverip`) and specify the URLs:

> **WARNING**
> Leave **Custom Server IP** unselected if Pitch Talk Servers run directly on the VBS4 Server.

- Input a **Federation Server Address** (`-pitchprtiserver`) to specify the IP Address and Port of the Pitch Talk Admin Server controlling the Federation.
- Input an **Admin Server Address** (`-pitchadminserver`) to specify the IP Address and Port of the Pitch Talk Admin Server to use for Pitch Talk Admin access.

Specify Communication Options

On the VBS4 Server use the VBS Launcher Radio Tab (on page 55) to specify multicast and VBS Gateway options.

- Select the **Enable Multicast** option and use the settings to control Multicast.

  > **NOTE**
  > Multicast is strongly recommended for scenarios with 20 or more users.

  > **TIP**
  > Multicast can improve performance of the host computer, for example, for recording AAR.

  For more information about Multicast, see Multicast in the VBS4 Administrator Manual.

  > **EXAMPLE**
  > To start a dedicated server from command-line with VBS Radio and Multicast, use:
  >
  > ```
  > VBS4.exe -server -prtimulticast "-prtimulticastaddress=229.229.229.228"
  >  -prtimulticastport=8900
  > ```

- If you need to communicate with other DIS-compliant radio products, select VBS Gateway (`-gateway`) to enable the host to communicate over DIS using parameters specified in the `rprdisgateway.settings` file. For more information, see Configure DIS (on page 37).

Specify Client Connections

If the Pitch Talk Servers are running on separate computers from the VBS4 Server, use the VBS Launcher Radio Tab (on page 55) on each VBS4 Client to specify the connection settings:

Select the **Custom Server IP** option (`-pitchcustomserverip`) and specify the URLs:

1. Input a **Federation Server Address** to specify the IP Address and Port of the Pitch Talk Admin Server running the Federation.
2. Input an **Admin Server Address** to specify the computer running the Pitch Talk Admin Server used for Pitch Talk Admin access.

WARNING

Leave the **Custom Server IP** option unselected to automatically connect to Pitch Servers running on the VBS4 Host. To connect to Pitch Servers running on dedicated computers, these settings must match those specified for the VBS4 Host.

NOTE

The Multicast settings are not applicable to VBS4 clients.

EXAMPLE

To start a client from command-line with VBS Radio connecting to Pitch Servers on a different computer on the local network, use:

```
VBS4.exe -pitchcustomserverip
 -pitchadminserver=http://10.2.60.5:9600 -pitchprtiserver=10.2.60.5:8992
```

Specify AAR Simulation Client Options:

If you are using an AAR Simulation Client, use the VBS Launcher Radio Tab (on page 55) to specify the computer running the Pitch Servers, and the Client tab to specify the Simulation Client parameters:

1. Select the **Enable Custom Server IP** option (`-pitchcustomserverip`), and specify the URLs:
   a. Input a **Federation Address** to specify the computer running the Pitch pRTI Server.
   b. Input an **Admin Server Address** to specify the computer running the Pitch Talk Admin Server.
2. Specify the **simulationclient** option (`-simulationClient=1` or `-simulationClient=2` to start an AAR Simulation Client).
3. Set the **connect** option to specify the Dedicated Server.

For more information about AAR Simulation Clients, see Simulation Clients in the VBS4 Administrator Manual.

Start the Scenario

When the Administrator starts a network mission:

- VBS Radio launches on the Dedicated Server.
- VBS Radio starts on each Client as they join the Scenario.

VBS4 is ready to operate a mission with VBS Radio communication.

- Instructors can administer VBS Radio communication, see Monitoring VBS Radio (on page 67).
- Trainees can communicate with VBS Radio, see Using VBS Radio (on page 58).

When the Administrator starts a mission, PitchRadio logs are written to the following locations on the VBS server computer:

- **pRTI** - Shows Federation messages:

  `\VBS_Installation\lib64\pitchTalk\prti\logs\CRC-date_time-N.log`

- **Admin Server** - Shows log messages from the Pitch Talk Admin Server:

  `\VBS_Installation\lib64\pitchTalk\pitchtalk\logs\adminserver-date-time.log`

- **Pitch RPR DIS Gateway** - Shows log messages for communication with other DIS Radio products.

  `\VBS_Installation\lib64\pitchTalk\pitchtalk\logs\rprdisgateway-date-time.log`

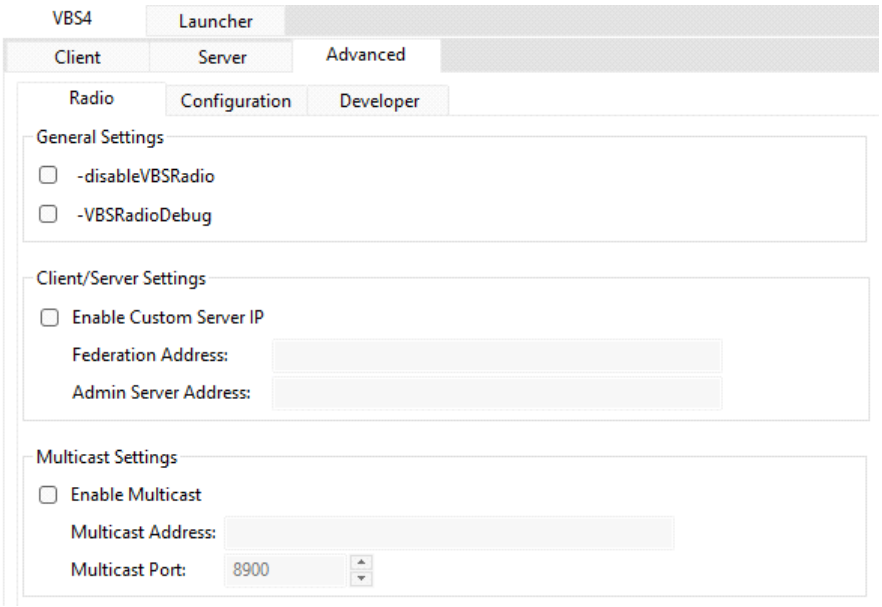
- **Client Computers** - Shows log messages for events on the client.

  `VBSPitchRadio-date-time-pid.log`

5.3 VBS Launcher Radio Tab

Use the **Advanced > Radio** tab to specify the additional settings if you run the Pitch Talk Servers on separate computers than the VBS4 Server, or if you want to configure the multicast settings.

Image-3: Radio Tab



- `-disableVBSRadio`

  VBS Radio is enabled by default. Select this option to disable VBS Radio.

  WARNING

  If you edit and save Battlespace with previously configured VBS Radio settings and channels after disabling VBS Radio, all channel configurations / settings are lost unless you save them as Presets (on page 32) first.

- `-VBSRadioDebug`

  Select to log additional debug information to the VBS Radio log file.

- `-pitchcustomserverip`

  Enable Custom Server IP - Set this option to enable connection to a Pitch Talk Admin Server running on a different machine than the VBS4 host.

  WARNING

  Clients starting VBS4 to join a multiplayer session should only select this option if the host has specified a Custom Server IP and their settings should match. By default, with this setting off, clients connect to the host.

- `-pitchprtiserver=ipaddress:port`

  Federation Address - Input the IP address and port on the Pitch Talk Admin Server to use for the Federation.

  > **NOTE**
  > If the Federation is not specified, VBS Radio uses the default, `127.0.0.1:8992`.

- `-pitchadminserver=ipaddress:port`

  Admin Server Address - Input the IP address and port on the Pitch Talk Admin Server to use for Pitch Talk Admin access.

  > **NOTE**
  > If the Admin Server is not specified, VBS Radio uses the default, `http://127.0.0.1:9600`.

- `-prtimulticast`

  Enable Multicast - Set this option to enable VBS Radio to use multicast.

  > **NOTE**
  > We strongly recommend Multicast for scenarios with 20 or more users.

  For more information about multicast, see Multicast in the VBS4 Administrator Manual.

- `-prtimulticastaddress=ipaddress`

  Multicast Address - input the IP address to use for multicast.

- `-prtimulticastport=port`

  Multicast Port - input the port to use for multicast.

WARNING

To enable multicast for your network, you may need to modify the Radio Time-To-Live (TTL) setting, by editing the `prti1516eLRC.settings` file at:

`\VBS_Installation\lib64\pitchTalk\prti\conf\`

Locate the `LRC.UDP.mutlicastTTL` parameter and change the value as required. This value should be set on each computer participating in the Network Mission.

Use the following values as required by your network configuration:

Value	Description
0	Restricted to the same host.
1	Restricted to the same subnet.
32	Restricted to the same site (default and recommended value to match the VBS4 multicast TTL).
64	Restricted to the same region.
128	Restricted to the same continent.
255	Unrestricted.

6. Using VBS Radio

VBS Radio enables units to communicate using the Radio Types and Radio Channels assigned to them, and enables units to communicate if they share a Communication Channel.

WARNING

All clients and the host must start with VBS Radio enabled. VBS Radio is enabled by default but can be disabled (`-disableVBSRadio`). For more information, see VBS Launcher Radio Tab (on page 55).

VBS Radio includes the following features to enable communication within a mission:

- Radio volume is attenuated by distance according to the **Range** value set in the Radio Profile.
- Vehicle crew can access a dedicated VoIP **Intercom Network** to enable communication within the vehicle.
- **Direct Talk** simulates hearing people around the player based on their proximity. For more information, see Direct Talk (on the next page).
- Dead units are locked to the **Dead** channel and cannot communicate with live units. The Dead channel can be deactivated.
- VBS Radio is available in C2 Mode and Execute Mode, using the PTT key binding and the Radio icon in the Toolbar to open the Radio Settings dialog.

- A speaker icon appears above units that are broadcasting in AAR View.
- Radio HUD and Controls (on page 60) to view and control VBS Radio communication.
- Communications Panel (on page 61) to select the Communication Channels to use, and to set the volume and microphone thresholds.
- Exercise Monitor to provide Administrators with a quick way of monitoring VBS Radio (see Monitoring VBS Radio (on page 67) in the VBS Radio Manual).

NOTE

Users controlling animals cannot use VBS Radio. To use VBS Radio, join missions as a human character or an invisible spectator.

6.1 Direct Talk

Direct Talk has the following features, functions, and effects:

> **NOTE**
>
> The Direct Talk channel is off by default.

> **WARNING**
>
> When using Direct Talk with Spectator Units, the initial position of a radio transmission becomes fixed and does not move with the unit.

The Administrator can enable Direct Talk and its activation method for a mission, see Advanced Settings and Presets (on page 31).

> **TIP**
>
> Reset the **Talk on Direct Channel** key binding to enable PTT Direct Talk.

Direct Talk has a spatial simulation feature with the following features:

- Allows the user to determine the speaking direction of a unit in the Direct Talk range.
  - The Direct Talk range can be set up for whispering, talking, and shouting. For more information, see the `DirectTalk_WhisperingDistance`, `DirectTalk_TalkingDistance`, and `DirectTalk_ShoutingDistance` parameters in VBSRadioSettings Configuration File (on page 39).
  - Use the Direct Talk range in-game with the **Cycle Direct Talk Volume Level** control. See VBS4 Controls Reference in the VBS4 Administrator Manual.
- The effect of location-based sound emission (for example, a person speaking on the left is heard louder in the left ear). Direct Talk sound attenuation is applied in open spaces (but not to building interiors), and in compartments of specific vehicles.

  > **FEATURE NOTICE**
  >
  > Sound attenuation in vehicle compartments is currently enabled on a subset of Swedish vehicles. However, future releases of VBS4 are expected to support sound attenuation on all vehicles.

- VBS Radio Standalone users hear no spatial effects, but the effects are applied to VBS Radio Standalone users in the VBS4 simulation. For more information, see VBS Radio Standalone in the VBS Radio Manual.

TIP

To better differentiate between Direct Talk and VBS Radio communication, Administrators can define start- and end-transmission sound effects that play before and after the transmission. For more information, see `Radio_TransmissionStartSound` and `Radio_TransmissionEndSound` in VBSRadioSettings Configuration File (on page 39).

6.2 Radio HUD and Controls

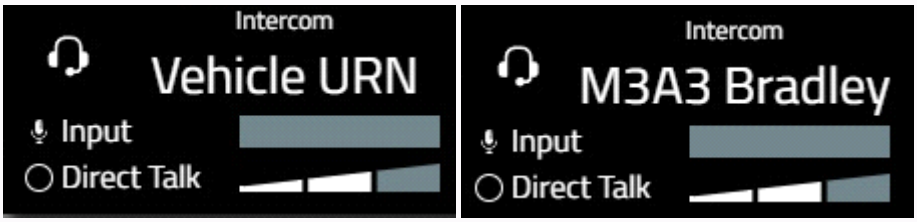
The VBS Radio HUD displays at the bottom-left of your screen.

Image-4: Radio HUD

The HUD displays the name of the current Radio Type, the currently selected Communication Channel for reception and transmission (including color and symbol assignments), Incoming Traffic Units (if applicable), and the Mic Input bar, where the Direct Talk icon shows **green** when in use, together with white input volume bars.

The HUD for Intercoms displays either the vehicle URN or the vehicle configuration name. For more information, see Communications Panel (on the next page).

EXAMPLE



Use the following controls for the VBS Radio HUD.

Control Name	Default	Description
Next Radio	.	Cycle through the available Radio Types, and Communication Channels.
Previous Radio	,	

Control Name	Default	Description
Next Radio Channel	**RCtrl + .**	Cycle through the available Communication Channels, depending on the selected mode or Radio Type.
Previous Radio Channel	**RShift + ,**	
Push to Talk	**Caps Lock**	Hold to transmit when a Communication Channel is set to use PTT. The Radio HUD indicator shows radio waves when you are broadcasting. 
Open Radio Settings	**Not Set Quick Menu**	Press **Quick Menu** (**Left Windows**) (see Quick Menu Actions in the VBS4 Trainee Manual) and access Communications Panel (below). **TIP** Set the **Open Radio Settings** key binding to create a keyboard shortcut. For more information, see Controls Settings in the VBS4 Administrator Manual.
	Esc	Close Radio Settings.
Talk on Direct Channel	**LShift + Caps Lock**	Press to use Direct Talk. The indicator light is **green** when in use. 
Cycle Direct Talk Volume Level	**2 x Tab**	Cycle through the VBS Radio Direct Talk volume levels (whispering, talking, shouting).

6.3 Communications Panel

The Communications Panel enables you to adjust the settings on your communication device.

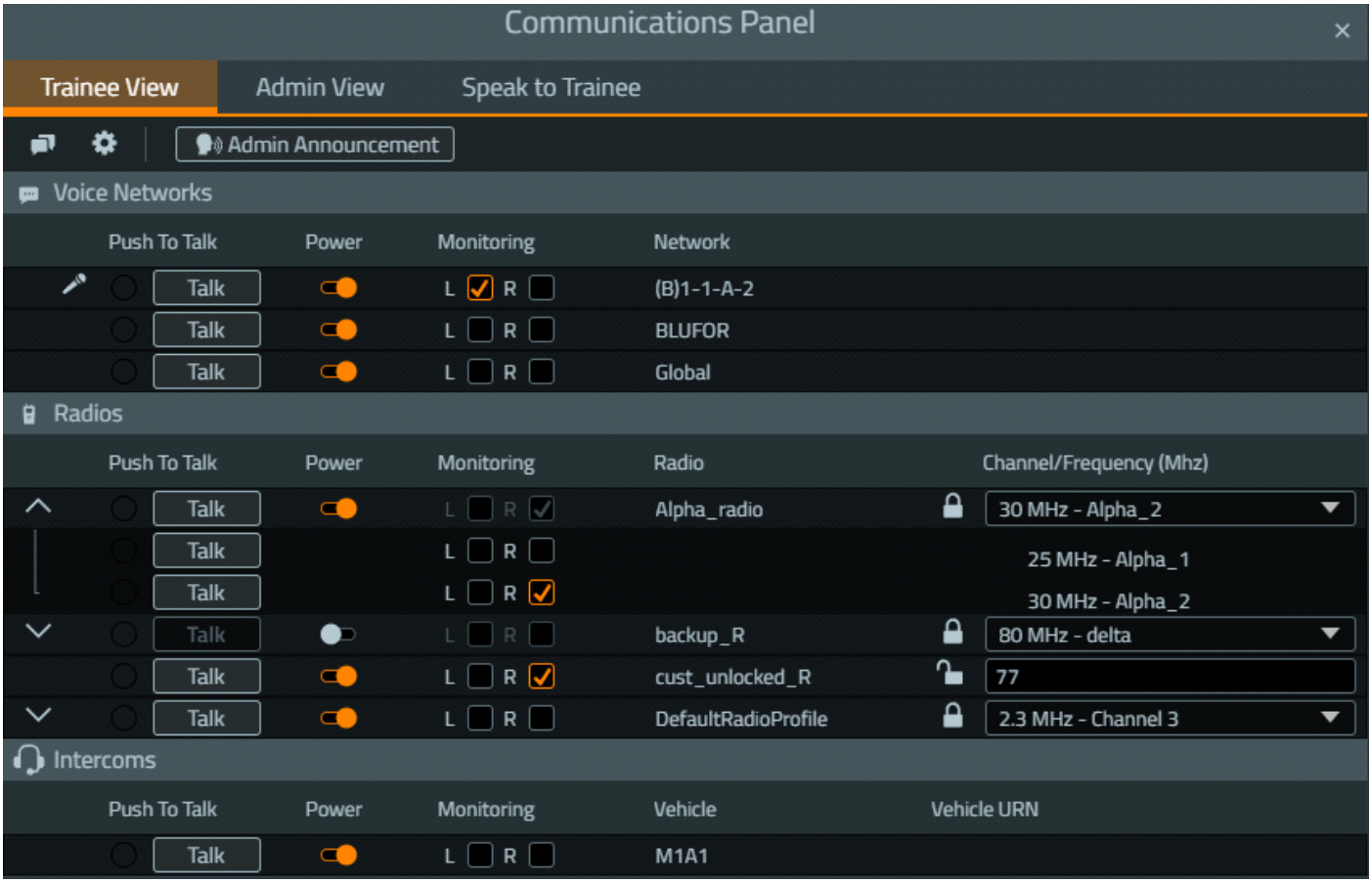
Press **Quick Menu** (**Left Windows**) (see Quick Menu Actions in the VBS4 Trainee Manual), and select **COMMS > OPEN RADIO SETTINGS** to open the Communications panel. Click **X** to close the Communications Panel.

Press **Free Look** (**LAlt**) to toggle interaction between the Communications Panel and the rest of VBS4.

TIP

Set the **Open Radio Settings** key binding to create a keyboard shortcut. For more information, see Controls Settings in the VBS4 Administrator Manual.

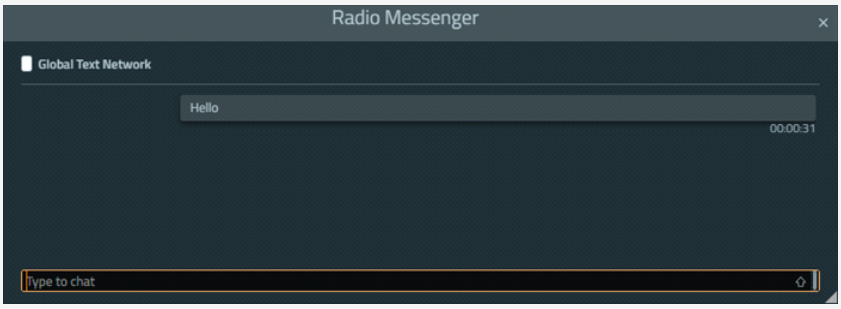
Click the **Trainee View** tab to view the settings.



TIP

Click a **down arrow** to show more properties for a specific radio.

The settings combine physical communication device control and related settings.

Section	Setting	Description
Radio Messenger		Click the **Text** icon to open the Radio Messenger dialog, and use the Global Text Network. Enter your message in the **Type to chat** field, and click the **up arrow** / press **Enter** to send. 
Radio Settings		Click the **Settings** icon to adjust radio settings (see Radio Settings (on the next page)).
Voice Networks Control individual Communication Channels	**Push to Talk**	Click **Talk** to broadcast. The Radio HUD indicator shows circular radio waves (see Radio HUD and Controls (on page 60)).
	Power	Click to turn the power of the Communications Channel on / off.
	Monitoring	Select to monitor the **L** (left) or **R** (right) ear output (see Create Radio Channels (on page 18)).
	Network	Displays the Communication Channels.
Radios Control Radio Types and Radio Channels	**Push to Talk**	Click **Talk** to broadcast. The Radio HUD indicator shows circular radio waves (see Radio HUD and Controls (on page 60)).
	Power	Click to turn the power of the Communications Channel on / off.
	Monitoring	Select to monitor the **L** (left) or **R** (right) ear output (see Create Radio Channels (on page 18)).
	Radio	Displays the Radio Type being used.
	Channels / Frequency	Use the drop-downs to change the channel / frequency for each device.

Section	Setting	Description
Intercoms Control individual intercoms	**Push to Talk**	Click **Talk** to broadcast. The Radio HUD indicator shows circular radio waves (see Radio HUD and Controls (on page 60)).
	Power	Click to turn the power of the Communications Channel on / off.
	Monitoring	Select to monitor the **L** (left) or **R** (right) ear output (see Create Radio Channels (on page 18)).
	Vehicle	Vehicle configuration name (also shown on the Radio HUD, see Radio HUD and Controls (on page 60)).
	Vehicle URN	Vehicle Unit Recognition Number (URN) (also shown on the Radio HUD, see Radio HUD and Controls (on page 60)). **NOTE** If used, the URN is displayed as the Intercom name. If not used, the vehicle configuration name is displayed as the Intercom name.

6.3.1 Radio Settings

Click the **Settings** icon to adjust radio settings.

Setting	Description
Input	Use the slider to adjust. Changes the volume of outgoing radio communication (corresponds with microphone sensitivity).
Output	Use the slider to adjust. Changes the volume of incoming radio communication (corresponds with speaker volume).

Setting	Description
VOX Threshold	Use the slider to adjust. Changes the microphone threshold value for VOX. **NOTE** If the microphone input is below the VOX threshold, it is visualized by a dark **gray** area on the VBS Radio HUD volume bar.  If the selected channel uses VOX and the microphone input is above the **VOX Threshold**, then the **gray** icon shows circular radio waves around it. Also, if Direct Talk Mode uses VOX, and the microphone input is above the **VOX Threshold**, then the Direct Talk indicator light is **green**. 
Independent Left / Right Mode	Click the button to enable / disable. If enabled, the Primary Ear radio buttons are made available. The active channel is monitored in the selected ear (Left / Right). All other channels are monitored in the other ear.
Show HUD	Click the button to show / hide the in-game HUD, see Radio HUD and Controls (on page 60) in the VBS Radio Manual.
Show Incoming Traffic	If enabled, shows a visual indicator of which channel / radio is being received in the HUD. This setting can be enabled / disabled during a mission. 

Setting	Description
Show Incoming Traffic Units	If enabled, shows the name of the Player whose transmission you are receiving. This setting can be enabled / disabled during a mission.  **WARNING** This setting does not work unless **Show Incoming Traffic** is enabled.

NOTE

The default values of the **Show HUD**, **Show Incoming Traffic**, and **Show Incoming Traffic Units** settings, which determine if the buttons are functional or not, can be changed in the `VBSRadioSettings.xml` file. For more information, see VBSRadioSettings Configuration File (on page 39).

7. Monitoring VBS Radio

In VBS Editor, Instructors are able to listen to and transmit on any channel using the Communications panel, as well as see transmission visualizations in the 2D and 3D Views.

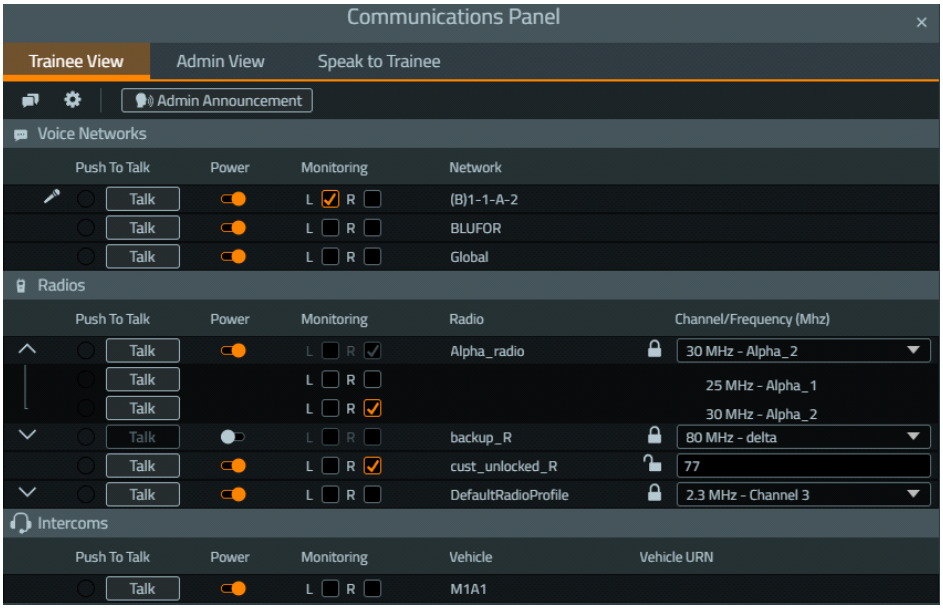
- Communications Panel (below)
- Transmission Visualization (on page 74)

7.1 Communications Panel

Use the Communications panel to listen to and transmit on any channel.

In the Editor Toolbar, click the **radio** icon to access the Communications panel.

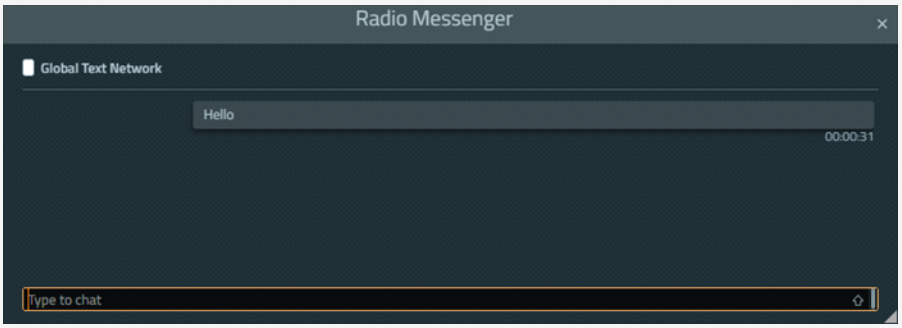
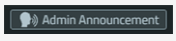
As an Administrator / Instructor, you can access the **Trainee View**, **Admin View**, and **Speak to Trainee** tabs.



TIP

Click a **down arrow** to show more properties for a specific radio.

The settings combine physical communication device control and related settings.

Section	Setting	Description
Radio Messenger		Click the **Text** icon to open the Radio Messenger dialog, and use the Global Text Network. Enter your message in the **Type to chat** field, and click the **up arrow** / press **Enter** to send. 
Radio Settings		Click the **Settings** icon to adjust radio settings (see Radio Settings (on page 70)).
Admin Announcement		Click and hold the **Admin Announcement** button to broadcast to all units in the scenario at the same time. Admin Announcement has the following features: • Broadcasts are heard by all users (including other Administrators), regardless of their current radio / channel setup. • It is listed under VoIP channels (there is no degradation). • Only Administrators can speak on this channel. • It cannot be disabled or monitored, using the **L** / **R** options. • It works with VBS Radio Standalone, and is recorded in the AAR. • It is not available in the Prepare Mode **Radio Admin** options.
Voice Networks Control individual Communication Channels.	**Push to Talk**	Click **Talk** to broadcast. The Radio HUD indicator shows circular radio waves (see Radio HUD and Controls (on page 60)).
	Power	In the Trainee View tab only. Click to turn the power of the Communications Channel on / off.
	Monitoring	Select to monitor the **L** (left) or **R** (right) ear output (see Create Radio Channels (on page 18)).
	Network	Displays the Communication Channels.

Section	Setting	Description
Radios Control Radio Types and Radio Channels.	**Push to Talk**	Click **Talk** to broadcast. The Radio HUD indicator shows circular radio waves (see Radio HUD and Controls (on page 60)).
	Power	In the Trainee View tab only. Click to turn the power of the Communications Channel on / off.
	Monitoring	Select to monitor the **L** (left) or **R** (right) ear output (see Create Radio Channels (on page 18)).
	Radio	Displays the Radio Type being used.
	Channels / Frequency	Use the drop-downs to change the channel / frequency for each device.
Intercoms Control individual intercoms.	**Push to Talk**	Click **Talk** to broadcast. The Radio HUD indicator shows circular radio waves (see Radio HUD and Controls (on page 60)).
	Power	In the Trainee View tab only. Click to turn the power of the Communications Channel on / off.
	Monitoring	Select to monitor the **L** (left) or **R** (right) ear output (see Create Radio Channels (on page 18)).
	Vehicle	Vehicle configuration name (also shown on the Radio HUD, see Radio HUD and Controls (on page 60)).
	Vehicle URN	Vehicle Unit Recognition Number (URN) (also shown on the Radio HUD, see Radio HUD and Controls (on page 60)). **NOTE** If used, the URN is displayed as the Intercom name. If not used, the vehicle configuration name is displayed as the Intercom name.

7.1.1 Radio Settings

Click the **settings** icon to adjust radio settings.

Setting	Description
Input	Use the slider to adjust. Changes the volume of outgoing radio communication (corresponds with microphone sensitivity).
Output	Use the slider to adjust. Changes the volume of incoming radio communication (corresponds with speaker volume).
VOX Threshold	Use the slider to adjust. Changes the microphone threshold value for VOX. **NOTE** If the microphone input is below the VOX threshold, it is visualized by a dark **gray** area on the VBS Radio HUD volume bar.  If the selected channel uses VOX and the microphone input is above the **VOX Threshold**, then the **gray** icon shows circular radio waves around it. Also, if Direct Talk Mode uses VOX, and the microphone input is above the **VOX Threshold**, then the Direct Talk indicator light is **green**. 
Independent Left / Right Mode	Click the button to enable / disable. If enabled, the Primary Ear radio buttons are made available. The active channel is monitored in the selected ear (Left / Right). All other channels are monitored in the other ear.
Show HUD	Click the button to show / hide the in-game HUD, see Radio HUD and Controls (on page 60) in the VBS Radio Manual.

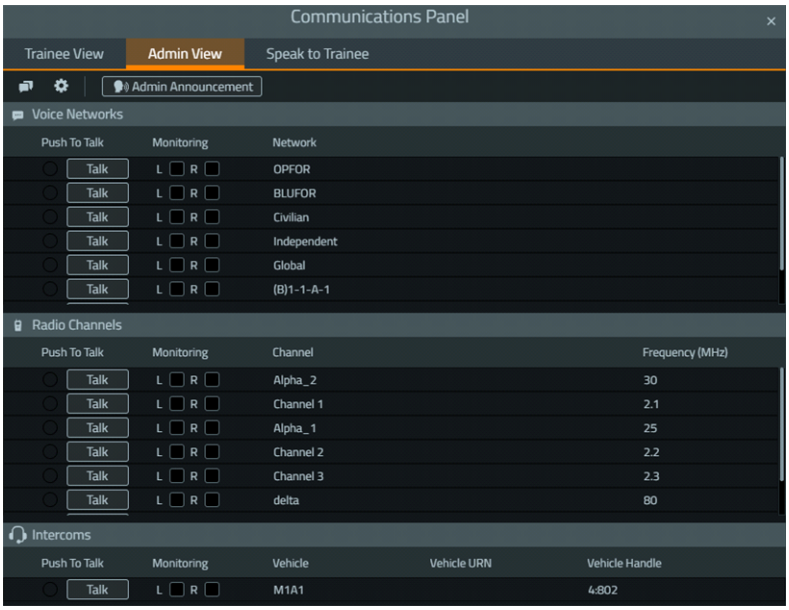
Setting	Description
Show Incoming Traffic	If enabled, shows a visual indicator of which channel / radio is being received in the HUD. This setting can be enabled / disabled during a mission. 
Show Incoming Traffic Units	If enabled, shows the name of the Player whose transmission you are receiving. This setting can be enabled / disabled during a mission.  **WARNING** This setting does not work unless **Show Incoming Traffic** is enabled.

NOTE

The default values of the **Show HUD**, **Show Incoming Traffic**, and **Show Incoming Traffic Units** settings, which determine if the buttons are functional or not, can be changed in the `VBSRadioSettings.xml` file. For more information, see VBSRadioSettings Configuration File (on page 39).

7.1.2 Admin View

Click the **Admin View** tab, and adjust the following settings.

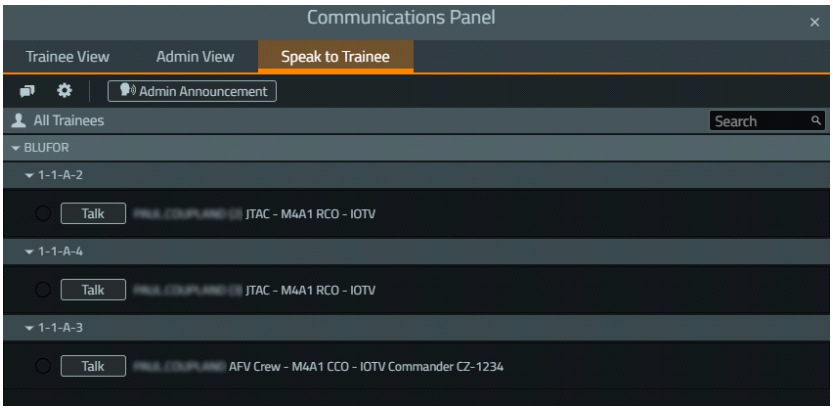


Settings	Description
Voice Networks	Control the Voice Networks: • **Push to Talk** - Click the **Talk** button to broadcast. The indicator light illuminates (**green**). If you are using a half-duplex radio profile, the indicator turns **red** if you are blocked by another user who is broadcasting. The Radio HUD indicator shows circular radio waves (see Radio HUD and Controls (on page 60)). • **Monitoring** - Select to monitor the **L** (Left) / **R** (Right) ear output (see Create Radio Channels (on page 18)). • **Network** - Displays the Communication Channels.

Settings	Description
Radio Channels	Control the Radio Channels: • **Push to Talk** - Click the **Talk** button to broadcast. The indicator light illuminates (**green**). If you are using a half-duplex radio profile, the indicator turns red if you are blocked by another user who is broadcasting. The Radio HUD indicator shows circular radio waves (see Radio HUD and Controls (on page 60)). • **Monitoring** - Select to monitor the **L** (Left) or **R** (Right) ear output (see Create Radio Channels (on page 18)). • **Channel** - Displays the channel names. • **Frequency (MHz)** - Displays the set frequencies for each radio channel.
Intercoms	• **Push to Talk** - Click the **Talk** button to broadcast. The indicator light illuminates (**green**). • **Monitoring** - Select to monitor the **L** (Left) or **R** (Right) ear output (see Create Radio Channels (on page 18)). • **Vehicle** - Vehicle configuration name. • **Vehicle URN** - Vehicle Unit Recognition Number (URN). • **Vehicle Handle** - VBS reference for entities. **TIP** Hover your cursor over a vehicle in the **Vehicle**, **Vehicle URN**, or **Vehicle Handle** columns to see a list of the vehicle occupants.

7.1.3 Speak to Trainee

Click the **Speak to Trainee** tab to open the All Trainees list, and speak directly to a specific Trainee.



Column	Description
Push to Talk	Click the **Talk** button next to a specific player to speak to them directly. The indicator light shows **green**. If you are using a half-duplex radio profile, the indicator light shows **red** if you are blocked by another user who is broadcasting.
All Trainees	Lists the names of the players in the scenario.

7.2 Transmission Visualization

Transmissions are visualized in 2D and 3D Views in Execute Mode. The following icons appear next to the transmitting unit in the 2D View, and above them in the 3D View, depending on the transmission type:

> **NOTE**
>
> The icons are only visible to Administrators / Instructors.

Icon	Description
	Simulated Radio / Additional audio channels (Pitch Voice)
	Intercom
	Direct Talk

8. Retractable Radio Mast

The Retractable Radio Mast (RRM) is a type of Antenna which can be assigned to any vehicle using the VBS Radio UI (see Setting Up VBS Radio (on page 12)). When such an Antenna is assigned to a vehicle, both transmitters and receivers of radio signals within the range of the Antenna are able to communicate.

NOTE

The **Land Rover Wolf - FFR** vehicle has a physical RRM, with an Antenna assigned by default, which is raised / lowered by units inside the vehicle. To configure other vehicles with an RRM Antenna, see Class Antennas in the VBS Developer Reference.

FEATURE NOTICE

This feature is part of VBS Radio Pro, a licensed product. For more information, contact sales@bisimulations.com.

NOTE

The following considerations apply when using RRM Antennas:

- Vehicles with an assigned Antenna have them automatically set as fully "raised" at mission start by default. Trainees inside the Land Rover Wolf - FFR must fully raise the RRM Antenna from within the vehicle for it to be functional (see Raising / Lowering the RRM (on page 84)).
- The Land Rover Wolf - FFR can also have a customized Antenna assigned to it, which then overrides the existing default Antenna. However, the physical RRM Antenna must still be fully raised for it to be functional. For more information, see Land Rover Wolf - FFR Antenna.
- Antennas affect only Radio Types, see VBS Radio Concepts (on page 9).
- Antenna signals are affected by Jammers, see Radio Jamming Device (on page 43).
- Antenna signals are affected by Degradation, see Degradation (on page 33).
- The range of RRM Antenna overrides the range of all the Radio Channels (except VOIPs) of player units who are inside the vehicle.

How the RRM Antenna is used by Trainees is discussed in Retractable Radio Mast Simulation (on page 83).

8.1 Configuring Antennas

Use the following procedures to configure Antennas for vehicles which do not have a physical RRM, or configure a customized Antenna to assign to the Land Rover Wolf - FFR vehicle.

WARNING

Antennas can only be configured in **Prepare Mode**.

Follow these steps:

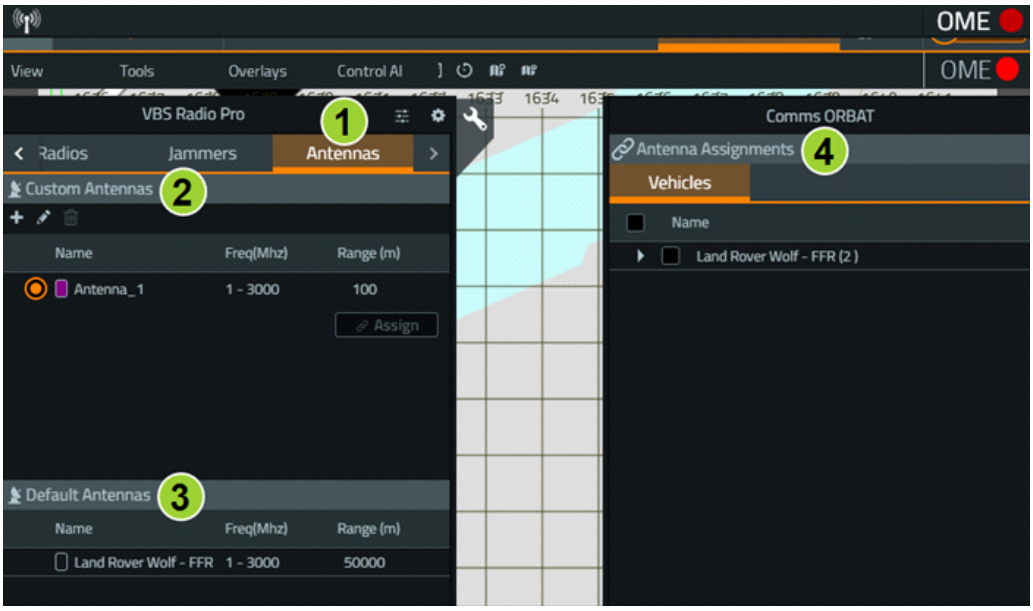
1. In the VBS Editor, go to **Tools > Radio Admin** to open the Radio UI.

   The Radio UI opens.

2. If necessary, click the **right arrow** icon next to the Jammers tab to expose the Antennas tab.

3. Click the **Antennas** tab to open the Antennas UI.



The Antennas UI has the following features:

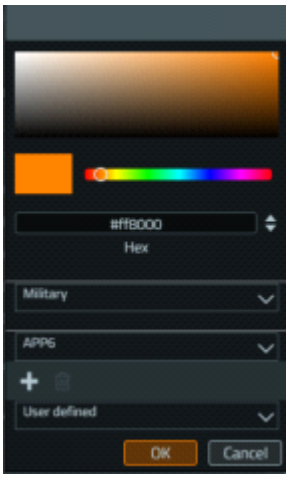
Number	Description
1	Antennas Tab
2	Custom Antennas Panel
3	Default Antennas Panel
4	Antenna Assignments Panel

8.1.1 Creating Antennas

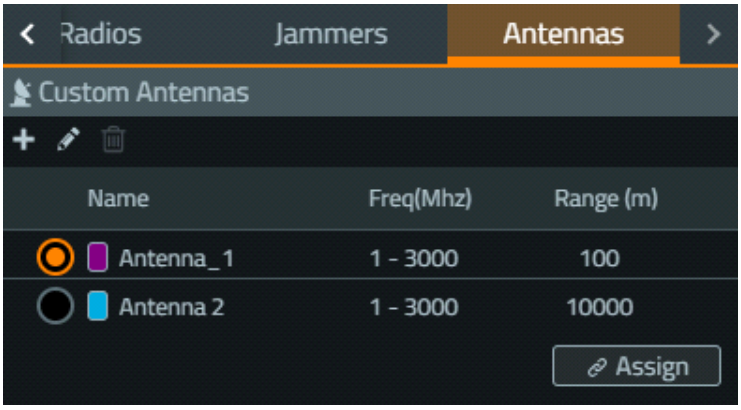
Antennas are created in the **Custom Antennas** panel.

Click the **plus** icon to open the Add Antenna Device dialog.

Adjust the following settings, and click **Save**.

Setting	Description
Name	Enter a unique name for the Antenna.
Color	 Click the **color** icon to open the color picker, select a predefined color (Military, APP6, User Defined), or create a customized color for Jammer identification, and click **OK**. The color you select is also used for the Antenna Range Visualization (on the next page).
Range	Enter the radius (in meters) of the area that the Antenna signal covers (see also Antenna Range Visualization (on the next page)).
Frequencies	Click a **radio button** to select a frequency for the Antenna: **All**, **HF**, **VHF**, **UHF**, **Custom** (**Min.** - Minimum value in MHz, **Max.** - Maximum value in MHz).

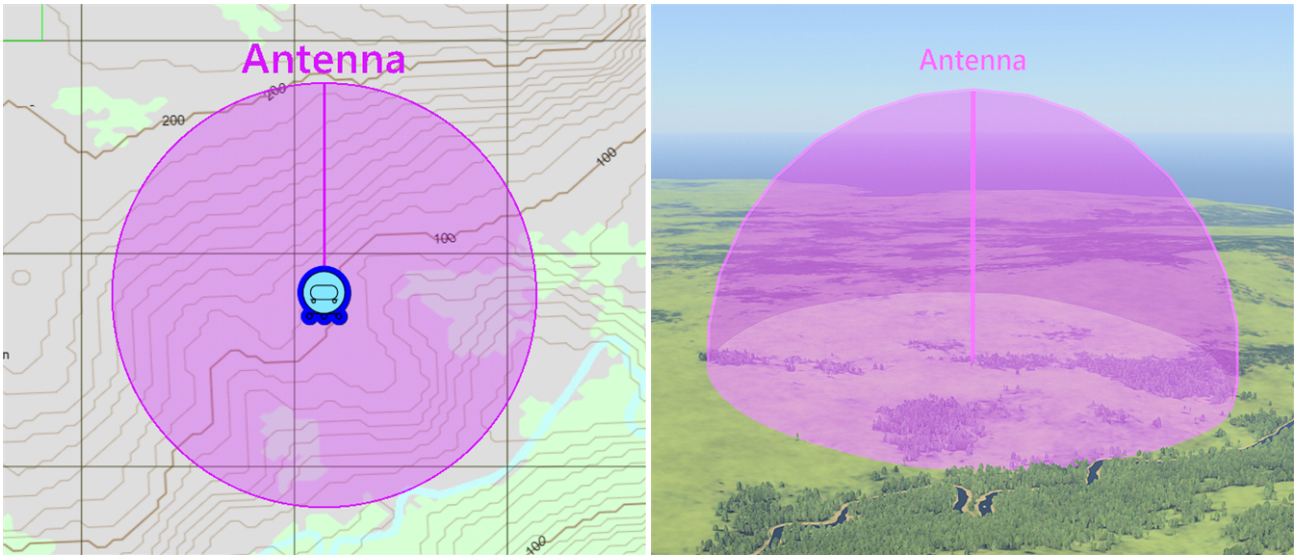
Your new Antenna is added to the Custom Antennas panel, and can now be assigned to a vehicle (see Assigning Antennas (on the next page)).



Antenna Range Visualization

The range of the Antenna can be visualized in VBS4, using the Color (on the previous page) you designated for Antenna identification.

Image-5: 2D and 3D range visualization



NOTE

Use the Range Visibility Settings in the VBS4 Administrator Manual to enable / disable the entire range visualization or individual elements of it.

Range visualizations can only be seen by scenario Administrators and Instructors, not Trainees.

8.1.2 Assigning Antennas

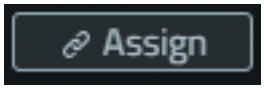
Antennas are assigned to Vehicles (manned or unmanned) in the **Antenna Assignments** panel.

WARNING

Antennas can only be assigned to Vehicles.

Follow these steps:

1. In the **Custom Antennas** panel, click the **radio button** next to the specific **Antenna** you want to assign to a Vehicle.
2. In the **Antenna Assignments** panel, check the **box** next to the specific **Vehicle** you want to assign the Antenna to.
3. In the **Custom Antennas** panel, click **Assign**.



The Antenna is assigned to the selected Vehicle. Confirm this by expanding the corresponding line in the **Antenna Assignments** panel, by clicking the **right arrow**, and review the assigned Antenna.

TIP

To unassign Antennas, see Deleting Antennas (on page 81).

8.2 Editing Antennas

Antennas are edited using the **Edit** control in the **Custom Antennas** panel.

Follow these steps:

1. Click the **radio button** next to the **Antenna** you want to edit.
2. Click the **edit** icon to open the Edit Antenna Device dialog.

Image-6: Edit Antenna Device dialog

3. Make your adjustments, and click **Save**.

8.3 Deleting Antennas

Antennas are deleted and removed from a Vehicle using the **trash** icon in the **Custom Antennas** panel.

WARNING

Antennas that were assigned to a vehicle must be unassigned from the vehicle first before you can delete them.

Follow these steps:

1. In the **Antenna Assignments** panel, click the **arrow** next to the Vehicle you want to unassign the Antenna from.

   The Antenna is shown.

2. Click the **unassign** icon.

3. In the **Custom Antennas** panel, click the **radio button** next to the **Antenna** you want to delete.
4. Click the **trash** icon.

The selected Antenna is deleted.

8.4 Land Rover Wolf - FFR Antenna

The Land Rover Wolf - FFR has an existing physical RRM with an Antenna assigned by default, which is shown in the **Default Antennas** panel for informational purposes. It always has a **black** color symbol next to it.

WARNING

This Antenna cannot be modified or deleted.

The range of the Land Rover Wolf - FFR RRM Antenna is set as 5000 meters by default and is visualized on the 2D Map as a colored circle, similar to the Range (on page 77) of other assigned Antennas. However, the color of the circle cannot be changed and is color-coded depending on the side of the vehicle, or the side of the occupants of the vehicle, as follows:

Side	Circle Color
BLUFOR	**Blue**
OPFOR	**Red**
Civilian / Independent	**Black**

TIP

If you require a different colored circle / range for the Land Rover Wolf - FFR RRM Antenna, you can assign a customized Antenna to the vehicle, which then overrides the default Antenna. How to do this is discussed in Configuring Antennas (on page 76).

8.5 Retractable Radio Mast Simulation

The Retractable Radio Mast (RRM) is a type of Antenna which can be assigned to any vehicle by your Administrator / Instructor (see Retractable Radio Mast (on page 75)). When an Antenna is assigned to a vehicle, both transmitters and receivers of radio signals within the range of the Antenna are able to communicate. You can operate and use the Antenna from any position in the vehicle.

NOTE

The **Land Rover Wolf - FFR** vehicle has a physical RRM, with an Antenna assigned by default, which is raised / lowered by units inside the vehicle. To configure other vehicles with an RRM Antenna, see Class Antennas in the VBS Developer Reference.

FEATURE NOTICE

This feature is part of VBS Radio Pro, a licensed product. For more information, contact sales@bisimulations.com.

NOTE

The following considerations apply when using RRM Antennas:

- Vehicles with an assigned Antenna have them automatically set as fully "raised" at mission start by default. Trainees inside the Land Rover Wolf - FFR must fully raise the RRM Antenna from within the vehicle for it to be functional (see Raising / Lowering the RRM (on the next page)).
- The Land Rover Wolf - FFR can also have a customized Antenna assigned to it, which then overrides the existing default Antenna. However, the physical RRM Antenna must still be fully raised for it to be functional. For more information, see Land Rover Wolf - FFR Antenna.
- Antennas affect only Radio Types, see VBS Radio Concepts (on page 9).
- Antenna signals are affected by Jammers, see Radio Jamming Device (on page 43).
- Antenna signals are affected by Degradation, see Degradation (on page 33).
- The range of RRM Antenna overrides the range of all the Radio Channels (except VOIPs) of player units who are inside the vehicle.

Image-7: Land Rover Wolf - FFR with lowered RRM

8.5.1 Raising / Lowering the RRM

The Land Rover Wolf - FFR has the RRM in the lowered position at the start of a scenario by default. You must fully raise it from inside the vehicle.

NOTE

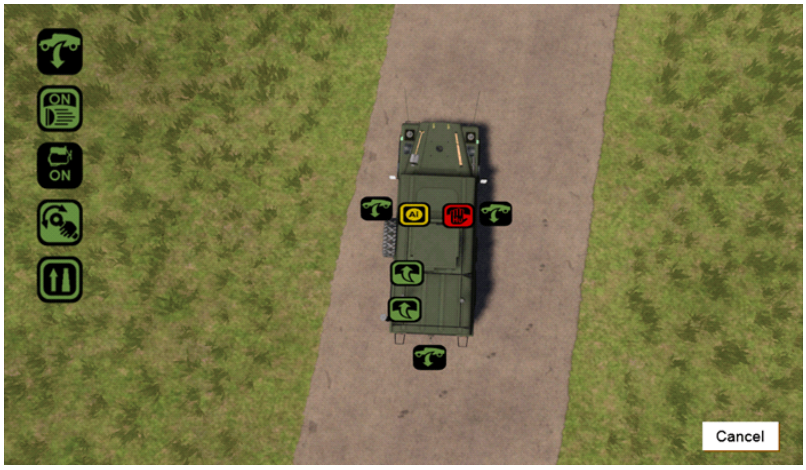
Vehicles with assigned Antennas have them fully "raised" by default. They cannot be lowered as they do not have a physical RRM. Therefore, the following procedure applies only to vehicles with a physical RRM, such as the Land Rover Wolf - FFR.

TIP

The RRM can be raised from any position within the vehicle.

Follow these steps:

1. Do one of the following:
   - In the Quick Menu (see Quick Menu Actions in the VBS4 Trainee Manual), select **INTERACT**.
   - Press **Interact with Vehicle** (**U**) to access the Interact with Vehicles Interface (IWV).



2. Click the **Raise / Lower Mast** icon to fully raise the RRM.

3. Click **Cancel** to return to the scenario, or repeat step 2 to lower the RRM.

8.5.2 Antenna HUD

When the RRM of the Land Rover Wolf - FFR is fully raised, or if a customized Antenna is assigned to your vehicle (see Assigning Antennas (on page 79)), you see the Radio HUD at the bottom-left of your screen (see Radio HUD and Controls (on page 60)):

TIP

You may need to press comma (,) or period (.) to see the HUD. For more information, see Radio HUD and Controls (on page 60).

The heading at the top of the HUD displays the current (extended) range of the Antenna in meters.

WARNING

This information only shows when you have a Radio Channel assigned (see Assign Channels and Radio Types (on page 27)).

8.5.3 Limitations

If a unit is inside a vehicle with an Antenna assigned, and another unit is outside the same vehicle, and they are both using the same Radio Channel, only the unit inside the vehicle has the boosted range of the Antenna. In the case of a very short radio range, the unit inside the vehicle is able to talk to the unit outside the vehicle, but not other way around. All units in all vehicle positions are affected.

9. VBS Radio Playback in AAR

VBS Radio enables VBS AAR to replay communications transmitted by users during a scenario. Individual radio channels can be turned on or off to focus on specific group communications.

WARNING

The use of multiple channels may impact AAR recording, depending on server and network capacity.

By default, all channels are **on** during AAR Playback. However, you can control which communications are transmitted during AAR Playback by selecting which channels to play.

In VBS AAR, click the **speaker** icon on the toolbar to open the All Networks and Channels panel.

Use the following controls:

- Use the **Search** fields to look for a specific transmission channel.
- Mute / unmute channels:
  - Check the **Monitor All** / **None** box at the top of the All Networks and Channels panel to mute / unmute all channels.
  - Check / uncheck the boxes in the **Monitor** column to mute / unmute specific transmission channels.
- Click the **Show Text Chat** button to access the Global Text Network (see Communications Panel (on page 61)), to see any text chats that occurred.

During playback, the following icons appear in the All Networks and Channels panel when radio transmission occurs.

Icon	Description
	Shown next to the name of a unit / channel indicating unmuted transmission.
	Shown next to the name of a unit / channel indicating muted transmission.

In addition, the icons in the following table appear on the AAR timeline and on the 2D / 3D map, followed by a colored line. The lines indicate the duration of a transmission. The color of the icons / lines indicates the side of the unit transmitting.

Icon	Description
	Simulated Radio / Additional audio channels (Pitch Voice)
	Intercom
	Direct Talk

9.1 VBS Radio AAR Limitations

The following limitations apply during VBS Radio playback in AAR:

- If Advanced Settings and Presets (on page 31) is set as **With Radio / VoIP Transmission**, icons in AAR timeline are inconsistent.
- Direct Talk sound depends on the position of the camera in 3D Camera View. You can hear Direct Talk transmissions in AAR only if you "fly" the camera close enough to the unit using it (Direct Talk cut-off distance). On the 2D Map, the initial position of a Direct Talk transmission becomes fixed, and does not move with the camera. You still hear the transmission, regardless of where the camera is.

10. VBS Radio Standalone

Bohemia Interactive Simulations provides a separate application, VBS Radio Standalone, to enable non-VBS4 users to communicate with VBS4 users participating in a VBS Radio scenario.

FEATURE NOTICE

VBS Radio Standalone is a licensed product. For more information, contact sales@bisimulations.com.

This topic describes the specific process to use VBS Radio Standalone connected to VBS4 running a VBS Radio scenario:

1. Deploy VBS Radio Standalone (below)
2. Configure VBS Radio Standalone (on the next page)
3. Using VBS Radio Standalone (on page 93)

NOTE

VBS Radio Standalone also supports use cases that do not require VBS4, and has additional configuration and usage options not described in this topic.

For more information, refer to the Pitch Talk User Guide in the VBS Radio Standalone installation `\docs\` folder.

10.1 Deploy VBS Radio Standalone

Bohemia Interactive Simulations distributes VBS Radio Standalone as a download package available from VBS License Manager or delivered directly by Customer Support.

Use the download package to install VBS Radio Standalone.

Follow these steps:

1. Navigate to the download folder and extract the download package.
2. Run `VBS_Radio_Standalone.Core.InstallerX64.version.exe`.

   The VBS Radio Standalone Installation Wizard opens.
3. Click **Next** to continue.
4. Review the License Agreement, and click **I Agree** to continue.
5. In the Choose Install Location panel, input or **Browse** for the **Destination Folder**.
6. Click **Next** to continue.

7. In the Choose Components panel, select the options to install:
   - Create Start Menu Shortcut
   - VBS Radio Standalone (mandatory)
   - Install Drivers
   - Firewall Exceptions

   WARNING

   Select **Install Drivers** and **Firewall Exceptions** if you are installing on a computer that does not already have VBS4 installed.
8. Click **Next** to continue.
9. Specify the **Start Menu Folder**, and click **Install**.
10. **Optional:** Select **Do not create shortcuts** to skip this step.

    The installer deploys VBS Radio Standalone to the selected folder and creates the selected shortcuts.
11. Click **Finish** to close the Installation Wizard.

10.2 Configure VBS Radio Standalone

To use VBS Radio Standalone to communicate with VBS Radio users in VBS4, configure its settings to connect to the same Pitch Talk Servers as specified by VBS4.

WARNING

If VBS Radio Standalone users are to be represented as entities in the VBS mission, apply URNs to those entities in VBS Editor Prepare Mode. This can be done for any human entity, including invisible spectators.

On each VBS Radio Standalone client, configure the connection settings.

Follow these steps:

1. Start `VBSRadioStandalone.exe`.
2. Click the **Settings Button** to open the Settings dialog.

3. Select the **HLA Settings** tab, and specify the following settings:

HLA Settings	Description
Federation Name	Specify **VBS Radio**.
Pitch pRTI specific	Select this option and specify the CRC Host and CRC Port.
CRC Host and Port	Specify the same IP Address and Port used as the **Federation Address** (`-pitchprtiserver`) specified when starting VBS4. **NOTE** If the VBS4 Host does not specify separate Pitch Servers, use the VBS4 Host IP Address and Port 8992. For more information, see Starting VBS Radio (on page 50).

4. Select the **User Identification** tab.

   Set the **Client Id:**

   NOTE

   This must be the same as the URN of the user / AI you want to connect to.

   TIP

   Multiple VBS Radio Standalone clients can use the same Client Id. Use this method for clients that use the same group of units.

   For example, if two separate clients are intended to communicate with members of the BLUFOR and Platoon A, they can use the same Client Id.

5. Click **OK**.

If you have not set URNs, enable the clients to connect on the VBS4 Host computer.

Follow these steps:

1. Start VBS4 as the administrator with VBS Radio enabled.
2. In the Battlespace Functions panel, go to **Execute**, and click **Host** to open the Networking Lobby.
3. Open a web browser at `localhost:9600` to open Pitch Talk.

4. Log in with **Name: admin** and **Password: admin**.

   Pitch Talk displays a Project with the name of your mission (only running MP missions are shown).

5. Click the mission name and select the **Users** tab.

6. For each Client Id configured in VBS Radio Standalone, click **New** to create a new user and use the following settings:

Setting	Description
Name	Input the name used as the Client ID
Identification Method	Select **Client Id** and input the name used as the Client Id as the fingerprint. **TIP** Multiple VBS Radio Standalone clients can use the same Client Id. Use this method for clients that use the same group of units. For example, if two separate clients are intended to communicate with members of the BLUFOR and Platoon A, they can use the same Client Id.

7. Click **OK**.

   Pitch Talk adds the new user to the Users list.

8. Click the **redeploy project** icon.

VBS Radio Standalone is configured and connects to a VBS Radio scenario when the mission is started from a VBS4 Host using the same Federation Address and VBS Radio Standalone is turned on. Each user can communicate using the Networks and Channels assigned to the units assigned to them in Pitch Talk.

10.3 Using VBS Radio Standalone

When VBS4 hosts a VBS Radio scenario, VBS Radio Standalone connects to the same Federation Address when VBS Radio Standalone is turned on.

Use VBS Radio Standalone to communicate with users in the VBS Radio scenario.

Follow these steps:

1. Start `VBSRadioStandalone.exe` to open the VBS Radio Standalone UI.

2. Turn on the radio using the dial:
   - Select **PTT** to use Push-to-Talk communication with the **PTT** button.
   - Select **VOX** to use Voice Activation.

   VBS Radio Standalone connects to the mission and displays the first channel.

3. Select the channel to use by using the **PRE + / -** buttons to cycle through the channels set up for the VBS Radio scenario.
4. To use any available Chat channels, follow these steps:
   a. Expand **Chat**, and select the tab name for the Chat channel to use.
   b. Type your message, and click **Send**.

   For information about VBS Radio Chat, see Communications Panel (on page 61).

TIP

Hotkeys are available as keyboard shortcuts. Do the following:

1. Click the **Settings Button** to open the Settings dialog.

2. Select the **Hotkeys** tab.
3. Click **Set** for the applicable option and press the key to use as the keyboard shortcut.
4. Click **OK**.

11. VBS Radio Troubleshooting

If you have an issue with VBS Radio, there are various methods you can use to determine what the problem is. If you are unable to solve the issue, you can prepare files for further investigation by Bohemia Interactive Simulations, which are discussed in this topic.

The following resources can help you to establish what the problem is:

- VBS Radio Debugging (on the next page)
  - Server Admin Panel Recovery Actions (on page 97)
  - General Issues (on page 99)
  - Radio Logs and the Diagnostic Dump (on page 100)
- User Interfaces (on page 104)
  - PitchTalk Admin Console (on page 104)
  - pRTI Explorer UI (on page 104)
  - Pitch Control Center (on page 105)
  - Web UI (on page 105)
- VBS Radio Known Limitations (on page 106)

If you are unable to resolve the issue, you should send the following items to Bohemia Interactive Simulations:

- If possible, all of the diagnostic logs mentioned in this topic or, preferably, the diagnostic dump `.zip` file, which includes all the logs (see Radio Logs and the Diagnostic Dump (on page 100)).
- Your VBS mission and AAR file (if relevant).
- Text describing what was happening when the error occurred, together with a brief description of your network setup.

11.1 VBS Radio Debugging

For cases of repeated and reproduceable VBS Radio problems, it is highly advised to re-create the affected mission again with `-VBSRadioDebug` running on all clients, including the server. This way, a diagnostic dump and, specifically, the Radio Component Log (on page 102) files, shall include much more information to enable problem resolution.

What files are generated, and where they are found, is influenced by the `-VBSRadioDebug` parameter (see VBS Launcher Radio Tab).

NOTE

Consider the following with regard to the `-VBSRadioDebug` parameter:

- If used, logs are written to a dedicated Radio Component Log (on page 102) file.
- If not used, a limited amount of information is logged to the VBS4.RPT (on page 102) file.

These files are also included in a `.zip` file when the diagnostic dump feature is employed (see Radio Logs and the Diagnostic Dump (on page 100)).

TIP

To look for possible network related issues, it is advisable to check correct network communication between workstations (using the Microsoft Windows Command Line `ping` command, for example). This should discover issues where VBS instances can communicate with each other, but VBS Radio does not work (the default relevant ports are 8992 and 6000).

NOTE

The reliability of communications may be improved by:

- Disabling firewalls (Microsoft Windows Firewall, for example).
- Running a DHCP server on the network, and manually setting the IP Address for each computer with all computers running VBS Radio, and using the DHCP server as the Default Gateway address.

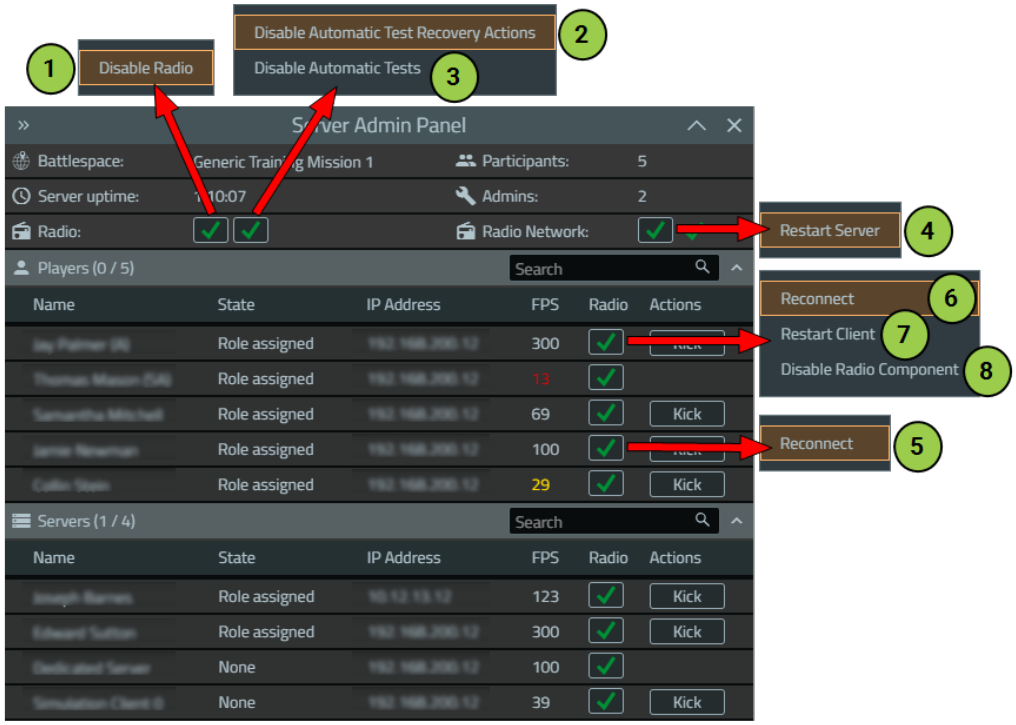
11.1.1 Server Admin Panel Recovery Actions

VBS Radio automatically detects issues in the background, using named automatic tests. The status of VBS Radio infrastructure is shown in the Server Admin Panel (see Server Admin Panel in the VBS4 Instructor Manual). When using `-vbsRadioDebug`, test output is also logged in the `VBSPitchRadio.log`. Some of the automatic tests should automatically perform "recovery actions" if known issues arise, and fix them without administrator intervention. These tests include: Pitch mission deployment, Pitch client connection, client data consistency, and Pitch mission data consistency.

> **NOTE**
>
> Automatic tests run at periodic intervals. Any recovery action immediately removes status icons / warnings. If the issue is not resolved, it is detected during the next test run. After triggering a recovery action (either manual or automatic), wait at least 1-2 minutes before trying to resolve the issue again.

In addition to automatic tests, there are various manual tests ("recovery actions") that you can perform to try and resolve issues. These actions are accessed from context menus attached to the VBS Radio icons / buttons (see also Server Admin Panel in the VBS4 Instructor Manual).

Image-8: Server Admin Panel recovery actions



Manual Recovery Actions - Server

The following table lists recommended manual recovery actions to try, if you have an issue affecting the entire server.

Number	Action	Description
1	**Disable / Enable Radio**	Select **Disable Radio** to disable radio for the whole mission and kill all Pitch related processes (pRTI, Admin Server, and so on). The `VBSPitchRadio` component for all currently connected clients is also disabled. If VBS Radio is blocking training or causing other major issues, it can be turned off, but as a last resort. **NOTE** If **Enable Radio** is called during a mission, any previous runtime changes compared to initial mission configuration are not present (for example, if there is an automatic respawn and there are units who respawned several times that have no radio). If VBS Radio is disabled on the server and there are any new join-in-progress clients, their `VBSPitchRadio` component is not disabled.
2	**Disable / Enable Automatic Test Recovery Actions**	Select **Disable Automatic Test Recovery Actions**, if recovery actions done by automatic tests keep restarting the client without seemingly solving the issue (for example, users repeatedly lose their federate connection with the Pitch Server), or if they are interfering with manual recovery actions. **NOTE** If you select **Disable Automatic Test Recovery Actions**, automatic tests continue to run and report / log fails, but with no recovery action.
3	**Disable / Enable Automatic Tests**	Select **Disable Automatic Tests** to attempt to slightly improve CPU / network performance on both the server and clients, otherwise it is not recommended to select this option.
4	**Restart Server**	Select to undeploy the current mission on the Pitch Admin Server, regenerate the mission data, and redeploy it. Usually used if a mission is not deployed or if some clients are unable to talk / listen on some channels.
5	**Reconnect**	Select to reconnect server federates. Used, for example, if a server connection test fails, or if AAR on the server is not recording VBS Radio properly.

Manual Recovery Actions - Clients

The following table lists recommended recovery actions to try should you have an issue affecting a single client.

Number	Action	Description
6	**Reconnect**	Select to reconnect the client federate to pRTI. Useful in cases when a client sees the VBS Radio HUD, but cannot talk / listen on channels.
7	**Restart Client**	Select to re-sync mission data from the server and reconnect the client federate to pRTI. Useful for cases when the client does not have channels which they should have, or they are all missing. For example, they do not see the VBS Radio HUD (see Radio HUD and Controls (on page 60)) or channels in the Communications Panel (see Communications Panel (on page 61)).
8	**Disable / Enable Radio Component**	Select **Disable Radio Component** to perform a hard restart of the whole `VBSPitchRadio` component of a client. Should be used as a last resort to try and fix any issues. If this action does not solve client issues, it means that there is a different problem or that the whole client VBS needs to be restarted. In addition, you can use this action to disable a troublesome VBS Radio of a client, if it is affecting general radio stability.

11.1.2 General Issues

The following table lists potential issues and possible solutions using the VBS Radio icons / buttons in the Server Admin Panel.

Issue	Solution
Client has the VBS Radio HUD but cannot hear / listen	Click the client **Reconnect** icon / button to reconnect the client.
Client does not have the VBS Radio HUD	Click the **Restart Client** icon / button to restart the client.
Specific client is missing channels	Click the **Restart Client** icon / button to restart the client.
VBS Radio did not deploy	Click the **Restart Server** icon / button to restart the server.
IsProcessPRTIActive > pRTI did not start	Click the **Restart Server** icon / button to restart the server.

Issue	Solution
It says: "IsProcessAdminServerActive failed" n the VBSPitchRadio.log	Means that the Pitch Server process did not start. Exit the mission and lobby and host it again.
The ClientHasComponentEnabled test is failing	Means either of the following: • The client has the `VBSPitchRadio` component disabled (`-disableVBSRadio`). • The client is currently frozen (for example, loading into the mission).
The server shows a "connection error" in the Server Admin Panel, but clients show no connection issues	Click the server **Reconnect** icon / button to reconnect the client.

If an issue persists after both automatic and manual recovery actions have been attempted, do the following:

1. Try to restart all VBS clients and servers (check for ghost Java / VBS processes).
2. Re-generate the `VBSRadioSettings.xml` configuration file.
3. Check the mission VBS Radio setup (see Setting Up VBS Radio (on page 12)), re-save the mission, and host it again.
4. Troubleshoot by creating a simpler mission with a simple VBS Radio setup, and host it with a limited number of players.

11.1.3 Radio Logs and the Diagnostic Dump

Any administrator present in a running / hosted mission can execute the following script command locally using the Developer Console (see Developer Console) to create a diagnostic dump.

```
_result = componentFunction ["VBSPitchRadio", "dump"]
```

This command collects diagnostic files from all client computers and the server computer, copies them to the computer which called the script, and compresses them into a single `.zip` file.

You can find the `.zip` file at the following location:

`%LOCALAPPDATA%\VBS4\RadioDiagnostic\`

NOTE

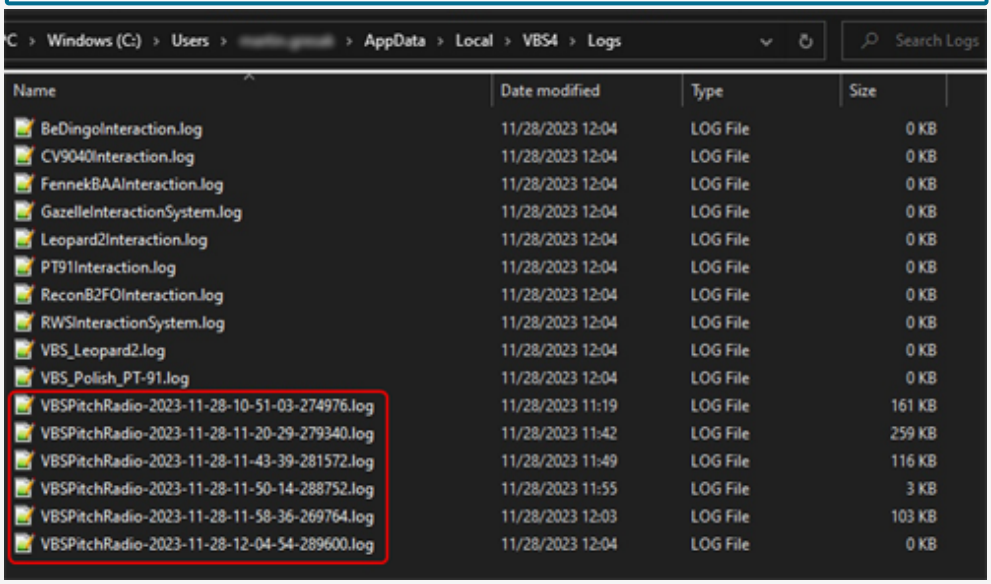
The following considerations apply:

- All instances of path `%LOCALAPPDATA%\VBS4\` refer to the default "user-profile data location". To change the profile location, see Advanced - Configuration.
- For the diagnostic dump to be useful, you should recreate the problem you encountered before executing the script command.
- Where there are multiple clients, the `.zip` file contains a folder for each client computer (named after each computer), containing the diagnostic files.

The following VBS Radio logs exist and are included in the diagnostic dump.

Dedicated Server and the Simulation Client Computer

File	Description
PitchTalk Admin Project (*5dd555f7-9cd6-4014-b703-b1a8c1fe458c*.admin)	Contains the project of the radio mission that is currently deployed. Generated on the computer where the mission is hosted (VBS server). File path: *\VBS_Installation*\lib64\pitchTalk\pitchtalk\admindata\projects\
PitchTalk Admin Log (adminserver-*date-time*.log)	Contains information about managing the radio mission from the perspective of PitchTalk. Generated on the computer where the mission is hosted (VBS server). File path: *\VBS_Installation*\lib64\pitchTalk\pitchtalk\logs\
Pitch pRTI / CRC Log (CRC-*date-time-N*.log)	Contains information about connected clients ("federates") from the perspective of PitchTalk. Generated on the computer where the mission is hosted (VBS server). File path: *\VBS_Installation*\lib64\pitchTalk\prti\logs\
Radio Component Internal State (MissionData.json)	VBS Radio mission configuration file. File path: %LOCALAPPDATA%\VBS4\RadioDiagnostic*year-month-day-hour-minutes-seconds*.zip\
CRC Settings (prti1516eCRC.settings)	Central RTI Component (CRC) server RTI configuration file. File path: *\VBS_Installation*\lib64\pitchTalk\prti\conf\

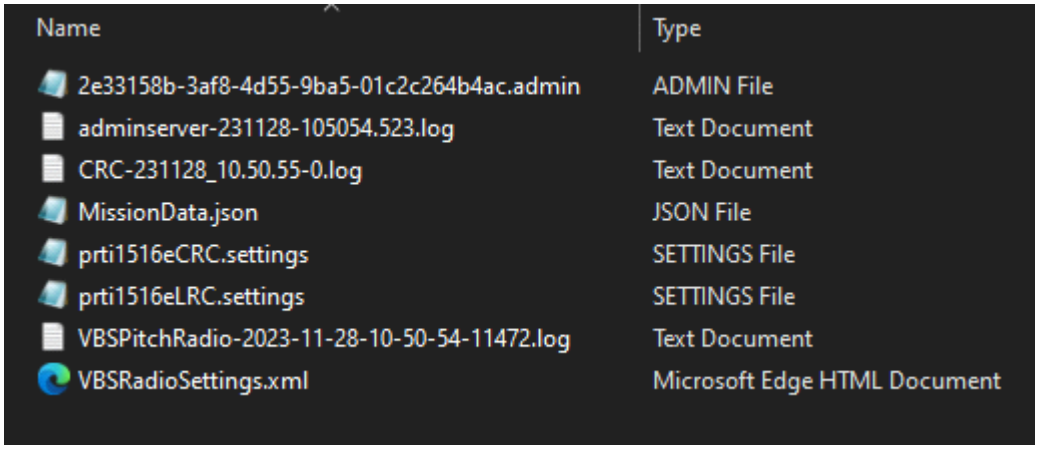
File	Description
LRC Settings (`prti1516eLRC.settings`)	Local RTI Component (LRC) client RTI configuration file. File path: `\VBS_Installation\lib64\pitchTalk\prti\conf\`
Radio Component Log (`VBSPitchRadio-date-time-pid.log`)	Included in the dump `.zip` file, if `-VBSRadioDebug` is used. Contains all logs from the `VBSPitchRadio` component, which are present on each client, and includes information about what was happening with VBS Radio during the mission. On the main host server, they also include information about managing the VBS Radio mission. **Example VBS Radio log backups:** **NOTE** There can be a maximum of six logs. If a seventh log is created, the oldest log already present in the folder is deleted.  File path: `%LOCALAPPDATA%\VBS4\Logs\`
VBS4.RPT (`VBS4.RPT`)	Included in the dump `.zip` file, if `-VBSRadioDebug` is not used. Includes the entire output from VBS4. Contains basic information from `VBSPitchRadio`. File path: `%LOCALAPPDATA%\VBS4\`
Radio Settings (`VBSRadioSettings.xml`)	Radio settings `.xml` file. For more information, see VBSRadioSettings Configuration File (on page 39). File path: `%LOCALAPPDATA%\VBS4\Settings\`

Admin and Trainee Computers

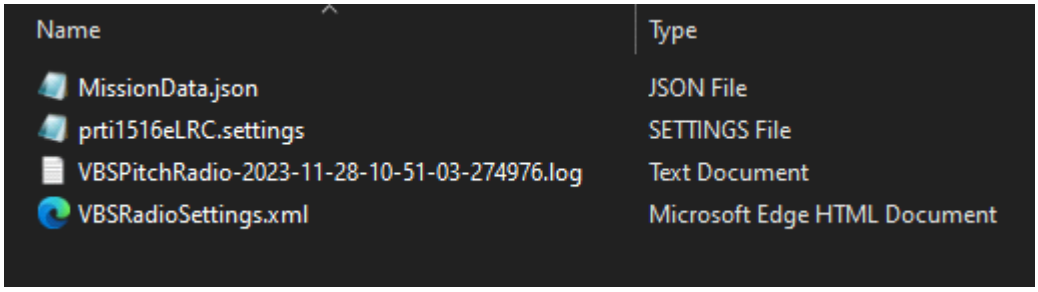
File	Description
Radio Component Internal State (`MissionData.json`)	See Radio Component Internal State (on page 101).
LRC Settings (`prti1516eLRC.settings`)	See LRC Settings (on the previous page).
Radio Component Log	See Radio Component Log (on the previous page).
VBS4.RPT (`VBS4.RPT`)	See VBS4.RPT (on the previous page).
Radio Settings (`VBSRadioSettings.xml`)	See Radio Settings (on the previous page).

Example contents of the `.zip` file (when `-VBSRadioDebug` is used).

Server / Simulation Client computer



Admin / Trainee computer



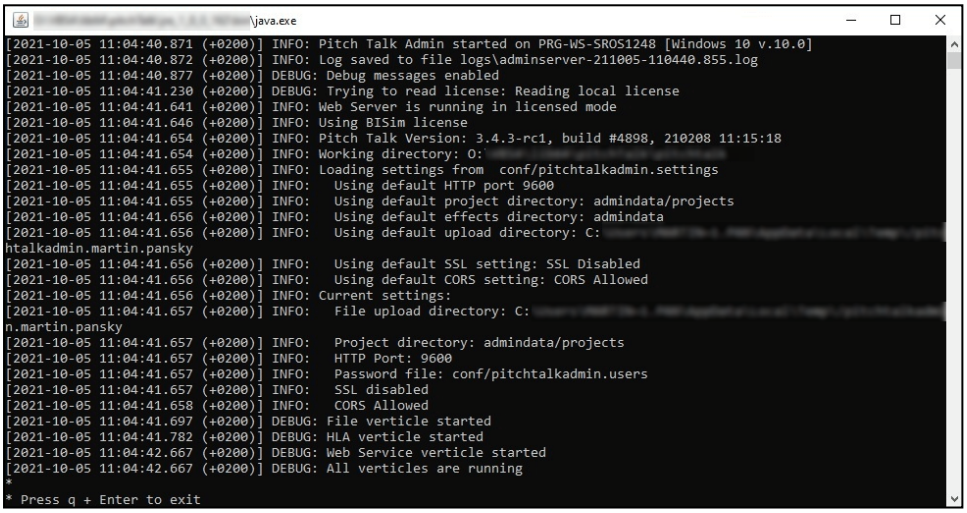
11.2 User Interfaces

The following user interfaces (UIs) are also available to check for errors.

PitchTalk Admin Console

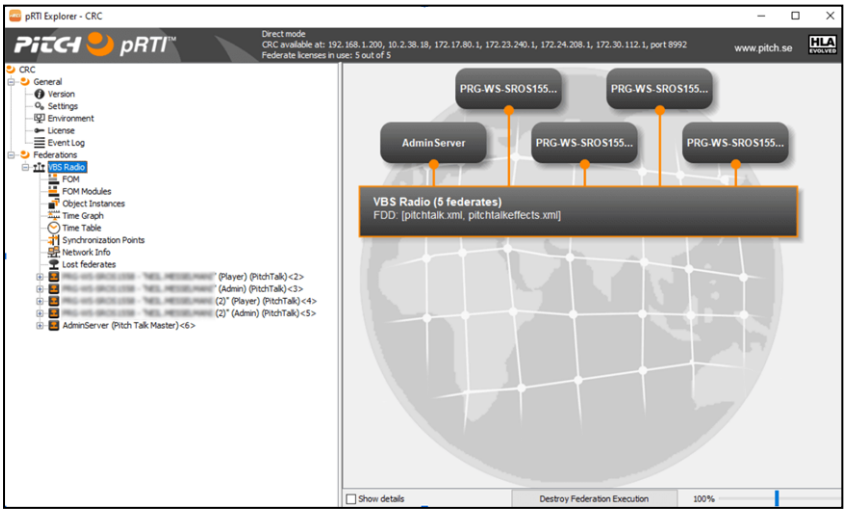
From the host machine only, access this console directly in a browser at `Pitch_Admin_Server_Address:9600` to verify that the project (mission) exists (username: **admin**, password: **admin**).

This console is launched automatically when you use the `-VBSRadioDebug` startup parameter. It is a live log of PitchTalk Admin, which is the same as the PitchTalk Admin Log (on page 101). However, if there is a Java exception in PitchTalk Admin, the console is the only place where the exception appears.



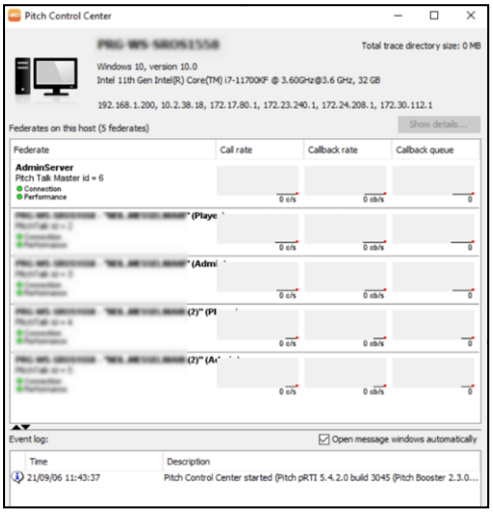
pRTI Explorer UI

The UI contains a visualization of connected clients in an Explorer format. It is meant to be launched from the main host VBS server where you use the `-VBSRadioDebug` startup parameter (this causes the pRTI Explorer UI to launch automatically). The UI contains information about connected clients, lost clients, and so on.



Pitch Control Center

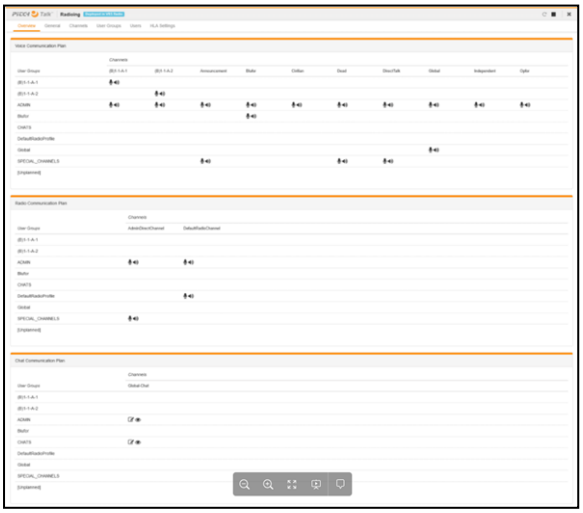
This UI shows information about all PitchTalk radio clients which are on the local computer, and also flags any problems found with PitchTalk. The UI must be launched manually. For more information, see the PitchTalk website.



Web UI

This UI contains information about PitchTalk radio missions, and is a visual representation of the PitchTalk Admin Console (on the previous page). Here you can see who has access to which channels (from the PitchTalk perspective), and compare it with the desired state.

To access the Web UI while in a mission, open the `http://localhost:9600` web page in a browser (login: **admin**, password: **admin**). The web server is hosted by the PitchTalk Admin (see PitchTalk Admin Log (on page 101), PitchTalk Admin Console (on the previous page), PitchTalk Admin Project (on page 101)).



11.3 VBS Radio Known Limitations

- In Execute Mode, it is not possible to access the Radio Admin option in the VBS Editor Tools menu (see Setting Up VBS Radio (on page 12)) and make assignment changes, or redeploy channels.
- The use of many different channels may impact AAR recording, depending on the server and network capacity.
- In some locales, PitchTalk does not recognize device names that use non-Latin characters, resulting in the microphone or sound output not working. If this happens, open the Microsoft Windows Control panel, select the **Region > Administrative** settings, and **Change system locale...** to **English (United States)**.
- At the start of a mission, there may be a small delay in setting up network communication between clients and the host. Channels only appear in the VBS Radio HUD (see Radio HUD and Controls (on page 60)) when VBS Radio is ready.