

Administrator Manual



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>



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1. Administrator Overview

VBS4 is a flexible solution for your training requirements with numerous deployment and configuration options.

The Administrator is a super-user role in VBS4 with the following responsibilities:

- Setting up VBS4 Deployments
- VBS4 Configuration
- Starting VBS4 for Training Sessions
- Managing VBS4 Scenarios as the Instructor
- Performing After Action Review as the Instructor

This manual focuses on VBS4 deployment and installation, the options available to configure and customize VBS4, and how to start VBS4.

To deploy VBS4, follow the process described in [Deploying VBS4 \(on page 13\)](#).

The Administration Manual contains the following primary content:

- [Starting VBS4 \(on page 55\)](#)

Using VBS Launcher or command-line options to control VBS4.

- [VBS4 Settings \(on page 158\)](#)

Specific options to configure VBS4.

- [Virtual Reality Headsets \(on page 306\)](#)

Setup and configure VR Headsets for use with VBS4.

- [Mixed Reality: Overview \(on page 317\)](#)

Setup and use Mixed Reality functionality in VBS4.

- [Screen and Video Capture \(on page 324\)](#)

Capture images and video in VBS4.

- [Support Tools \(on page 326\)](#)

A set of utilities to assist issue diagnosis in VBS4.

- [Advanced Configuration \(on page 333\)](#)

VBS4 components may require specific configuration if they are part of your use case.

- VBS4 stores configuration information in specific [.xml](#) files:

- [VBS4.xml Options \(on page 373\)](#)
- [VBS4 Profile Options \(on page 386\)](#)

- [Config Patch Builder \(on page 435\)](#)

Generate patch files ([.pbo](#)) that contain parameter and value changes for assets in VBS.

To manage VBS World Server, see VBS World Server Overview in the VBS World Server Manual.

To manage a training session, see Scenario Execution in the VBS4 Instructor Manual.

To review a training session, see Scenario Assessment in the VBS4 AAR Manual.

2. Deploying VBS4

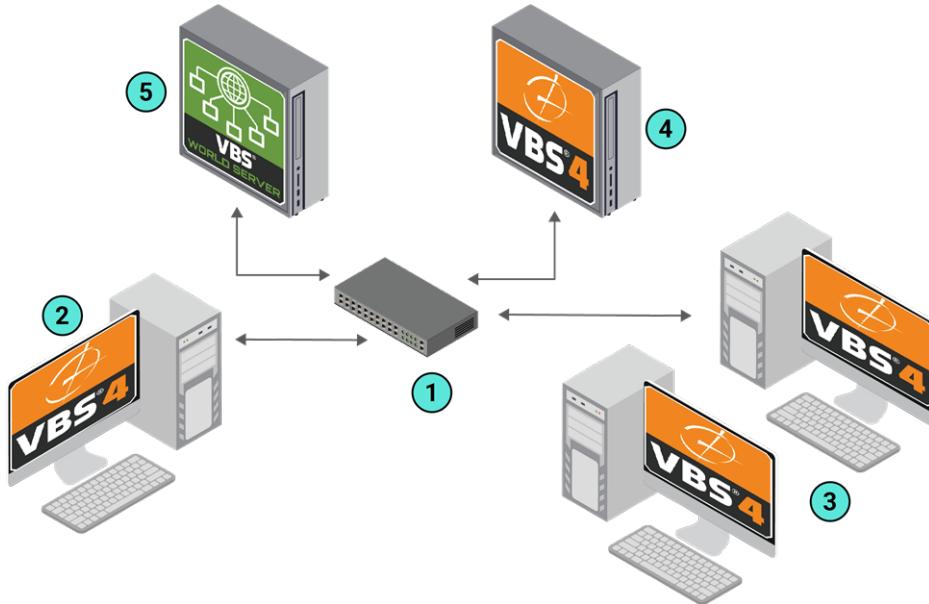
VBS4 is available for download from VBS License Manager and consists of multiple product installers and packages:

- VBS World Server installer
- VBS4 Client / Dedicated Server installer
- A set of mandatory core download packages
- A set of optional download packages.

WARNING

VBS4 and VBS World Server installations must be the same major version (e.g., 21.1.x) to ensure full compatibility.

For most use cases, a VBS4 deployment consists of the products shown in the following diagram.



1	Network Switch	The recommended setup for VBS4 deployments is for all clients and servers to share the same network.
2	VBS4 Admin Clients	<p>The Admin Client is a VBS4 Client installation started with Administrator privileges for the following primary purposes:</p> <ul style="list-style-type: none">• Prepare - Design Scenarios by creating a Battlespace containing terrain edits, a tactical plan, and a mission.• Execute - Start and manage a Scenario as the Instructor.• Assess - Run After Action Review to playback a Scenario Execution.

3	VBS4 Trainee Clients	Each Trainee Client is a VBS4 Client installation started with default user privileges in order to participate in Scenario Executions.
4	VBS4 Dedicated Server	The Dedicated Server is a VBS4 Client installation started as a server to host the Scenario.
5	VBS World Server	For Online use cases the VBS World Server acts in two significant capacities: <ul style="list-style-type: none">• Streaming the base Whole-Earth Terrain to connected VBS4 Clients.• Acts as the central repository of Battlespaces.

**TIP**

Bohemia Interactive Simulations recommend a faster network connection between the VBS World Server and the network switch. For more information, see [System Requirements \(on page 27\)](#).

**NOTE**

VBS4 supports Offline use cases where VBS World Server is not required.

To download and install VBS4 for most use cases, follow this process:

1. Review [VBS4 Deployment Options \(on page 16\)](#) to assess the deployment requirements that meet your training needs.
2. Review the [System Requirements \(on page 27\)](#).
3. [Download VBS4 \(on page 30\)](#) from VBS License Manager.
4. Install VBS World Server, see [Installing VBS World Server \(on page 33\)](#).
5. Install as many Dedicated Servers and VBS4 Clients as required for your training needs, see [Installing VBS4 \(on page 38\)](#).

Your VBS4 deployment is installed.

**WARNING**

Additional World Data packages are available on VBS License Manager that are not installed by default.

Download and deploy them using the Updater Tool. For more information, see [Installing World Data in the VBS World Server Manual](#).

To support patch updates and later download of optional packages, VBS4 includes update utilities for VBS World Server and VBS4 Clients.

- [Installing a VBS World Server Patch \(on page 41\)](#)
- [Updating VBS4 \(on page 43\)](#)

After successful deployment, you are ready to start VBS4:

1. If it is not already running, start VBS World Server:

Run `\WS_Installation\vws_start.exe`

2. Start the Dedicated Server and VBS4 Clients:

See [Starting VBS4 \(on page 55\)](#).

2.1 VBS4 Deployment Options

VBS4 supports a large range of use case options from single computer usage to multi-room combined simulation and specialist display solutions.

- *Online* use cases include the separate deployment of a VBS World Server that streams the Whole-Earth Terrain to all connected VBS4 Clients and acts as a central repository of Battlespaces.
- VBS4 supports *Offline* use cases where VBS World Server is not required.
- VBS4 uses the same installer on all Dedicated Server and VBS4 Client computers and the operation type is determined by the VBS4 startup options for each computer.

 **WARNING**

VBS4 and VBS World Server installations must be the same major version (e.g., 21.1.x) to ensure full compatibility.

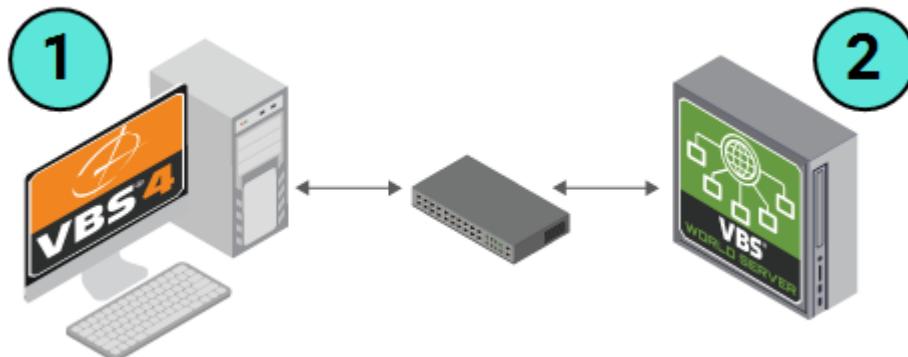
Refer to the following for an overview of which deployment type is most suitable for different use cases:

- [Single Computer Deployment \(on the next page\)](#)
- [Hosted Training \(on page 18\)](#)
- [Group Training \(on page 20\)](#)
- [High-Load Training Exercises \(on page 22\)](#)
- [Multi-Room Combined Simulation \(on page 24\)](#)
- [Multi-Product Combined Simulation \(on page 25\)](#)
- [Specialist Display Solutions \(on page 26\)](#)

2.1.1 Single Computer Deployment

Running VBS4 on a single computer is suitable for the following use cases:

- Single Player Training
- Scenario Design
- AAR Playback



1	VBS4 Clients	Admins and Trainees use VBS4 with an optional connection to VBS World Server.
2	VBS World Server	For Online use cases where VBS World Server acts as a central repository of Battlespaces and streams the Whole-Earth Terrain to all connected VBS4 Clients.

i **NOTE**

For Offline use cases, VBS World Server is not required.

Follow this process:

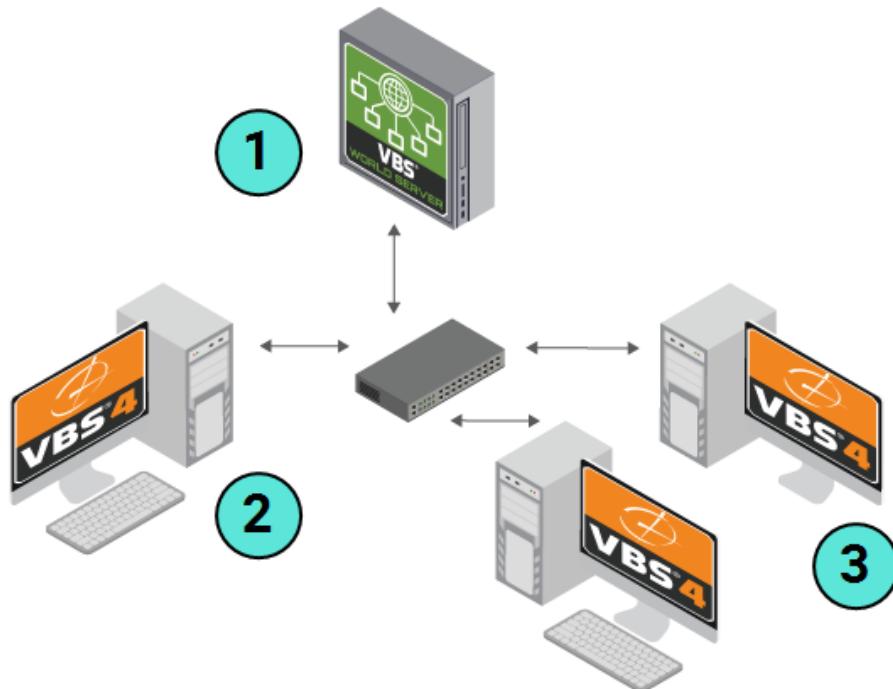
1. Install VBS World Server on a single computer if you need to save or access data on it.
For more information, see [Installing VBS World Server \(on page 33\)](#).
2. Install VBS4 on a single computer.
For more information, see [Installing VBS4 \(on page 38\)](#).
3. Use VBS Launcher with the appropriate **Client** tab settings to start VBS4 for your use case.
For more information, see [Starting VBS4 \(on page 55\)](#).

Depending on your Single-Computer use case, see the following topics for more information:

- For Single Player Training, see Single Player Training in the VBS4 Trainee Manual.
- For Scenario Design, see Scenario Preparation in the VBS4 Editor Manual.
- For AAR Playback, see After Action Review (AAR) in the VBS4 AAR Manual.

2.1.2 Hosted Training

For less demanding Scenarios with a small number of Trainee Clients, a VBS4 Admin Client can Host the Scenario, with connected VBS4 Trainee Clients.



1	VBS World Server	For Online use cases where VBS World Server acts as a central repository of Battlespaces and streams the Whole-Earth Terrain to all connected VBS4 Clients.
2	VBS4 Admin Clients	<p>NOTE</p> <p>For Offline use cases, the VBS World Server is not required.</p>
3	VBS4 Trainee Clients	Instructors use VBS4 with Admin privileges to start and manage the Scenario.

Follow this process:

1. Install VBS World Server on its own computer.

For more information, see [Installing VBS World Server \(on page 33\)](#).

2. Install VBS4 on the VBS4 Admin and Trainee Clients.

NOTE

All computers must be on the same network for VBS4 to communicate automatically.

For more information, see [Installing VBS4 \(on page 38\)](#).

3. If it is not already running, start VBS World Server:

Run `\WS_Installation\vws_start.exe`

4. Use a VBS4 Admin Client to create your training exercise.

For more information, see Scenario Preparation in the VBS4 Editor Manual.

5. Use VBS Launcher with the applicable Admin settings in the **Client** tab to start VBS4 on the Admin Clients to manage the Scenario.

NOTE

If you require Clients to connect from outside the local network, disable **multicast** (`-multicast=0`) on the Host computer.

For more information, see [Starting VBS4 \(on page 55\)](#).

To administer a Multiplayer Scenario, see Scenario Execution in the VBS4 Instructor Manual.

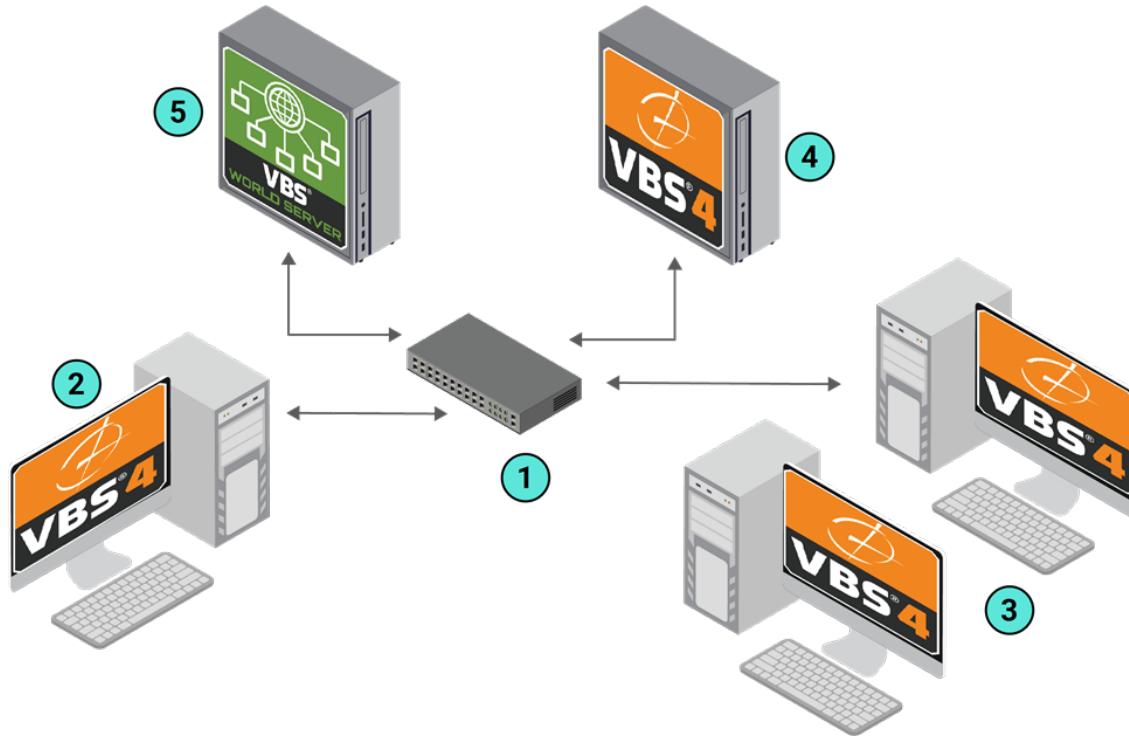
6. Use VBS Launcher with the applicable settings in the **Client** tab to start VBS4 on each Trainee Client to participate in the scenario.

For more information, see [Starting VBS4 \(on page 55\)](#).

To participate in a Multiplayer Scenario, see Joining a Multi-Player Scenario in the VBS4 Trainee Manual.

2.1.3 Group Training

For a typical Scenario Execution for Group Training, deploy a VBS World Server, a Dedicated Server, one or more VBS4 Admin Clients, and VBS4 Trainee Clients.



1	VBS World Server	For Online use cases where VBS World Server acts as a central repository of Battlespaces and streams the Whole-Earth Terrain to all connected VBS4 Clients.
2	VBS4 Dedicated Servers	<p>In typical use cases, a Dedicated Server is used to Host the Scenario Execution.</p> <p>NOTE For less demanding Scenarios with smaller numbers of Trainees, a VBS4 Admin Client can Host the Scenario.</p>
3	VBS4 Admin Clients	Instructors use VBS4 with Admin privileges to start and manage the Scenario.
4	VBS4 Trainee Clients	Trainees use VBS4 without Admin privileges to participate in the Scenario.

Follow this process:

1. Install VBS World Server on its own computer.
For more information, see [Installing VBS World Server \(on page 33\)](#).
2. Install VBS4 on the Dedicated Server, and all VBS4 Admin and Trainee Clients.

NOTE

All computers must be on the same network for VBS4 to communicate automatically.

For more information, see [Installing VBS4 \(on page 38\)](#).

3. If it is not already running, start VBS World Server:

Run `\WS_Installation\vws_start.exe`

4. Use a VBS4 Admin Client to create your training exercise.

For more information, see Scenario Preparation in the VBS4 Editor Manual.

5. Use VBS Launcher with the applicable settings in the **Server** tab to start VBS4 on the Dedicated to Host the Scenario.

NOTE

If you require Clients to connect from outside the local network, disable **multicast** (`-multicast=0`) on the Host computer.

For more information, see [Dedicated Server \(on page 105\)](#).

6. Use VBS Launcher with the applicable Admin settings in the **Client** tab to start VBS4 on the Admin Clients to manage the scenario.

For more information, see [Starting VBS4 \(on page 55\)](#).

To administer a Multiplayer Scenario, see Scenario Execution in the VBS4 Instructor Manual.

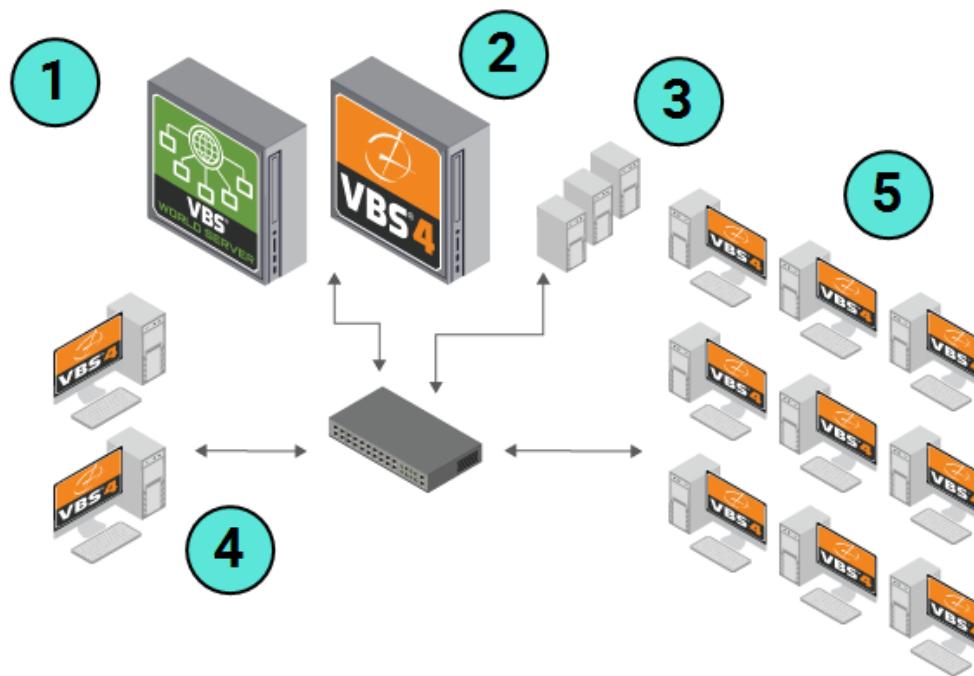
7. Use VBS Launcher with the applicable settings in the **Client** tab to start VBS4 on each Trainee Client to participate in the scenario:

For more information, see [Starting VBS4 \(on page 55\)](#).

To participate in a Multiplayer Scenario, see Joining a Multi-Player Scenario in the VBS4 Trainee Manual.

2.1.4 High-Load Training Exercises

For even larger training scenarios with many participants and a very large number of simulation objects, Simulation Clients can provide additional computing resources to Host the simulation and maintain performance.



1	VBS World Server	For Online use cases where VBS World Server acts as a central repository of Battlespaces and streams the Whole-Earth Terrain to all connected VBS4 Clients.
		<p>NOTE</p> <p>For Offline use cases, the VBS World Server is not required.</p>
2	VBS4 Dedicated Servers	In high-load use cases, a Dedicated Server is used to Host the Scenario Execution.
3	VBS4 Simulation Clients	Simulation Clients can manage the simulation of entities or AAR recording to improve performance.
4	VBS4 Admin Clients	Instructors use VBS4 with Admin privileges to start and manage the Scenario.
5	VBS4 Trainee Clients	Trainees use VBS4 without Admin privileges to participate in the Scenario.

1. Install VBS World Server on its own computer.

For more information, see [Installing VBS World Server \(on page 33\)](#).

2. Install VBS4 on the Dedicated Server, Simulation Clients, VBS4 Admin Clients, and VBS4 Trainee Clients.

 **NOTE**

All computers must be on the same network for VBS4 to communicate automatically.

For more information, see [Installing VBS4 \(on page 38\)](#) and [Simulation Clients \(on page 128\)](#).

3. If it is not already running, start VBS World Server:

Run `\WS_Installation\vws_start.exe`

4. Use a VBS4 Admin Client to create your training exercise.

For more information, see Scenario Preparation in the VBS4 Editor Manual.

5. Use VBS Launcher with the applicable settings in the **Server** tab to start VBS4 on the Dedicated to Host the Scenario.

 **NOTE**

If you require Clients to connect from outside the local network, disable **multicast** (`-multicast=0`) on the Host computer.

For more information, see [Dedicated Server \(on page 105\)](#).

6. Use VBS Launcher with the `-simulationclient` option to start the Simulation Clients, also specifying the `-connect` option with the IP Address or DNS name of the Dedicated Server.

For more information, see [Simulation Clients \(on page 128\)](#).

7. Use VBS Launcher with the applicable Admin settings in the **Client** tab to start VBS4 on the Admin Clients to manage the scenario.

To administer a multi-player scenario, see Scenario Execution in the VBS4 Instructor Manual.

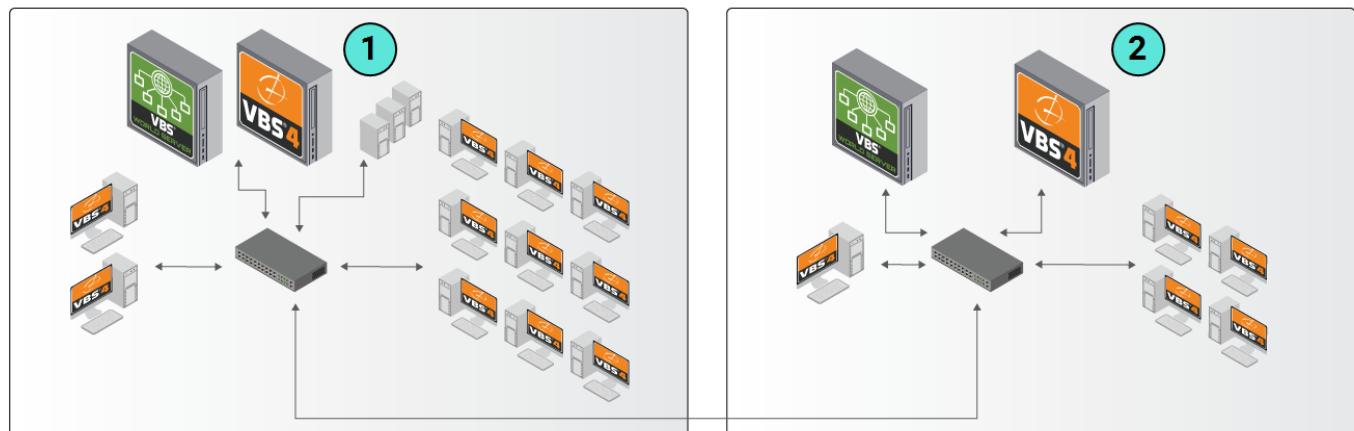
8. Use VBS Launcher with the applicable settings in the **Client** tab to start VBS4 on each Trainee Client to participate in the scenario.

To participate in a multi-player scenario, see Joining a Multi-Player Scenario in the VBS4 Trainee Manual.

More specific setups are available by setting the Simulation Client type. For more information, see [Simulation Clients \(on page 128\)](#).

2.1.5 Multi-Room Combined Simulation

VBS Gateway enables multiple instances of VBS4 to Host different sets of simulation objects as part of a combined simulation where entities managed by each instance of VBS4 appear as external entities in the other instances of VBS4.



1 Room 1 - Dedicated Server running VBS Gateway.

2 Room 2 - Dedicated Server running VBS Gateway.

NOTE

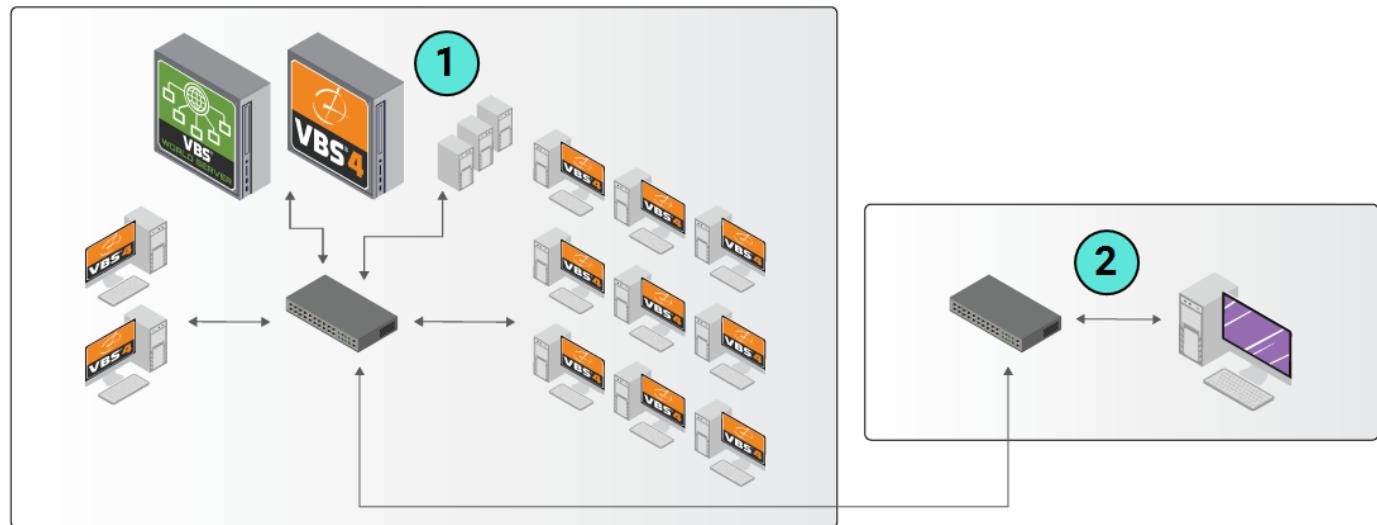
The simulation runs in two separate sessions that are broadcast to each other. This means that an Administrator in the Room 1 session cannot directly interact with objects created in the Room 2 session.

This scenario may be appropriate for all previously described deployment scenarios. Follow the appropriate process for each deployment type, replacing the preset with the equivalent **Gateway** preset, or by additionally selecting the `-gateway` option on the VBS4 instance that is Hosting the Scenario.

For more information, see VBS Gateway Overview in the VBS Gateway Manual.

2.1.6 Multi-Product Combined Simulation

VBS Gateway enables VBS4 to participate in combined simulations with other HLA or DIS compliant simulation products where entities managed by each product appear as external entities in the other products.



1 Room 1 - Dedicated Server running VBS Gateway.

2 Room 2 - HLA / DIS compliant Simulation Product

This scenario may be appropriate for all previously described deployment scenarios. Follow the appropriate process for the VBS4 deployment type, replacing the preset with the equivalent **Gateway** preset, or by additionally selecting the `-interopForwarding` option on the VBS4 instance that is Hosting the Scenario.

⚠️ WARNING

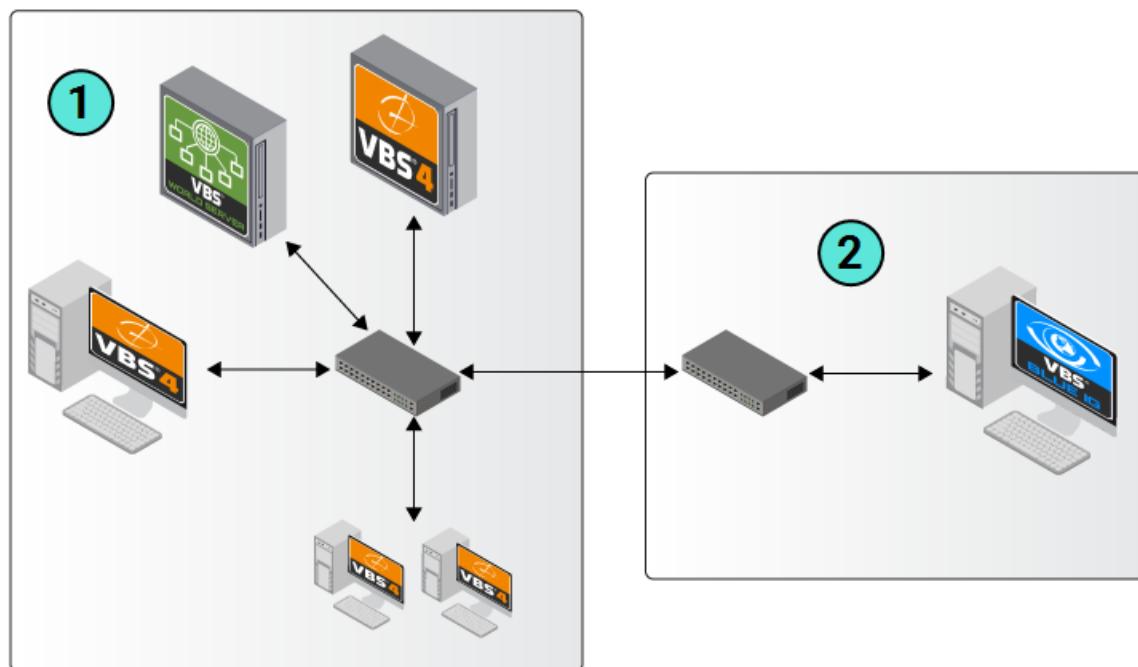
If you are broadcasting a combined DIS exercise to VBS Blue IG, you must enable `-interopForwarding`, see Enabling DIS Entities in the VBS Host Manual.

For more information, see VBS Gateway Overview in the VBS Gateway Manual.

Start the other simulation products as appropriate.

2.1.7 Specialist Display Solutions

For graphically demanding deployments, such as output to domes, use VBS4 to Host the simulation objects and transmit to VBS Blue IG to render high quality graphics.



1 Room 1 - Dedicated Server Hosting the Scenario

2 Room 2 - VBS Blue IG

This scenario may combine with any of the previously described deployment scenarios. Follow the appropriate process for the VBS4 deployment type, with the following additional startup options:

- To transmit to VBS Blue IG, start VBS4 with the `-vbsHostNet` parameter.

⚠️ WARNING

If you are broadcasting a combined DIS exercise to VBS Blue IG, you must enable `-interopForwarding`, see Enabling DIS Entities in the VBS Host Manual.

For more information, see VBS Host Overview in the VBS Host Manual.

Start the Image Generation product as appropriate.

ℹ️ NOTE

Bohemia Interactive Simulations recommend using VBS Blue IG for Image Generation solutions. For more information, contact sales@bisimulations.com.

2.2 System Requirements

Bohemia Interactive Simulations recommends the following hardware requirements for VBS4 Clients:

VBS4	Recommended	Optimal
CPU	Intel Core i7-12700K (or better) Ryzen 9 7900X	Intel Core i9-12900K (or better) Ryzen 9 7950X
RAM	32GB DDR4 (or better)	64GB DDR4 (or better)
GPU	Nvidia GeForce RTX 3070 (or better) DirectX 11	Nvidia GeForce RTX 3080 (or better) DirectX 11
<div style="border: 2px solid red; padding: 10px; text-align: center;"> WARNING AMD GPUs are not currently supported.</div>		
Disk	512GB SSD for OS and VBS4	1TB SSD for OS and VBS4
OS	Windows 10 (v1607+) or 11, 64-bit	Windows 10 (v1607+) or 11, 64-bit
<div style="border: 2px solid red; padding: 10px; text-align: center;"> WARNING VBS4 uses the Windows account name as the VBS4 user name. This name can only contain printable ASCII (https://www.w3schools.com/charsets/ref_html_ascii.asp) characters. VBS4 may crash if characters outside this range are used. Modify the Windows account name before starting VBS4 if it contains non-ASCII characters.</div>		
Network	1 Gbps / 2.5 Gbps	1 Gbps / 2.5 Gbps

NOTE

VBS4 does not require expensive professional graphics cards (designed for CAD work, CGI, or other complex scientific calculations). These cards do not provide any additional benefits compared to graphics cards designed for gaming.

VBS4 installations that are intended to be used as Dedicated Servers or Simulation Clients can meet the VBS World Server requirements instead of the more graphically demanding VBS4 requirements.

Third-party cybersecurity software may increase load time and impact VBS4 performance.

⚠️ WARNING

To avoid potential UI display issues, do not use USB hubs or adapters to connect monitors. Also, support of the new map view (see Advanced New Map and Map Layers) is limited on 4K monitors. Delays may occur when moving / dragging the map.

Bohemia Interactive Simulations recommends the following for VBS World Server:

VBS World Server	Recommended	Optimal
CPU	Intel Core i7-12700K (or better) Ryzen 9 7900X	Intel Core i9-12900K (or better) Ryzen 9 7950X
RAM	64GB DDR4 (or better)	128GB DDR4 (or better)
GPU	Nvidia GeForce GTX 1080 (or better) DirectX 11	Nvidia GeForce GTX 4090 (or better) DirectX 11
Disk	512GB SSD for OS, 4TB SSD for VBS World Server and Global Data (optional)	512GB SSD for OS, 8TB SSD for VBS World Server and Global Data (optional) and space for local processing.
OS	Windows 10 (v1607+) 64-bit, Windows Server 2016/2019	Windows 10 (v1607+) or Windows 11 64-bit, Windows Server 2016/2019
Network	1 Gbps	10 Gbps

NOTE

The hardware listed is not exclusive. Compare your hardware to the listed items for an indication of performance.

Operational usage can affect performance requirements. Increasing visual fidelity (detail, distance, and / or resolution), as well as scenario complexity, can have a significant impact on performance, and may warrant increasing the system specification to the next performance tier.

For hardware queries, contact us at <https://bisimulations.com/company/contact-us>.

Bohemia Interactive Simulations recommends the following hardware requirements for VBS Map:

VBS Map	Recommended
CPU	Intel Core i5-7400 (equivalent or better)
RAM	8 GB RAM
GPU	NVidia GeForce GTX 1050 Ti 4GB (equivalent or better) DirectX 11
OS	Windows 10 64-bit
Web Browser	Google Chrome

NOTE

A firewall may prevent VBS Map clients from connecting to the VBS Map Server. If you get an error message, either disable the firewall, or configure it to allow client to server connections.

VBS Map uses the following port, which is configurable:

- 4080 (default VBS Map Server port) - Configurable on the VBS Map Server (see Server Configuration in the VBS Map Manual).

If you are using a firewall, this port should be open.

For more information, see Deploying VBS Map in the VBS Map Manual.

TIP

The Benchmark Tool can be used to measure system performance.

For more information, see [Benchmark Tool \(on page 330\)](#).

2.3 Download VBS4

VBS4 is typically accessed and downloaded using VBS License Manager.

NOTE

Alternate distribution methods are available by contacting support@bisimulations.com.

In each case, the content you require must be copied to the same temporary folder on the machine where you want to install VBS4 or VBS World Server.

Follow these steps:

1. In VBS License Manager, open the **Downloads** page.
2. Select VBS4 from the products panel and **Choose Version**:
3. Expand **Instructions** to view the help available for product deployment.
4. Expand **Products Available to Download** to display the products available for download.
5. Select **VBS4+VWS** for a default download of VBS4 and VBS World Server packages.
6. Select optional World Data packages to install procedural and generated terrain detail:
 - **World Data (23.2)**: Global coverage of procedurally generated buildings and roads.
 - **World Airfields (24.1)**: A large set of insets for global airfields.

For a list of supported airfields (using ICAO airport codes), see [Global_Airfield_List.txt](#).

NOTE

The World Airfields package includes some heightmap changes in the area of each airfield that can conflict with existing World Data buildings when used together. To address this, the World Airfields package contains cutouts of World Data buildings around each airfield to resolve building elevation changes. If using World Airfields without World Data buildings, these extra buildings around airfields may be distracting and can be removed. For more information, see Removing World Airfield Building Data in the VBS World Server Manual.

NOTE

Only download packages if your current World Data is older than the version listed.

WARNING

If World Data is not installed as part of your initial installation, add it to your installation using the Updater Tool.

For more information, see [Installing World Data in the VBS World Server Manual](#).

If you already have a VBS World Server installation, backup your World Data before installing a newer version of VBS World Server.

For more information, see [Migrating Data to a New VBS World Server Version](#) in the [VBS World Server Manual](#).

7. Select from the additional products as required, which include:

- Select **DeveloperSuite** to download the VBS4 Developer Suite.
- Select **VBS Radio Standalone** to download the separate VBS Radio client application.
For more information, see [VBS Radio Standalone](#).
- Select **READ THIS FIRST** to download supplementary PDFs.



FEATURE NOTICE

The exact set of products and packages displayed depends on your licensing.

8. Do any of the following for a more selective VBS4 download:

- For a default VBS4 and VBS World Server download, skip to step 10.
- For a selective installation, **click** the Configure List icon to display the Configure panel.

9. Deselect **VBS4** to uncheck all items, and then select specific packages to download:

- **VBS4** is the installer and core packages for VBS4.
- **VBS World Server** is the installer and core packages for VBS World Server.
- **VBS4 KEY_General** and **VBS World Server - KEY_General** contain exclusive content for your licensed version of the products.
- **VBS4 Terrain_Inset** are optional highly detailed terrain insets.

For more information, see Terrain Insets.

i **NOTE**

To deploy Terrain Insets at a later date, download them from VBS License Manager, copy the downloads to the same folder as the VBS4 Installer, and re-run the VBS4 Installation.

- **Geolocation Lookup Service** is an optional package that provides location search.

If optional packages are present in the downloads folder when the installer runs, they automatically install.

10. Expand **Save Location**, click **Change**, and select a download folder.

11. Click **Download**.

VBS License Manager downloads the selected packages to the selected location.

Copy the applicable downloads to the required computers and proceed with installation:

- [Installing VBS World Server \(on the next page\)](#)
- [Installing VBS4 \(on page 38\)](#)

2.4 Installing VBS World Server

Before getting started:

- If you are installing VBS World Server for the first time, continue to [Installing the VBS World Server \(below\)](#).
- If you are updating VBS World Server from a previous version, follow the instructions in [Installing a Newer VBS World Server Version \(on page 36\)](#).

After you Download VBS4, the VBS World Server installer and the selected download packages are available in the selected download folder.

WARNING

VBS4 and VBS World Server installations must be the same major version (e.g., 21.1.x) to ensure full compatibility.

2.4.1 Installing the VBS World Server

Install VBS World Server on a computer meeting the VBS World Server [System Requirements \(on page 27\)](#).

NOTE

VBS4 and VBS World Server installers must be in the same directory for the VBS World Server installer to automatically detect and install VBS4 in the correct location.

WARNING

The VBS4 installed by the VBS World Server installer is used by the server and should not be used as a VBS4 client. Download and install VBS4 Clients on separate computers.

Copy the downloaded folder containing the VBS World Server installer and the download packages to the required computer and run the installer:

`VBS_World_Server.Core.InstallerX64.version.exe`

The VBS World Server installer starts and leads you through the following installation process:

WARNING

Installation requires Windows Administrator privileges.

1. Installer Language

Select the Installer language to use and click **OK**.

NOTE

Language selection only applies to the installer and does not affect the VBS World Server installation.

2. Welcome Panel

Review the version of VBS World Server and click **Next** to continue.

3. License Agreement

Review the license agreement, and click **I Agree**.

4. Choose Components

Select which components to install, and then click **Next**:

- The **Core** package is mandatory and pre-selected.
- Your **License Key** encoded package is mandatory and pre-selected (for example, YYMEA).
- **Geolocation Lookup Service** is an optional package for location search services.
- Select **Start Menu Shortcuts** to add VBS World Server to your Start Menu list.
- Select **Desktop Shortcuts** to add VBS World Server shortcuts to your desktop.
- Select **Verify Checksum** to validate the download packages prior to installation.
- Select **VBS4 Server** to silently install VBS4 as a Dedicated Server for Scenario Execution.
- Select **Installing Drivers** to run install drivers process during VBS World Server installation.

5. Choose Install Location

Input or click **Browse** to select an installation folder, and then click **Next**.

NOTE

Select a location on an SSD drive that meets the VBS World Server [System Requirements \(on page 27\)](#) that is as close to the drive root folder as possible.

WARNING

The installation path can only contain printable [ASCII](https://www.w3schools.com/charsets/ref_html_ascii.asp) (https://www.w3schools.com/charsets/ref_html_ascii.asp) characters. VBS World Server does not start if installed to a path with characters outside this range.

6. Choose Start Menu Folder

Input a name and optionally select an existing start menu item to place it in.

Click **Install** to start the installation process.

NOTE

This documentation refers to the VBS World Server installation folder as `\Installation\`.

VBS World Server installs to the selected folder and, if selected, silently installs VBS4 to:

`\Installation\Services\VBS4\`

When installation completes, select from the following options:

- **Open the Installation Folder**

View the content of the `\Installation\` folder.

Click **Finish** to close the installer.

After installation, run the following executable to finalize the VBS World Server configuration:

- Run `\Installation\vws_configure.exe`

NOTE

The `vws_configure.exe` must be run following the initial installation in order to start using the VBS World Server. For more information about the executable and its functions, see Managing VBS World Server.

VBS World Server is ready to start. For more information, see Managing VBS World Server.

If you wish to install World Data to your offline VBS4 installation, follow the instructions in Installing World Data in the VBS World Server Manual.

2.4.2 Installing a Newer VBS World Server Version

If you have an older version of the VBS World Server installed on your computer (for example, 20.1.x) and you wish to install a newer version (for example, 21.1.x), you must manually back up any user data that you wish to carry over to the new version. Otherwise, this user data will be deleted when you perform the update.

2.4.3 Migrating Data to a New VBS World Server Version

To back up your user-generated data (such as Battlespaces and VBS4 inset data) and any installed World Data packages, follow these steps:

1. Create a New Folder

Separate from the VBS World Server installation, create a new folder to act as a repository (for example, `D:\Backup`).

2. Move User Data

Cut the following folders from the VBS World Server installation:

- `\Installation\data\Battlespaces\`
- `\Installation\Services\VBS4\myData\`

If World Data is installed, cut these folders as well:

- `\Installation\Services\VBS4\data\BlueBase\earth\Global_Geometry\`
- `\Installation\Services\VBS4\data\BlueBase\earth\Global_Roads\`
- `\Installation\Services\VBS4\data\BlueBase\earth\Global_Veg_Removal\`



WARNING

Once all desired user data has been archived, you must uninstall all older versions of the VBS World Server prior to updating to the newer version.

3. Uninstall the Older Version

Uninstall the older version of the VBS World Server. For more information, see [Uninstalling VBS World Server](#).

4. Install VBS World Server

Install the new version of the VBS World Server by following the instructions in the [Installing the VBS World Server \(on page 33\)](#).

5. Run the Stop Executable

After installing the new version of the VBS World Server, stop the service before restoring the user data.

- Run `\Installation\vws_stop.exe`

6. Delete the VBS World Server Cache

Delete the VBS World Server Cache folder at the following location:

- `\Installation\Services\VBS4\cache\`

7. Restore User Data

After VBS World Server has been installed, manually restore the archived data by cutting it from the backup repository folder made in **Step 2: Move User Data** to the following locations in the new installation.

- `\Installation\data\Battlespaces\`
- `\Installation\Services\VBS4\myData\`
- `\Installation\Services\VBS4\data\BlueBase\earth\Global_Geometry\`
- `\Installation\Services\VBS4\data\BlueBase\earth\Global_Roads\`
- `\Installation\Services\VBS4\data\BlueBase\earth\Global_Veg_Removal\`

8. Run the Start Executable

After restoring user data, run the following executable to finalize the VBS World Server upgrade:

- Run `\Installation\vws_start.exe`

2.5 Installing VBS4

After you [Download VBS4 \(on page 30\)](#), the VBS4 installer, and the selected download packages, are available in the selected download folder.

Install VBS4 on every client computer, ensuring that they meet the [System Requirements \(on page 27\)](#).

WARNING

VBS4 and VBS World Server installations must be the same major version (e.g., 21.1.x) to ensure full compatibility.

Copy the downloaded VBS4 folder containing the VBS4 installer and the download packages to the required computer and run the installer:

VBS4.Core.InstallerX64.version.exe

WARNING

Installation requires Windows Administrator privileges.

The VBS4 installer starts and leads you through the following installation process:

Follow these steps:

1. Select your Language

Select the language to use during installation and click **OK**.

NOTE

The language selection only applies to the installer process and does not affect the VBS4 installation.

2. Welcome Screen

Review the version of VBS4 and click **Next** to continue.

3. License Agreement

Review the license agreement, and click **I Agree**.

4. Choose Components

Select which components to deploy, and then click **Next**:

- **Core** is mandatory and pre-selected.
- **Terrain_Inset** selections are optional and deploy highly detailed terrains for the specified locations.
- Your **License Key** encoded package is mandatory and pre-selected (for example, YYMEA).
- Select from the set of **Additional Options**:
 - Select **Verify Checksum** to validate the download packages prior to installation.
 - Select **Start Menu Shortcuts** to add VBS4 to your Start Menu list.
 - Select **Desktop Shortcuts** to add a VBS4 shortcut to your desktop.
 - Select **Firewall Exceptions** to add VBS4 to your list of permitted software in the Windows Firewall rules.
 - Select **Installing Drivers** to run the driver installation process as part of the VBS4 installation.

5. Choose Install Location

Input or click **Browse** to select an installation folder, and then click **Next**.



NOTE

Select a location on an SSD drive that meets the [System Requirements \(on page 27\)](#).



WARNING

The installation path can only contain printable [ASCII](https://www.w3schools.com/charsets/ref_html_ascii.asp) characters. VBS4 does not start if it is installed to a path containing characters outside this range.

6. Choose Start Menu Folder

If you selected the additional **Start Menu Shortcuts**, input a name and optionally select an existing Start Menu item to place it in

Click **Install** to start the installation process.

The installer deploys VBS4 to the specified installation folder. This documentation refers to the folder as **\VBS_Installation**.

When installation completes, select from the following options, and click **OK**:

- **Open the Installation Folder**

View the content of the **\VBS_Installation** folder in Windows File Explorer.

Click **Finish** to close the installer.

VBS4 is ready to start. For more information, see [Starting VBS4 \(on page 55\)](#).

If you want to install World Data to your offline VBS4 installation, follow the instructions in [Installing World Data in the VBS World Server Manual](#).

2.5.1 Silent Installation

You can install in Silent Mode, with default options from a command line using the **/S** switch, and any of the following additional switches (required switches are in bold):

Installation Switch	Description
/S	Silent / unattended installation.
/INST=	Specify the installation directory.
/NOSM	Do not create Start Menu shortcuts.
/NOFIREWEX	Do not create firewall exceptions.
/NODESK	Do not create desktop shortcuts.
/NOCRC	Do not perform an MD5 check of the installation packages.



EXAMPLE

To install VBS4 to a local **C:\VBS4_20.1** folder with no Start Menu shortcuts:

```
VBS4.Core.InstallerX64_20.1.0_b8.exe /S /INST=C:\VBS4_20.1 /NOSM
```

2.6 Installing a VBS World Server Patch

The Updater Tool included with VBS World Server supports patch updates to VBS World Server.

WARNING

Updates to VBS World Server require an earlier release of the same major version. For example, updating to VBS World Server 20.1.1 requires an earlier version of VBS World Server 20.1.x.

If you have not already installed the same major version of VBS World Server, please perform a full installation instead of using the update process.

For more information, see [Installing VBS World Server](#).

Download updates for VBS World Server through VBS License Manager.

NOTE

If you have been delivered a patch, see [Installing the Patch \(on the next page\)](#).

Follow these steps:

1. Open VBS License Manager, and select the **Download** page.
2. Select VBS4 in the products panel, and **Choose Version**: selecting the applicable major version **Y.X**.
3. Expand **Products Available to Download**, select **VBS4**, and click the **View** icon.



The Configure panel opens, displaying all VBS4 and VBS World Server packages available for download.

4. In the **Configure** panel, click **VBS4** to deselect all packages.

Select the required VBS World Server Updates between your current version and the version you require. For information about the updates, see the Patch Notes for the specific version.

Update packages use the naming convention: **WS_x.x.x_Update_Customer**. For each update, VBS License Manager displays the update applicable to your specific customer license:

- **WS_x.x.x_Update_General** contains updates for all customers.
- **WS_x.x.x_Update_Customer** also contains updates specific to your customer license.

5. Expand **Save Location**, click **Change**, and select a download folder.

**TIP**

If VBS License Manager is running on the same computer as the VBS World Server installation you want to update, select the VBS World Server Installation folder.

6. Click **Download**.

VBS License Manager downloads the update packages as a set of **.zip** files in a **\VBS4 version** folder in the selected location.

Once you have the update packages, use the Updater Tool to deploy the update to your VBS World Server installation.

**WARNING**

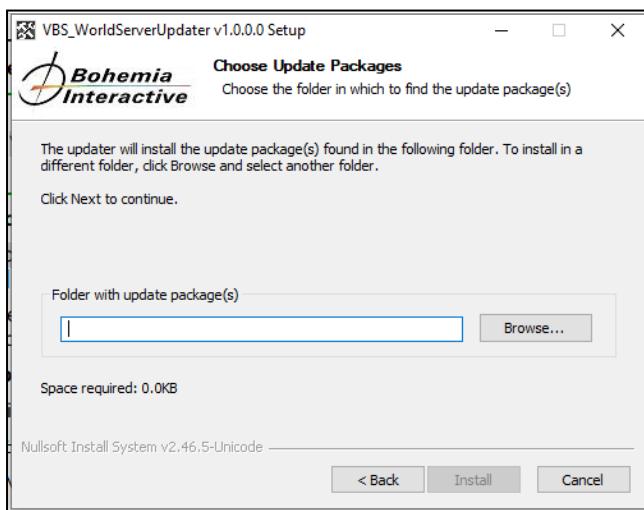
Ensure that VBS World Server is shut down before running the Updater Tool.

2.6.1 Installing the Patch

This section describes how to install a patch on an existing VBS World Server installation.

Follow these steps:

1. From your existing VBS World Server installation folder run the Updater Tool:
\Installation\Updater.exe
2. Specify the **\VBS4 version** folder in your VBS License Manager download location.



3. Click **Install**.

VBS World Server is updated with the changes from the selected download packages.

The Updater Tool can also be used to install World Data for the VBS4 installation on the VBS World Server. For more information, see [Installing World Data \(on page 45\)](#).

2.7 Updating VBS4

Bohemia Interactive Simulations provides an Updater Tool with VBS4 to support updates to VBS4 and the later deployment of optional packages.

WARNING

Updates to VBS4 require an earlier release of the same major version. For example, updating to VBS4 20.1.1 requires an earlier version of VBS4 20.1.x.

If you have not already installed the same major version of VBS4, please perform a full installation instead of using the update process.

For more information, see [Installing VBS4 \(on page 38\)](#).

Download updates for VBS4 through VBS License Manager.

Follow these steps:

1. Open VBS License Manager, and select the **Download** page.
2. Select VBS4 from the products panel, and **Choose Version: x.x**.
3. Expand **Products Available to Download**, select VBS4, and click the **View** icon.



The Configure panel opens, displaying all VBS4 packages pre-selected for download.

4. In the **Configure** panel, click **VBS4** to deselect all packages.

Select the Required Updates between your current version and the version you require. For information about the updates, see the VBS4 Patch Notes for the specific version you require.

Update packages use the following naming convention: **VBS4_x.x.x_Update_Customer**. For each update, VBS License Manager displays the update applicable to your specific customer license.

- **VBS4_x.x.x_Update_General** contains updates for all customers.
- **VBS4_x.x.x_Update_Customer** contains updates specific to your customer license.

5. Expand **Save Location**, click **Change**, and select a download folder.

TIP

If VBS License Manager is running on the same computer as the VBS4 installation you want to update, select the VBS4 Installation folder.

6. Click **Download**.

VBS License Manager downloads the update packages as a set of **.zip** files in a **\VBS4_version** folder in the selected location.

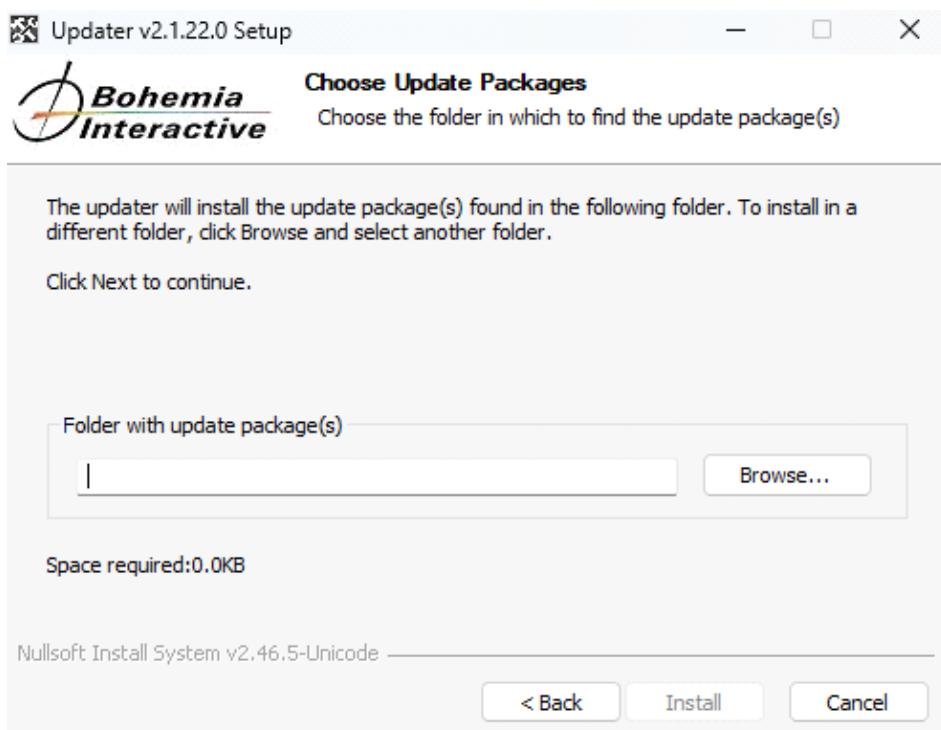
Once you have the update packages, use the Updater Tool to deploy the update to your VBS4 installation.

Follow these steps:

1. From your existing VBS4 installation folder run the Updater Tool:

\VBS_Installation\Updater.exe

2. Specify the *\VBS4 version* folder in your specified VBS License Manager download location.



3. Click **Install**.

Your installation of VBS4 is updated with the changes from the selected download packages.

2.8 Installing World Data

VBS4 is available with a set of optional World Data packages that include buildings, roads, and airfields. They are intended to serve as background cultural data to enhance large scale training environments.

Download World Data from VBS License Manager.

Follow these steps:

1. In VBS License Manager, open the **Downloads** page.
2. Select **VBS4** from the products panel and **Choose Version**.
3. Expand **Products Available to Download** to display the World Data available for download:
 - **World Data (23.2)** contains procedurally generated buildings for each continent and regional roads generated from OpenStreetMap data.
 - **World Airfields (24.1)** is a large set of insets for global airfields. For a complete list of supported airfields (using ICAO airport codes), see [Global_Airfield_List.txt](#).

Click the **Configure List** icon, to view the available sets of World Data:



- Asia
- North America
- South America
- Europe
- Australia
- Africa
- Antarctica
- Islands
- Airfields

For more information, see [World Airfields \(on page 50\)](#) and [World Data \(on page 47\)](#).

NOTE

The World Airfields package includes some heightmap changes in the area of each airfield that can conflict with existing World Data buildings when used together. To address this, the World Airfields package contains cutouts of World Data buildings around each airfield to resolve building elevation changes. If using World Airfields without World Data buildings, these extra buildings around airfields may be distracting and can be removed. For more information, see Removing World Airfield Building Data in the VBS World Server Manual.

4. Select the World Data packages to download.

TIP

Deselect **VBS4** and all other products to only download World Data packages.

5. Expand **Save Location**, click **Change**, and select a download folder.

6. Click **Download**.

VBS License Manager downloads your selected packages to the selected folder.

Once your packages are downloaded, use the Updater Tool to install them.

Follow these steps:

1. Copy the download packages to the same temporary folder on the target computers.

2. Stop VBS World Server and close all target VBS4 Clients:

On VBS World Server run `vws_stop.exe`.

3. Run the appropriate Updater Tool to install the World Data:

- On VBS World Server:

`\Installation\Updater.exe`

- On VBS4 Clients:

`\VBS_Installation\Updater.exe`

4. Specify the folder containing the World Data packages, and click **Install**.

5. After installation, restart VBS World Server:

- On VBS World Server run `vws_start.exe`.

The VBS World Server or VBS4 Updater Tools will update your installation of VBS World Server or VBS4 with the applicable World Data.

2.8.1 World Data

The World Data packages for roads and buildings are organized by continent and include regional road coverage, and contain OpenStreetMap-based cultural data including procedurally extruded building footprints with regional texturing and roads with road type-based texturing. Shown below are examples of cities using the world data for each continent.

Image-1: Asia - Hong Kong



Image-2: North America - New York City



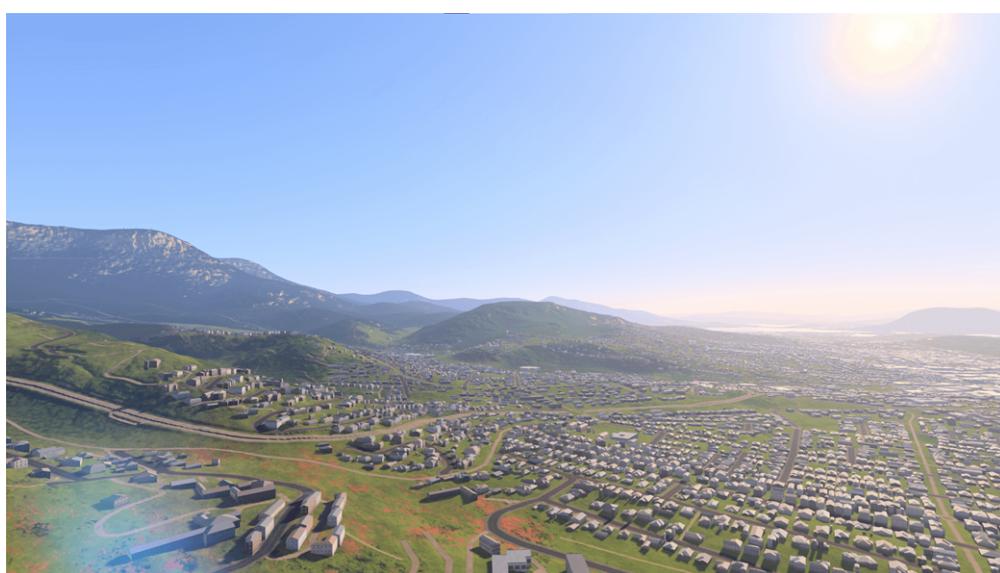
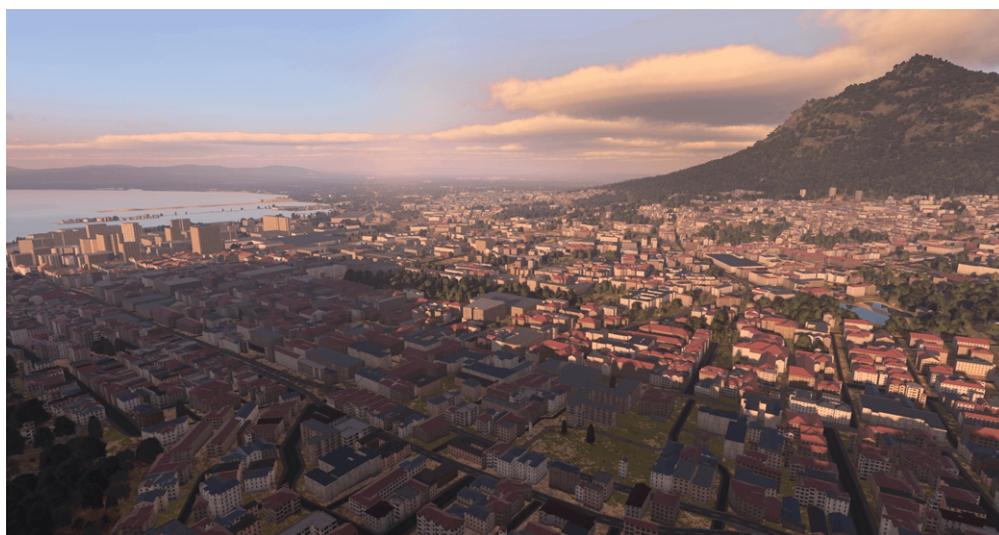
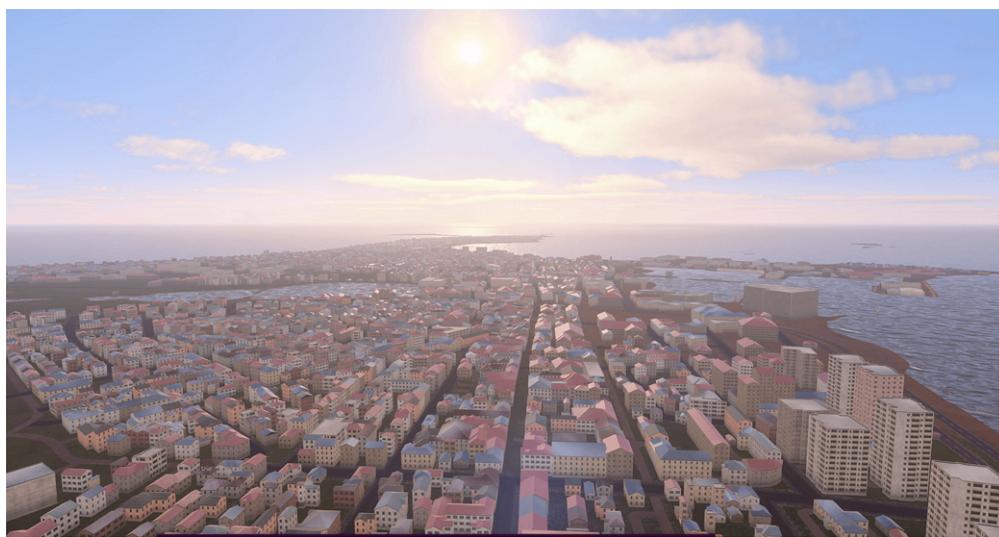
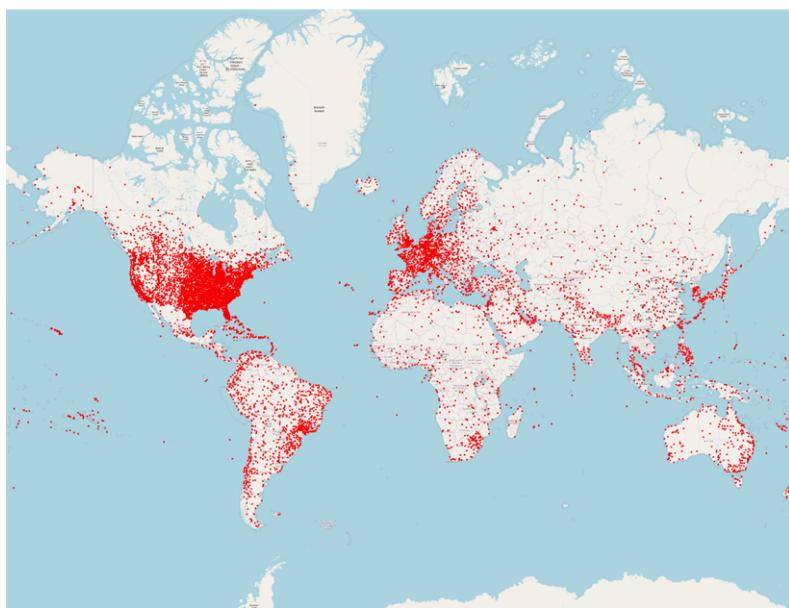
Image-3: South America - Rio de Janeiro**Image-4: Europe - San Marino****Image-5: Australia - Hobart**

Image-6: Africa - Cape Town**Image-7: Antarctica - Troll Research Station****Image-8: Islands - Rejkjavik**

2.8.2 World Airfields

VBS4 includes an optional airfield package that contains over 9,000 major and regional airfields throughout the world.

Image-9: VBS4 World Airfields Coverage



These airfields are created using TerraTools to produce accurate paint markings, realistic navigational light models, and updated heightmaps and surface masks for each inset. The airfield pack can be installed in an offline VBS4 instance or on the VBS World Server for streaming across your network.

For a complete list of airfields supported in VBS4 (provided in ICAO airport codes), see the [Global_Airfield_List.txt](#) list.

Below are examples of some of the airfields included in this package:

Image-10: EDDB - Berlin Brandenburg Airport, Germany

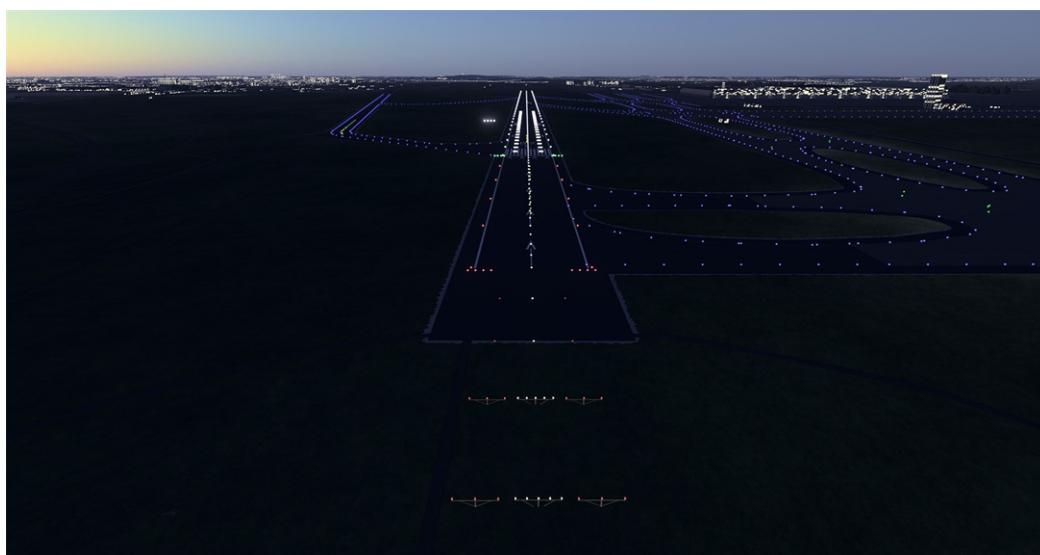


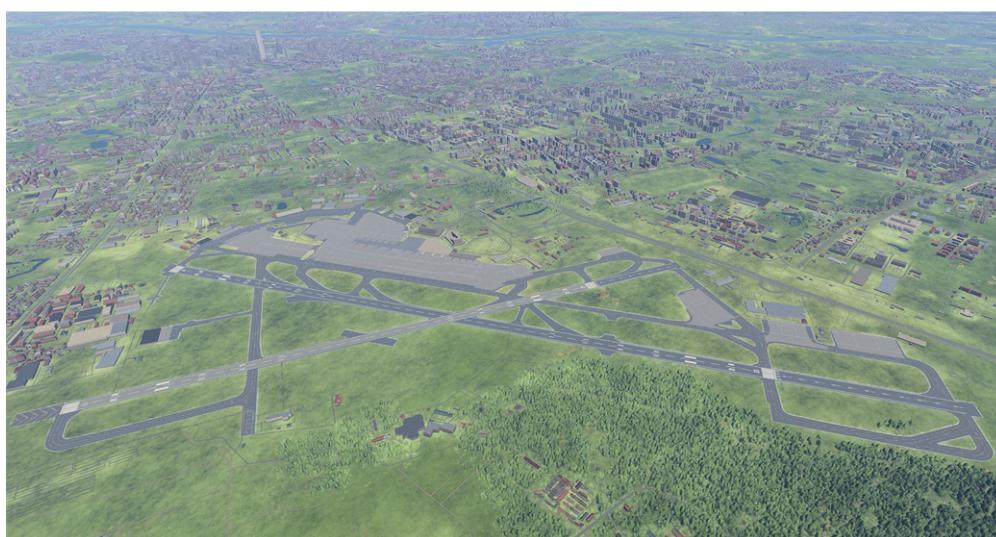
Image-11: EETN - Tallinn Airport, Estonia**Image-12: ENGM - Oslo Gardermoen Airport, Norway****Image-13: EPWA - Warsaw Chopin Airport, Poland**

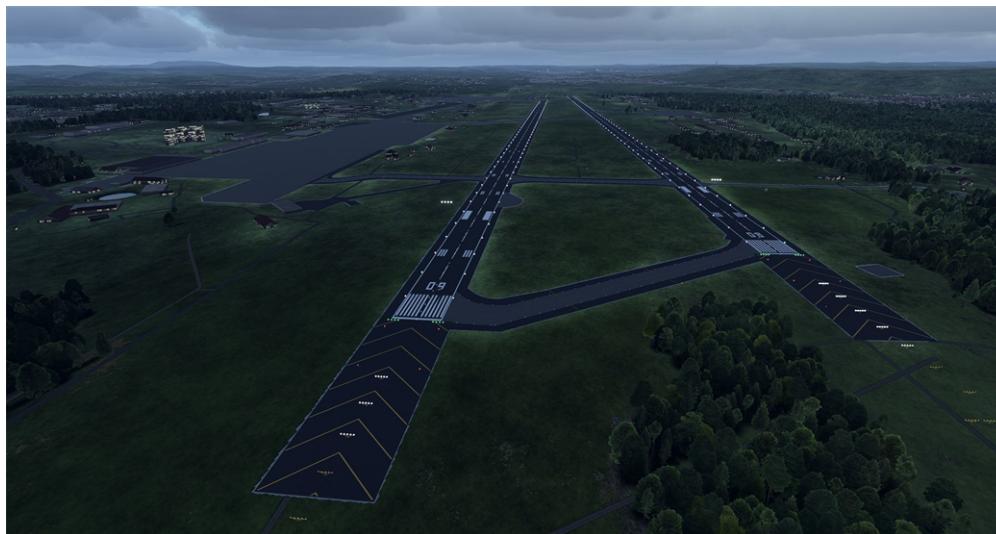
Image-14: ETAR - Ramstein Air Base, Germany**Image-15: FACT - Cape Town International Airport, South Africa****Image-16: KCLE - Cleveland Hopkins International Airport, United States**

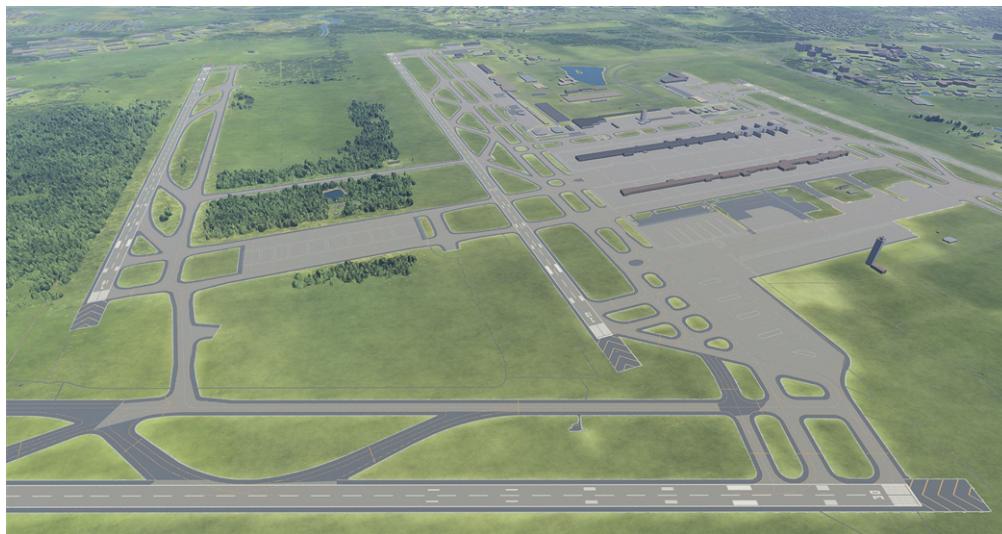
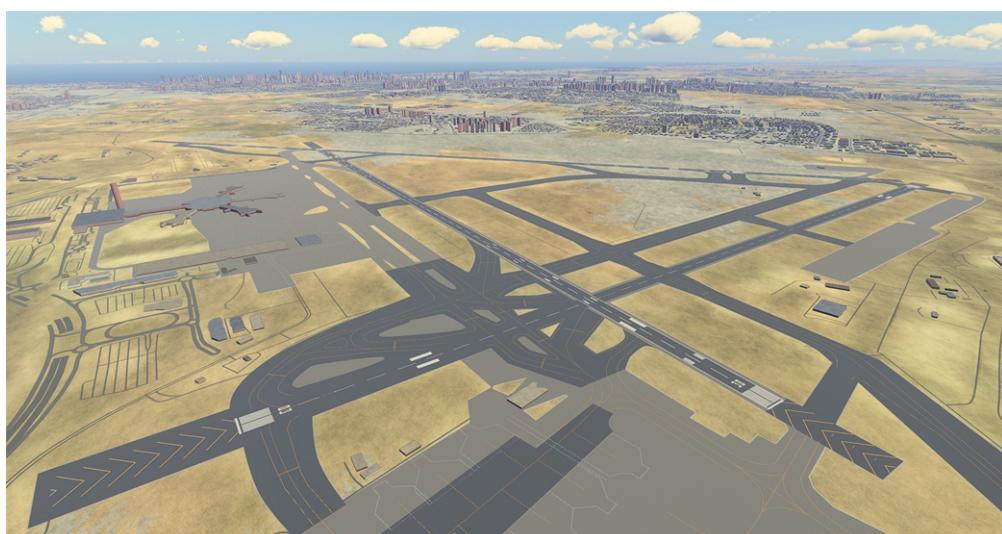
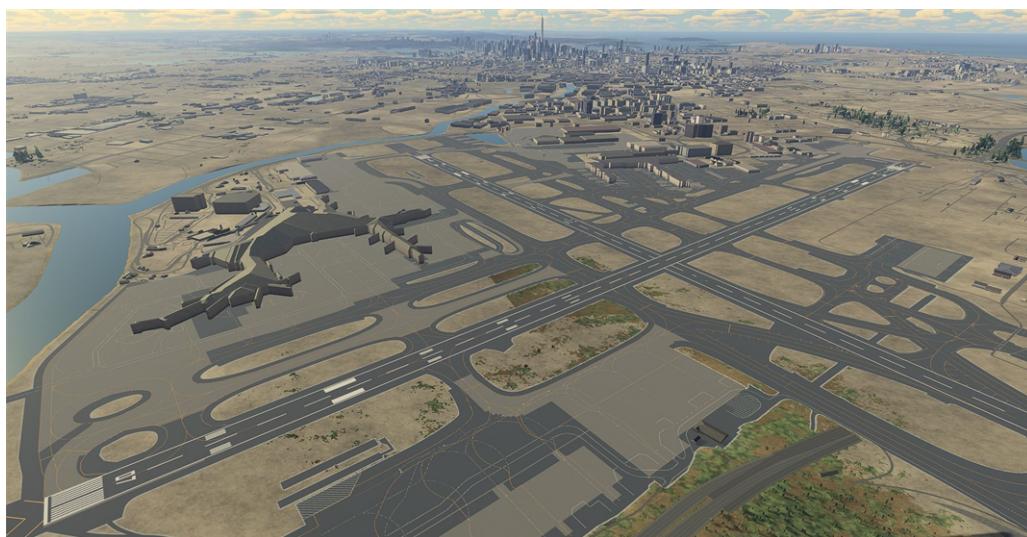
Image-17: KIAD - Dulles International Airport, United States**Image-18: LEBL - Josep Tarradellas Barcelona–El Prat Airport, Spain****Image-19: LLBG - Ben Gurion Airport, Israel**

Image-20: LOWW - Vienna International Airport, Austria**Image-21: YSSY - Sydney International Airport, Australia**

3. Starting VBS4

After installing VBS4 with appropriate licensing, you are ready to run it.

VBS4 provides the following primary methods to start the application:

- Use VBS Launcher, a utility specifically designed to enable you to launch VBS4 using Presets or custom startup parameters, and also to launch VBS4 on other computers on your network.

For more information, see [VBS Launcher \(on page 59\)](#).

- Start VBS4 with a Command Line.

For more information, see [Starting with a Command Line \(on the next page\)](#).

- Use Desktop Shortcuts available as an option to add during installation.

You can also create [Custom Desktop Shortcuts \(on page 58\)](#).

All these methods can use custom startup parameters. For more information, see [Command Line and Launcher Options \(on page 76\)](#).

WARNING

VBS World Server is included with VBS4. VBS World Server provides terrain streaming to connected VBS4 Clients, and also acts as a central repository of Battlespaces.

VBS4 can only stream terrain data from VBS World Server if it is connected as a Client.

To use VBS4 with VBS World Server, select the **VBS4 Online** configuration in VBS Launcher.

For most use cases, a separate Dedicated Server or VBS4 Admin Client hosts the scenario:

- For Online use cases, VBS World Server streams the base Whole-Earth Terrain and the Host computer provides additional terrain edits associated with the running Battlespace.
- For Offline use cases, the Host computer (Dedicated Server or VBS4 Admin Client) provides the terrain data.

Use the Client or Server tabs in VBS Launcher to select the appropriate Configuration.

For more information, see [Launching with Parameters \(on page 62\)](#).

The primary decision when starting a VBS4 Client is whether to start as an Administrator or as a User. For more information, see [Administrator and User Modes \(on page 57\)](#).

VBS4 creates Profiles for each user containing their settings and preferences. For more information, see [Profiles \(on page 57\)](#).

⚠️ WARNING

VBS4 uses the Windows account name as the VBS4 user name. This name can only contain printable [ASCII](https://www.w3schools.com/charsets/ref_html_ascii.asp) (https://www.w3schools.com/charsets/ref_html_ascii.asp) characters. VBS4 may crash if characters outside this range are used. Modify the Windows account name before starting VBS4 if it contains non-ASCII characters.

⚠️ WARNING

VBS4 does support multiple instances running on the same computer. However, it is not recommended due to its effect on performance.

ℹ️ NOTE

While VBS4 is running, the Microsoft Windows Sleep settings are ignored, and the computer on which VBS4 is running does not enter Sleep mode.

3.1 Starting with a Command Line

You can start VBS4 using a Command Prompt console window.

Follow these steps:

1. Open a Windows Command Prompt.
2. Run the VBS4 executable, adding the startup parameters you require. For example:

```
C:\Program Files\Bohemia Interactive Simulations\VBS4\VBS4.exe -admin  
-window -forceSimul
```

For details of the available startup parameters, see [Command Line and Launcher Options \(on page 76\)](#).

3.2 Administrator and User Modes

Start VBS4 in either Administrator or User mode (not to be confused with Windows administrator / user modes). Administrator mode enables full access to video, audio, and difficulty settings and has a more advanced setup interface.

To start VBS4 in Administrator mode, the [Use the following Client options to configure how the VBS4 Client operates: \(on page 79\)](#) command line option is required (or start VBS4 using the Administrator shortcut). For a full list of command line options, see [Command Line and Launcher Options \(on page 76\)](#).

NOTE

The Editor in Prepare Mode is only available if VBS4 is started in Administrator mode. In User mode during a Scenario, the Command and Control (C2) View is available instead of the Editor. Also, User mode does not allow you to change video, simulation, or localization options.

WARNING

The concept behind Administrator and User modes is to prevent users from changing key configuration settings and speed up the process of getting a scenario started (without users spending time on customizations).

3.3 Profiles

A VBS4 profile stores all relevant information for a particular user, including:

- Options configuration settings
- Keyboard settings, custom key controls
- Editable missions
- Overlays
- AAR and in-game video recordings
- Map visualization data

WARNING

VBS4 uses the Windows account name as the VBS4 user name. This name can only contain printable [ASCII](https://www.w3schools.com/charsets/ref_html_ascii.asp) (https://www.w3schools.com/charsets/ref_html_ascii.asp) characters. VBS4 may crash if characters outside this range are used. Modify the Windows account name before starting VBS4 if it contains non-ASCII characters.

Profile data is stored in:

- Default VBS4 Profile location: `%LOCALAPPDATA%\VBS4\`
- Other VBS4 Profile location: *Path* (*Path* is specified using the `-profiles=Path` command-line option - for more information, see [Command Line and Launcher Options \(on page 76\)](#))

WARNING

Deleting a profile also removes all associated saved games and custom created missions assigned to the **deleted** profile.

3.4 Custom Desktop Shortcuts

If you chose the Desktop Shortcuts option during installation, you can use them to start VBS4.

You can also create custom shortcuts to start VBS4 using specific startup parameters:

Follow these steps:

1. Navigate to the VBS4 installation folder with Windows File Explorer.
2. Right-click the executable file, `VBS4.exe`, and select **Create Shortcut**.
3. Right-click the Shortcut and select **Cut**, and then right-click in your Desktop and select **Paste**.
4. Right-click the Shortcut and select **Properties**.
5. In the Target input add startup parameters to the Target path.

For example, `C:\VBS_Installation\VBS4.exe -admin -window -forceSimul`

For more information about the available startup parameters, see [Command Line and Launcher Options \(on page 76\)](#).

6. Click **OK**.
7. Right-click the Shortcut and select **Rename** to apply a suitable name to your custom Shortcut.

Windows saves the Shortcut. Double-click the Shortcut to start VBS4 with the specified parameters.

3.5 VBS Launcher

VBS Launcher is a separate application used to start VBS4 using specific startup parameters either locally (on the local computer) or over a network.

To start VBS Launcher, execute the following file:

`\VBS_Installation\VBSLauncher.exe`



NOTE

VBS Launcher can also be started with additional command line parameters.

For more information, see [VBS Launcher Command Line \(on page 70\)](#).

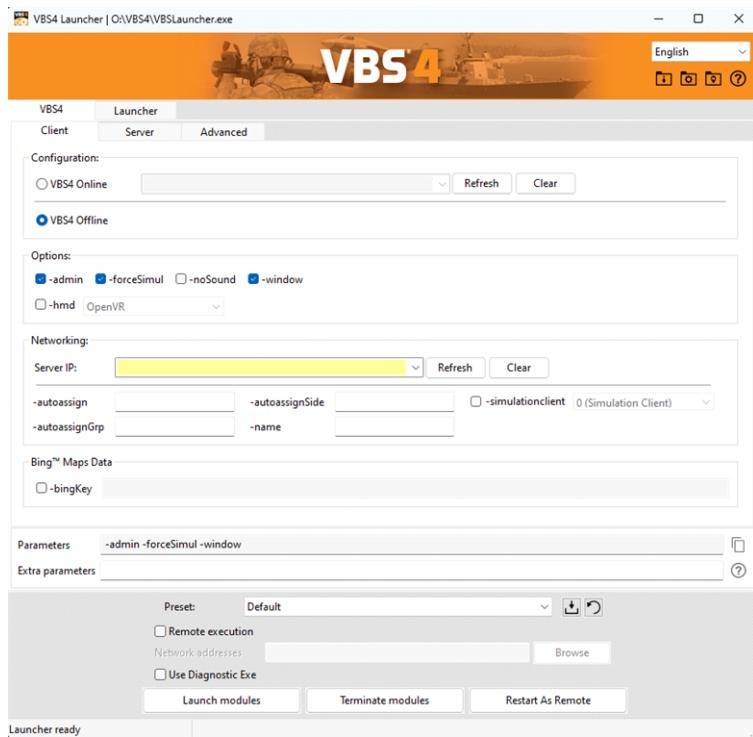


WARNING

VBS Launcher cannot be used to start VBS World Server (VWS). To start the VBS World Server, run:

`\VWS_Installation\vws_start.exe`

VBS Launcher opens and displays the following user interface:



VBS Launcher provides the following ways to start VBS4:

- [Launching with Parameters \(on page 62\)](#)

Manually specify command line parameters.

- [Launching with Presets \(on page 64\)](#)

Use Presets (collections of saved command line parameters) to start VBS4.

- [Remote Launching \(on page 66\)](#)

Use VBS Launcher to start VBS4 on a different computers on the network using the same startup parameters.

- [Batch Launching \(on page 67\) \(Advanced\)](#)

Launch one or more Presets at the same time, on one or multiple computers, for example launching both a VBS4 Client and a VBS4 Dedicated Server at the same time on two different computers.

WARNING

VBS World Server is included with VBS4. VBS World Server provides terrain streaming to connected VBS4 Clients, and also acts as a central repository of Battlespaces.

VBS4 can only stream terrain data from VBS World Server if it is connected as a Client.

To use VBS4 with VBS World Server, select the **VBS4 Online** configuration in VBS Launcher.

For most use cases, a separate Dedicated Server or VBS4 Admin Client hosts the scenario:

- For Online use cases, VBS World Server streams the base Whole-Earth Terrain and the Host computer provides additional terrain edits associated with the running Battlespace.
- For Offline use cases, the Host computer (Dedicated Server or VBS4 Admin Client) provides the terrain data.

Use the Client or Server tabs in VBS Launcher to select the appropriate Configuration.

For more information, see [Launching with Parameters \(on page 62\)](#).

VBS Launcher is an extensible utility enabling multiple products or *modules* to launch with their own set of custom parameters. See [Launching Other Modules \(on page 73\)](#) for more information about how to customize VBS Launcher for your needs (advanced).

VBS Launcher provides additional help icons, including to open commonly used file locations:



Use the drop-down to select the Language to use in VBS Launcher.

NOTE

This selection is separate from choosing the VBS4 display language.

To select the VBS4 display language, see [Localization \(on page 240\)](#).

From left-to-right:

- Open the VBS4 Installation folder in Windows File Explorer.
- Open the VBS4 Settings folder in Windows File Explorer.
- Open the VBS4 Battlespaces folder in Windows File Explorer.
- Open the VBS Launcher documentation.

3.5.1 Launching with Parameters

VBS Launcher enables you to start VBS4 in different modes. Start VBS4 as either a Client (stand-alone or connected to a Dedicated Server) or as a Dedicated Server (to which Clients connect). One or more Clients can connect to a Dedicated Server. Servers cannot directly connect to Servers, although VBS Gateway can be used to achieve this - see [Launching VBS Gateway \(on page 144\)](#).

Follow these steps:

1. In VBS Launcher select the **VBS4** tab.
2. Select the **Client** or **Server** tab depending on the type of VBS4 instance you want to start.
3. For **Online** use cases, select **Client > VBS4 Online** or **Server > VBS4 Online Dedicated Server**.

Starts VBS4 in an *Online* configuration, connected to VBS World Server hosting the Whole-Earth Terrain and providing access to stored Battlespaces.

During Scenario Execution VBS World Server streams terrain data to connected VBS4 Clients.

Configuration:

VBS4 Online

VBS4 Offline

Click **Refresh** and select a VBS World Server from the drop-down list or manually enter the IP address of a VBS World Server. The drop-down is **green** if VBS Launcher can communicate with the VBS World Server.

4. For **Offline** use cases, select **Client > VBS4 Offline** or **Server > VBS4 Offline Dedicated Server**.

Starts VBS4 *Offline*, disconnected from VBS World Server. Local terrain data is used.

Configuration:

VBS4 Online

VBS4 Offline

Options:

-admin -forceSimul -noSound -window
 -hmd

Networking:

Server IP:

Click **Refresh** and select a VBS4 Server from the drop-down list or manually enter the **Server IP** address. The drop-down is **green** if VBS Launcher can communicate with the Server.

Connecting to a Dedicated Server is optional when running VBS4. The VBS4 Training UI provides a **Connect to Server** option to use after VBS4 starts.

5. Set additional parameters in the **Client** or **Server** tab, and in the **Advanced** tabs, as required.

The **Parameters** field displays the options selected.

- Click the Clipboard icon to the right of the input to copy your selected parameters.

Extra Parameters enables additional parameters that are not in the VBS Launcher tabs.

Parameters	-admin -forceSimul -window	<input type="button" value=""/>
Extra parameters		<input type="button" value="?"/>

For more information about the available parameters, see [Modifying Common Parameters \(below\)](#) and [Command Line and Launcher Options \(on page 76\)](#).



TIP

Parameters changed from the default or selected Preset are highlighted in **yellow**.

6. Click **Launch Modules**.

VBS4 starts using the selected parameters.

To save your custom parameters as a Preset, see [Modifying Presets \(on page 65\)](#).

3.5.1.1 Modifying Common Parameters

The Client and Server tabs display commonly used VBS4 parameters for Client and Server configurations. For more information, see [Command Line and Launcher Options \(on page 76\)](#).

The most useful parameters in the Client and Server tabs include:

Client Option	Description
<code>-admin</code>	Starts VBS4 in administrator mode (defaults to trainee mode if omitted).
<code>-forceSimul</code>	VBS4 continues to draw the scene and run the simulation even if VBS4 loses focus. Useful for administrators running additional software alongside VBS4.
<code>-window</code>	Runs VBS4 in window mode (defaults to full screen if omitted).
<code>-hmd=type</code>	Starts VBS4 using a virtual reality head-mounted display. For more information, see Virtual Reality Headsets (on page 306) .

Server Option	Description
<code>-gateway</code>	Starts the VBS4 Server with VBS Gateway (a HLA / DIS gateway) enabled.
<code>-multicast</code>	Use this option to disable multicast, for example if you are connecting to the VBS4 Server over the Internet.

To save your selected parameters, see [Modifying Presets \(on page 65\)](#).

3.5.2 Launching with Presets

VBS Launcher includes a set of Presets to enable you to quickly start VBS4 in your required mode:

Follow these steps:

Expand the **Preset** drop-down, and select the required Preset.

Preset	Description
Default	Preselects a VBS4 Online connection ready to connect to the VBS World Server specified in the Client (on page 77) Tab next to VBS4 Online . Key Parameters: <code>-worldServer=ipaddress_or_dnsname -admin</code>
Admin	Same as Default . Key Parameters: <code>-worldServer=ipaddress_or_dnsname -admin</code>
Client	Same as Admin but without the <code>-admin</code> parameter. Key Parameters: <code>-worldServer=ipaddress_or_dnsname</code>
Dedicated Server	Starts VBS4 as an Offline Dedicated Server in a console window. Key Parameters: <code>-server</code>

NOTE

If no `ipaddress` is specified, VBS4 starts Offline, disconnected from VBS World Server. Local terrain data (stored on the local computer) is used.

WARNING

To use Presets as a shortcut with connections to VBS World Server or a VBS4 Server, ensure that the applicable `ipaddress` parameters are set in the [Client \(on page 77\)](#) Tab as required, and save the Preset as described in [Modifying Presets \(on the next page\)](#).

Click **Launch Modules**.

VBS4 starts using the parameters specified by the Preset.

3.5.2.1 Modifying Presets

The existing Presets are configurable and can be changed or new ones created.

Follow these steps:

1. Select the **VBS4** tab and specify custom parameter settings and values in the sub-tabs as required.

For more information, see [Launching with Parameters \(on page 62\)](#).

2. Click the Preset **Save** icon.



The Save Preset dialog opens.

3. Do one of the following:

- To modify the current Preset, click **OK**.
- To create a new Preset, change the **Preset Name** and click **OK**.

VBS4 saves Presets to the following location:

`\Documents\VBS4\Launcher\Modules\VBS4\`



TIP

VBS4 stores a backup set of the default Presets at the following location:

`\VBS_Installation\Launcher\Modules_VBS4\Presets\`

To perform a factory reset to restore the default Presets, remove the

`\Documents\VBS4\Launcher\` folder (default location), and restart VBS Launcher.



WARNING

Create a backup of the folder, if necessary, prior to the removal.

Select a Preset and click **Reset** to reset any unsaved changes and return the values to the ones saved in the currently selected Preset.



3.5.3 Remote Launching

Use VBS Launcher to specify startup parameters for VBS4 on remote computers on the network.

Follow these steps:

1. On each remote computer, start VBS Launcher and click **Restart as Remote**, or start VBS Launcher with the `-srv` command line:

`\VBS_Installation\VBSLauncher.exe -srv`

For more information, see [VBS Launcher Command Line \(on page 70\)](#).

2. On the local computer, in VBS Launcher, select the parameters to use or choose a Preset:
 - [Launching with Parameters \(on page 62\)](#)
 - [Launching with Presets \(on page 64\)](#)
3. Select Remote Execution.



4. Input the computers to start in **Network Addresses**:

- Specify the IP Addresses of the computers separated by semi-colons ;
- Multiple address must be separated with a semi-colon ; and **no spaces**.
- **Optional:** add delays between computers using `~N` where `N` is the seconds to wait.

For example: `192.168.0.1;~3;192.168.0.2;~3;localhost`



You can also use a text file with predefined network addresses. To load it, click the **Browse** button next to **Network addresses** and select the file.

Network addresses: "192.168.0.1;192.168.0.2;"

5. Click **Launch Modules**.

VBS Launcher starts VBS4 on all the specified computers using the defined parameters or Preset.



If **incorrect path in applist?** appears when launching VBS4, check the paths to VBS4 installations and `VBS4.exe` files in the following file. Restart the VBS Launcher server after editing the file.

`\VBS_Installation\Launcher\appList.txt`

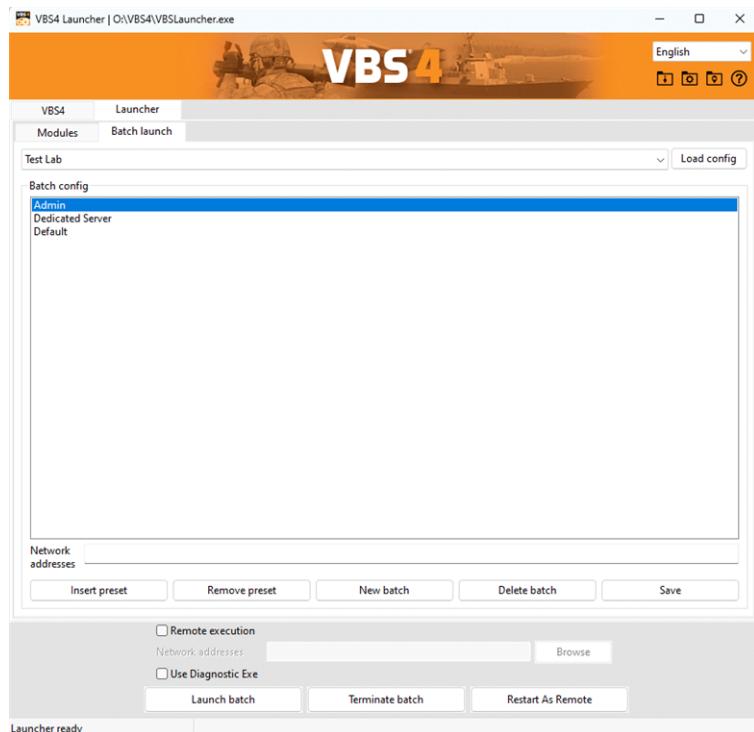
3.5.4 Batch Launching

The **Batch launch** feature enables you to create and save a startup configuration for multiple computers on your network.

A Batch consists of a set of Presets, each associated with a set of computers (IP addresses) to start using that Preset.

Create the Presets you require as described in [Modifying Presets \(on page 65\)](#).

Select or create a Batch in the **Launcher > Batch Launch** tab.



Follow these steps:

1. Click **Load Config** to select and open a previously saved Batch configuration. Skip this step to create a new one.
2. Select a Batch from the drop-down or to create a Batch, click **New Batch**, input a name, and click **OK**.
3. To add a Preset to a batch, click **Insert Preset**, select the Preset, and click **OK**.

Use the **Remove Preset** button to remove a Preset from a Batch. The Presets must already exist in order to be added to the Batch.

4. Select a Preset, and input **Network Addresses** to specify the computers to launch with the selected Preset. IP addresses are saved automatically as they are entered.
 - Separate IP addresses with a semi-colon ; and ensure that no spaces are added between IP addresses.
For example: `192.168.0.1;192.168.0.2`
 - To launch a Preset on the local PC in addition to network PCs, add either a semi-colon ; at the start or `localhost` anywhere (if it is not the first or last entry, make sure there are semi-colons before and after it).
For example:
`;192.168.0.1;192.168.0.2`
`192.168.0.1;192.168.0.2;localhost`

5. Repeat steps 5 and 6 to specify as many Presets and IP addresses as required.
6. Click **Save** to store the Batch configuration.

The default file is `BatchConfig.xml` but you can specify a different filename if you prefer. A single Batch configuration `.xml` file can contain an unlimited number of Batches.

The default location for Batch files is:

`\Documents\VBS4\Launcher\Config\BatchConfig.xml`

The Batch file is ready to launch and start VBS4 across your network.

Follow these steps:

1. On every computer that you want to remote start, start VBS Launcher in server mode.

Do one of the following:

- On the remote computer, start VBS Launcher and click **Restart as Remote**.
- On the remote computer, start VBS Launcher with the `-srv` command line:

`\VBS_Installation\VBSLauncher.exe -srv`

For more information, see [VBS Launcher Command Line \(on page 70\)](#).

2. In VBS Launcher select the **Launcher** tab.
3. Select **VBS4** from the list of Modules.
4. Select the **Launcher > Batch Launch** tab.

5. Select the required Batch from the drop-down.

 **NOTE**

If you saved your Batch to a non-default configuration file (other than **BatchConfig.xml**), then click **Load Config** to load it.

6. Click **Launch Batch** to use the currently selected Batch.

VBS Launcher starts VBS4 on all the specified computers using the specified Presets.

 **NOTE**

If any VBS Clients fail to start, VBS Launcher provides a report.

 **TIP**

If **incorrect path in applist?** appears when launching VBS4, check the paths to VBS4 installations and **VBS4.exe** files in the following file. Restart the VBS Launcher server after editing the file.

\VBS_Installation\Launcher\appList.txt

3.5.5 VBS Launcher Command Line

As an alternative to using the user interface, VBS Launcher can be run using a Command Line using the parameters listed in the following table.

Using VBS Launcher in Command Line mode is required if you want to use the [Remote Launching \(on page 66\)](#) or [Batch Launching \(on page 67\)](#) features.

`\VBS_Installation\VBSLauncher.exe parameters`

Short (Long)	Description
<code>-s</code> (<code>--s</code>)	<p>Start VBS Launcher in silent mode:</p> <ul style="list-style-type: none"> • Hides the console (in server mode). • Hides the GUI and shutdown the launcher when all tasks are done (in GUI mode). • Works only in combination with other parameters. <p>The default is <code>false</code>.</p>
<code>-configs=path</code> (<code>--config-directory=path</code>)	Allows you to specify a different absolute <code>path</code> for the VBS Launcher settings (where they are saved and loaded from), than the default one (<code>\Documents\VBS4\Launcher\</code>).
<code>-console</code> (<code>--show-console</code>)	Shows a DOS console associated with the VBS Launcher application.
<code>-srv</code> (<code>--server</code>)	<p>Starts VBS Launcher in server mode (remote launch), waiting for remote requests.</p> <p>The default is <code>false</code>.</p>
<code>-rl ip_addresses</code> (<code>--remote-launch=ip_addresses</code>)	<p>Enables remote launch at the specified network addresses.</p> <p>The remote addresses must have previously been started using the <code>-srv</code> option.</p>
<code>-p preset_name</code> (<code>--preset=preset_name</code>)	Sets the specified preset as active.
<code>-pl preset_name</code> (<code>--preset-launch=preset_name</code>)	Launches with the specified preset (if it exists).

Short (Long)	Description
<code>-pt <i>preset_name</i></code> <code>(--preset-terminate=<i>preset_name</i>)</code>	Terminates with the specified preset (if it exists).
<code>-b <i>batch_name</i></code> <code>(--batch=batch_name)</code>	Loads a batch configuration from the file specified. The default location is: <code>\Documents\VBS4\Launcher\Config\VBSLauncher\BatchConfig.xml</code>
<code>-bl <i>batch_name</i></code> <code>(--batch-launch=batch_name)</code>	Launches the batch specified (if exists in the batch configuration).
<code>-bt <i>batch_name</i></code> <code>(--batch-terminate=batch_name)</code>	Terminates the batch specified (if exists in the batch configuration).

Example Usage

Startup Parameter	Action
<code>VBSLauncher.exe -srv</code>	Starts VBS Launcher in server mode, waiting for remote requests.
<code>VBSLauncher.exe -srv -s</code>	Starts VBS Launcher in server mode and hidden (no console).
<code>VBSLauncher.exe -configs="C:\VBS_Launcher"</code>	Starts VBS Launcher using the VBS Launcher configuration in <code>C:\VBS_Launcher</code> .
<code>VBSLauncher.exe -b "C:\Launcher\MyBatches.xml"</code>	Starts VBS Launcher in GUI mode and loads the batch configuration from the file specified.
<code>VBSLauncher.exe -bl "batch1"</code>	Starts VBS Launcher in GUI mode and launches <code>"batch1"</code> from the default batch configuration.
<code>VBSLauncher.exe -b "C:\Launcher\MyBatches.xml" -bl "batch1"</code>	Starts VBS Launcher in GUI mode and launches <code>"batch1"</code> from <code>MyBatches.xml</code> .
<code>VBSLauncher.exe -bl "batch1" -s</code>	Starts VBS Launcher hidden (no launcher GUI), launches <code>"batch1"</code> from the default batch configuration, and terminates the launcher when all tasks from <code>"batch1"</code> are done.
<code>VBSLauncher.exe -pl "Dedicated Server" -s</code>	Starts the <code>"Dedicated Server"</code> preset hidden (no launcher GUI).

Startup Parameter	Action
VBSLauncher.exe -pt "Dedicated Server"	Terminates the "Dedicated Server" preset.
VBSLauncher.exe -pl "Dedicated Server" -rl "192.168.1.101"	Enables remote launch, sets the network address to "192.168.1.101" and launches the "Dedicated Server" preset (launches a dedicated server at 192.168.1.101).
VBSLauncher.exe -pt "Dedicated Server" -rl "192.168.1.101"	Enables remote termination, sets the network address to "192.168.1.101" and terminates the "Dedicated Server" preset (terminates a dedicated server at 192.168.1.101).

3.5.6 Launching Other Modules

VBS Launcher is extensible and can be used to start other products as well as VBS4. You can add your own products by [Creating Custom Modules \(below\)](#).

When multiple products start, you may need to control the order in which they start. VBS Launcher refers to products as *Modules*.

Follow these steps:

1. In VBS Launcher select the **Launcher** tab.
2. Select all the products you want to start from the list of Modules.
3. If the products need to start in a specific order, use the Dependencies tab to specify the order.

For example, if Module A needs Module B to be running before it is started:

- a. Select **Module A** from the list of Modules.
 - b. In the Dependencies tab, select **Module B**.
4. Click **Launch Modules**.

VBS Launcher starts the modules in the order they appear in the Modules list. However, if a module has a dependency on another module, VBS Launcher starts that other module first.

3.5.6.1 Creating Custom Modules

It is possible to customize VBS Launcher to display additional modules and to customize the appearance and arguments that appear for each module.

GUI.xrc

Contains the GUI configuration. The GUI can be completely customized (add / remove / edit UI elements). For more info about XRC please visit:

http://wiki.wxwidgets.org/Using_XML_Resources_with_XRC

Multiple **GUI.xrc** files exist in the following locations:

- The primary Launcher tab:
`\VBS_Installation\Launcher\Data\GUI.xrc`
- Each module tab with the primary module being **_VBS4**:
`\VBS_Installation\Launcher\Modules\module\GUI.xrc`

Arguments.xml

Contains all supported arguments, their default values, and tooltips for a module.

For example: `\VBS_Installation\Launcher\Modules_VBS4\Arguments.xml`

Every argument must have the following structure:

```
<argument name="argument_name" type="argument_type">
    <default>the default value of the argument</default>
    <tooltip>a help text that is visible in the GUI</tooltip>
</argument>
```

Supported types are:

- bool (value: "true" or "false")
- string
- number
- enum (value: number - index of an enum item)

Presets Folder

The following folder contains the VBS4 preset files loaded when the launcher starts:

`\Documents\VBS4\Launcher\Modules\VBS4\`

New arguments can be added:

1. Declare the argument in `Arguments.xml`
2. Create a corresponding UI element (declare in `GUI.xrc`):

```
argument type | UI element
-----
bool | wxCheckBox
string | wxTextCtrl
number | wxSpinCtrl
enum |wxChoice
```

The name of the UI element must be the same as the name of the argument.

Example: To add a new boolean argument "nosound":

1. Add to `SupportedArguments.xml`:

```
<argument name="nosound" type="bool">
    <default>false</default>
    <tooltip>No sound output.</tooltip>
</argument>
```

2. Create a corresponding UI element in `GUI.xrc`:

```
<object class="wxCheckBox" name="nosound">
    <label>nosound</label>
</object>
```

For more information, see https://wiki.wxwidgets.org/Using_XML_Resources_with_XRC.

wxSpinCtrl and wxChoice Labels

For `wxSpinCtrl` and `wxChoice` there should be a label element (optional).

```
<!-- LABEL -->
<object class="wxStaticText" name="limitfps_label">
    <label>limitfps</label>
</object>
<!-- VALUE -->
<object class="wxSpinCtrl" name="limitfps">
    <size>100,-1</size>
    <max>10000</max>
    <value>0</value>
</object>
```

The label element must have the name `elementname_label` (where `elementname` is a name of the argument, `limitfps` in this case, and `_label` is a common suffix for label elements). If the name of the label is different, highlighting unsaved values does not work.

Remapping Arguments

There is a configuration parameter for remapping arguments. This can be used to set up startup parameters based on the settings of other startup parameters.

```
<remap name="somecontrol" type="bool" value="false">disabled</remap>
<remap name="somecontrol" type="bool" value="true">enabled</remap>
```

Remaps a checkbox `somecontrol` to `enabled` if selected and to `disabled` if unselected.

Example for the `epenet` argument:

```
<argument name="epenet" type="string">
    <default>0</default>
    <tooltip>Allows collision simulation on one computer, for objects close enough to collide. Should improve object interaction during network play.</tooltip>
    <remap name="chkepenet" type="bool" value="false">0</remap>
    <remap name="chkepenet" type="bool" value="true">1</remap>
</argument>
```

- If `chkepenet == "false"`, then the value of `epenet = "0"`
- If `chkepenet == "true"`, then the value of `epenet = "1"`

i NOTE

- `<remap>` is activated, if the value (for example, `value="true"`) evaluates as correct.
- Checkboxes are set by true / false (or at least by false, where everything else is true).
- Only the last `<remap>` is used when the same argument has different `<remaps>` set in the config. Those can be activated / configured separately, but not at once.

3.6 Command Line and Launcher Options

VBS4 includes many start-up options to control its behavior, operation, and performance.

Use VBS4 start options either as options to append to the VBS4 executable command, or as selections in [VBS Launcher \(on page 59\)](#). Access these options in VBS Launcher in the VBS4 tab.

This topic provides a reference to the available options, organized by their tabs in VBS Launcher:

- [Client \(on the next page\)](#)
- [Server \(on page 81\)](#)
- [Advanced - Radio \(on page 85\)](#)
- [Advanced - Configuration \(on page 88\)](#)
- [Advanced - Developer \(on page 91\)](#)

Additional command-line options which are not in VBS Launcher can be added manually and are listed in:

- [Extra Parameters \(on page 94\)](#)

WARNING

VBS World Server is included with VBS4. VBS World Server provides terrain streaming to connected VBS4 Clients, and also acts as a central repository of Battlespaces.

VBS4 can only stream terrain data from VBS World Server if it is connected as a Client.

To use VBS4 with VBS World Server, select the **VBS4 Online** configuration in VBS Launcher.

For most use cases, a separate Dedicated Server or VBS4 Admin Client hosts the scenario:

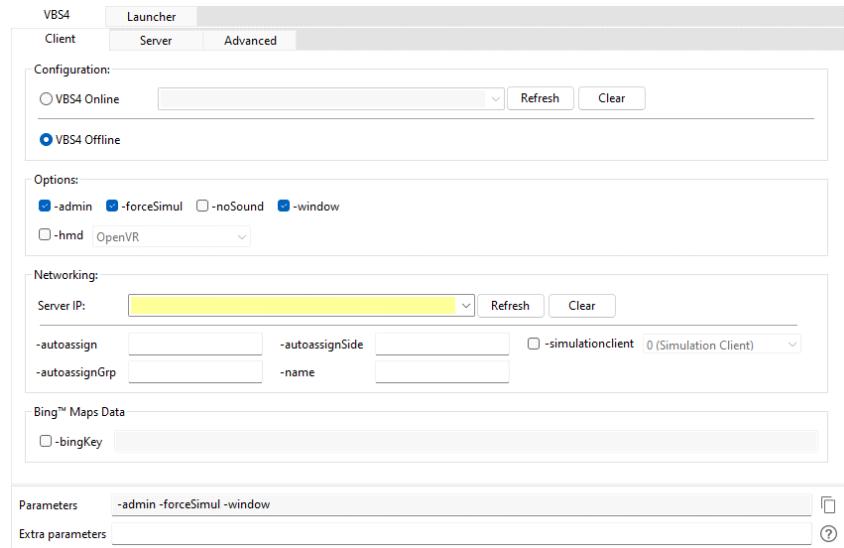
- For Online use cases, VBS World Server streams the base Whole-Earth Terrain and the Host computer provides additional terrain edits associated with the running Battlespace.
- For Offline use cases, the Host computer (Dedicated Server or VBS4 Admin Client) provides the terrain data.

Use the Client or Server tabs in VBS Launcher to select the appropriate Configuration.

For more information, see [Launching with Parameters \(on page 62\)](#).

3.6.1 Client

Use Client options to start a VBS4 Client, selecting Server connections, and Client options.



Use **VBS4 Online** options to connect to a VBS World Server:

- **-worldServer=ipaddress_or_dnsname**

Specifies the **VBS4 Online** Configuration to connect to a VBS World Server specified by the IP address or DNS name input next to the VBS4 Online selection.

NOTE

If VBS World Server is on the same computer, **ipaddress** can be set to **localhost**.

Selecting **VBS4 Offline** deactivates the **-worldServer** parameter and starts the VBS4 Client without a connection to VBS World Server.

Use the **Networking Options** to specify a connection to a Dedicated Server or VBS4 Client that hosts the Scenario, or to start a Simulation Client.

- **-connect=ipaddress_or_dnsname**

Specifies the IP address / DNS name (in the **Server IP** input) of the Dedicated Server or the VBS4 Client that hosts the Scenario.

Leave the *ipaddress_or_dnsname* empty to start a standalone VBS4 Client for Single Computer use cases or to specify a connection later in the Training UI.

NOTE

If *ipaddress_or_dnsname* is set to **localhost**, it connects to a Dedicated Server or the VBS4 Client that hosts the Scenario on the same computer.

- **-simulationclient=type**

Player-invisible client to take care of a certain number of units, vehicles and network objects, and / or AAR from server (use **-connect** command line argument to connect to other than localhost).

type can have these values:

- **0** - Simulation client (same as **-simulationClient**).
- **1** - AAR Simulation client.
- **2** - Simulation + AAR Simulation client.

 **NOTE**

Generally, it is recommended to use SC type 1 (**-simulationClient=1**) for AAR recording rather than SC type 2 because AAR recording is very demanding.

 **WARNING**

If an AAR Simulation Client (**-simulationClient=1** or **-simulationClient=2**) is used, and you want radio transmissions to be recorded, do not use the **- disableVBSRadio** parameter on the Simulation Client.

- **-autoassign=name**

Automatically assign the player to the unit **name**, when the player joins a multiplayer session (**name** is defined in VBS Editor - see Adding Units in the VBS4 Editor Manual).

- **-autoassigndelete=side**

Automatically assign the player to side **side** when the player joins a multiplayer session (**side** can be: **east**, **west**, **civilian**, or **resistance** - if left empty, a random side is chosen, based on the free slots it has).

- **-autoassingngroup=name**

Automatically assign the player to the group with the leader **name**, when the player joins a multiplayer session (**name** is defined in VBS Editor - see Adding Units in the VBS4 Editor Manual).

 **NOTE**

To enable, the leader of the group must be assigned as **player** or **playable**.

- `-name=name`

Can be used to set the player name in the following ways:

- `-name=#computerName` - Sets the player name to the DNS name of the computer running VBS4.

NOTE

`computerName` is a special keyword used by VBS4 to generate the player name accordingly.

- `-name=#fullComputerName` - Sets the player name to the fully-qualified DNS name of the computer running VBS4.

NOTE

`fullComputerName` is a special keyword used by VBS4 to generate the player name accordingly.

- `-name=#text_file_path` - Sets the player name to the content of the specified text file. The path to the file can be relative to the VBS4 installation folder, or an absolute path.

NOTE

Only the first line of the file is used as the name.

- `-name=player_name` - Sets the player name to `player_name`.

NOTE

This specification does not require the use of the `#` character prefix.

Also, see Joining a Multi-Player Scenario in the VBS4 Trainee Manual.

Use the following **Client** options to configure how the VBS4 Client operates:

- `-admin`

Start VBS4 in admin mode (defaults to trainee mode if omitted).

- `-forceSimul`

VBS4 continues to draw the scene and run the simulation even if the VBS4 window loses focus.

This is useful for administrators running additional software that needs to be controlled while VBS4 is running.

- **-nosound**

Disables audio output.

NOTE

If **-windowmode=N** (on page 94) is anything other than **0**, **-nosound** is automatically applied.

- **-window**

Runs in window mode (VBS4 runs in Full Screen mode if omitted).

- **-hmd=type**

Start VBS4 using a Virtual Reality (VR) Head-Mounted Display (HMD).

For more information, see [Virtual Reality Headsets \(on page 306\)](#).

Use the **hmd** drop-down to select the *type*:

- **OpenVR** (**-hmd=openvr**) - Default display mode for most VR headsets (that support the OpenVR API).
- **OpenXR** (**-hmd=openxr**) - Display mode for supported XR headsets.
- **Varjo** (**-hmd=varjo**) - Varjo display mode for Varjo VR headsets.
- **XTAL** (**-hmd=xtal**) - XTAL display mode for XTAL VR headsets.
- **Debug** (**-hmd=debug**) - Starts VBS4 in a display mode that simulates VR headset output on a standard monitor.

NOTE

If **-hmd** is used as a command-line parameter without a specified *type*, VBS4 auto-detects the first applicable option. For additional types, apart from **-hmd=openvr** and **-hmd=debug**, see [Setup VBS4 for VR \(on page 308\)](#).

Use the **Bing™ Maps Data** options to stream Microsoft Bing Maps data in VBS4.

- **-bingKey=key**

Select **-bingKey** and enter the Bing Maps Key in the input.

For more information, see [Starting VBS4 with Microsoft Bing Maps \(on page 142\)](#).

⚠️ WARNING

The following considerations apply:

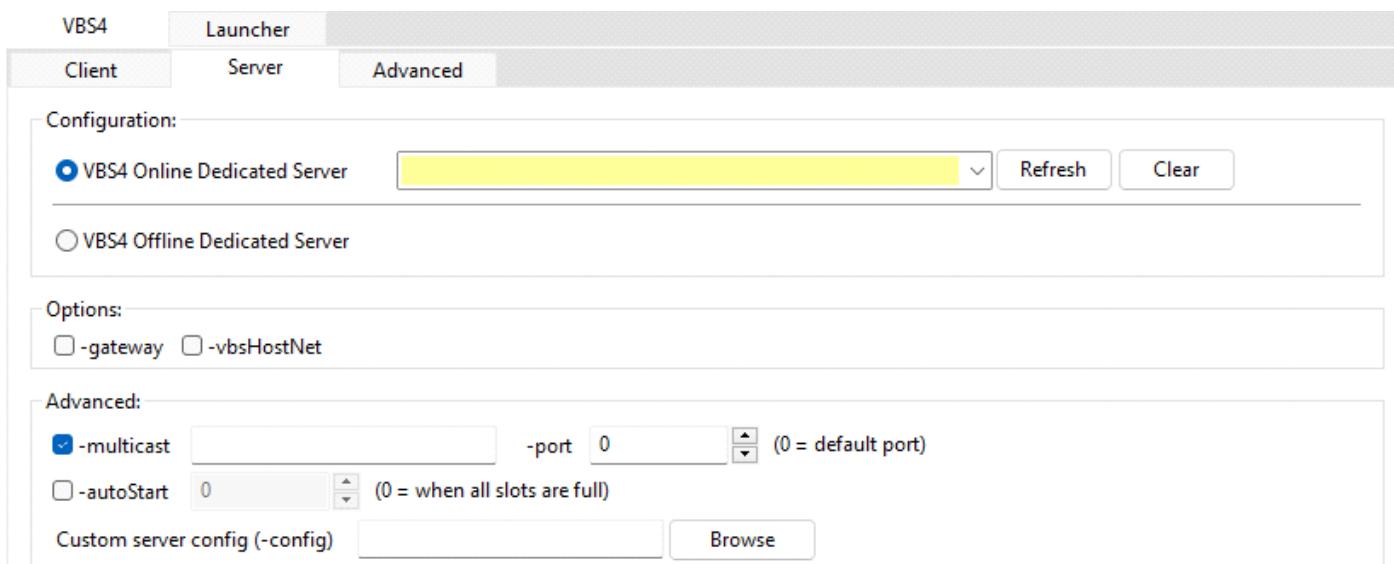
- In order to stream data from Microsoft Bing Maps, VBS4 requires internet access and a valid Bing Maps Key.
- Combining Microsoft Bing Maps and VBS World Server data is not supported.

✓ TIP

You can find more information about existing and upcoming detailed Earth insets (such as cities) on the [Microsoft Bing Blogs](https://blogs.bing.com/maps?tagname=Bing%20Maps%20Imagery&groupid=9) (<https://blogs.bing.com/maps?tagname=Bing%20Maps%20Imagery&groupid=9>) website.

3.6.2 Server

Use the Server options to start a VBS4 Dedicated Server that VBS4 Clients can connect to, with the possibility to connect the Dedicated Server to a VBS World Server (Online configuration) or not (Offline configuration).



Use **VBS4 Online Dedicated Server** option to connect to a VBS World Server:

- **-server -worldServer=ipaddress_or_dnsname**

Starts a Dedicated Server with a connection to a VBS World Server specified by the IP address or DNS name input next to the VBS4 Online Dedicated Server selection.

NOTE

Selecting **VBS4 Offline Dedicated Server** sets `-server` but deactivates the `-worldServer` parameter and starts the VBS4 Dedicated Server without a connection to VBS World Server.

Use the following options to configure the operation of a VBS4 Dedicated Server running in console mode:

- `-server`

Selecting **Online** or **Offline** sets `-server` and starts a Dedicated running in console mode that VBS4 Clients can connect to.

For more information, see [Dedicated Server \(on page 105\)](#).

- `-gateway`

Start VBS4 with VBS Gateway as the HLA / DIS gateway.

WARNING

VBS Gateway is off by default. You can only access VBS Gateway by starting VBS4 with the `-gateway` option.

- `-vbsHostNet`

Used to enable the `VBSExternalNetworking` host component on VBS4, and run it in broadcast mode with VBS Blue IG.

For more information, see the VBS Host Overview in the VBS Host Manual, and Start Up Parameters in the VBS Blue IG Manual.

- **-multicast=ipaddress:port**

By default, multicast is enabled in VBS4 and network update messages (UpdateMan, UpdatePositionMan, UpdateTank) are multicast to every Client and to the Server.

NOTE

Multicast is only supported when all Servers and Clients are on the same local network. To enable Clients to connect from outside the local network, disable multicast on the Host computer using **-multicast=0** (unchecked **-multicast** in VBS Launcher automatically adds **-multicast=0** to the **Parameters** field).

Use **-multicast=ipaddress** to define a specific multicast IP address to use. Specify **-multicast=ipaddress:port** to define a port to use.

- Default multicast address 225.6.7.8 is used.
- If **port** is not specified, the port selected is output to the Dedicated Server Console.
- LAN Only - Multicast only works over LAN setup, not over the internet. The error message "Multicast connection rejected" displays when VBS4 attempts to use multicast over the internet.
- Disable Multicast - Specify **multicast=0**.

- **-port=N**

Select port number *N* for the Dedicated Server. The default port is 2302.

- **-autostart / -autostart=N**

Starts a multiplayer scenario when all slots are filled. Skips the briefing as soon as all clients are ready, if you use `briefing = 0;` in `description.ext`.

Default location:

`\Documents\VBS4\Battlespaces\Battlespace_Name\Missions\Battlespace_Name\description.ext`

For more information, see Scripting with `description.ext` in the VBS4 Scripting Manual.

NOTE

The following considerations apply:

- The scenario does not start automatically without `briefing = 0;` in `description.ext`.
- `debriefing = 0;` has no effect.

Alternatively, specify the number of slots, *N*, that must be filled before the mission automatically starts.

- `-autostart=0` starts a mission when all slots are filled.
 - `-autostart=-1` prevents a mission from automatically starting.
 - When the `-autostart` parameter is not used on a Dedicated Server, or when `-autostart=-1` is used on a Dedicated Server, the `-autostart` parameter on the VBS4 Admin Client is used, if it is set.
- **-config=filename**

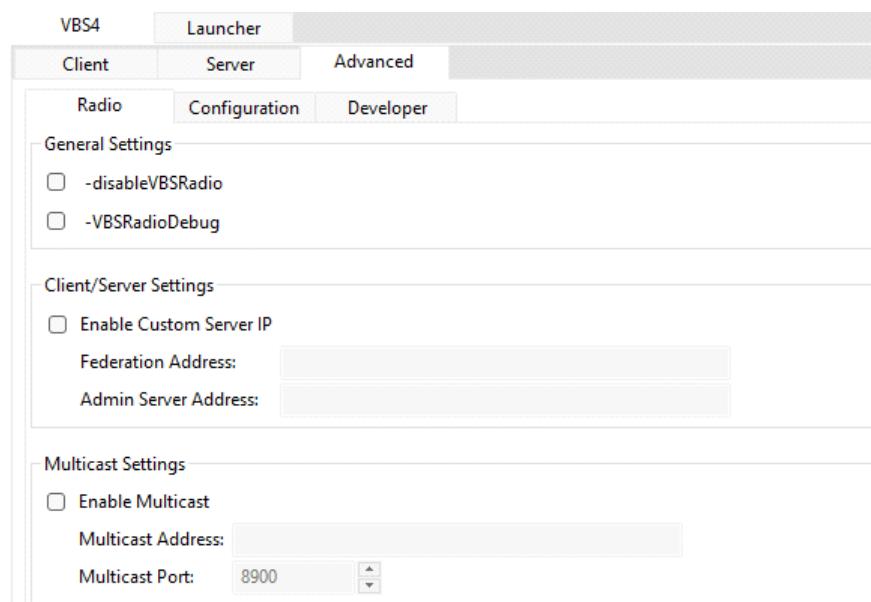
Specify the Server configuration file to use where *filename* is the path to the file.

For more information, see [Server Configuration File \(on page 121\)](#).

3.6.3 Advanced - Radio

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-22: 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 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.

i 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.

i 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.

i NOTE

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

For more information about multicast, see [Multicast \(on page 135\)](#).

- **-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 `prt1516eLRC.settings` file at:

`\VBS_Installation\lib64\pitchTalk\prt1\conf\`

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

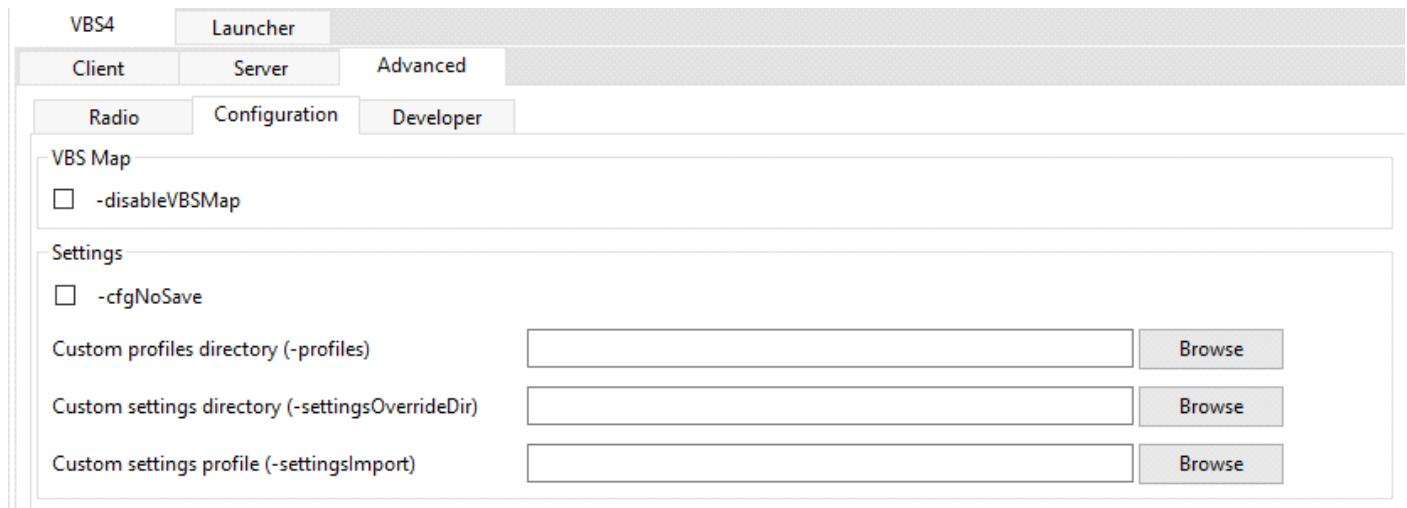
Use the following values as required by your network configuration:

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.

For more information, see Starting VBS Radio in the VBS Radio Manual.

3.6.4 Advanced - Configuration

Use the Configuration options to specify custom profiles or controls to use or to prevent updates to the VBS4 configuration file.



- **-disableVBSMap**

VBS Map is enabled by default. Select this option to disable VBS Map (see Deploying VBS Map in the VBS Map Manual).

- **-cfgNoSave**

Prevents changes in the options overwriting configuration files such as `VBS4.xml`. When this parameter is used, no changes are saved to the configuration files or the VBS4 Profile file.

Any changes to configuration files do not take effect in-game because those changes are reverted when any mission is started / hosted.

- **-profiles=path**

Enables you to choose an alternate user profile, where `path` specifies the user-profile data location. The Windows user account needs permissions to read from and write to the location folder.

You can specify either an absolute path (for example, `D:\VBS4\profiles`) or a relative one, beneath the VBS4 installation folder (for example, `\profiles\wide\`).

The default user profile location is `%LOCALAPPDATA%\VBS4\`, where the `\Settings\` sub-folder holds the main user-profile data. For more information, see [VBS4 Profile Options \(on page 386\)](#).

- **-settingsOverrideDir=path**

Allows you to do one of the following:

- Override any of the default XML configuration files from the default Profile folder at `%LOCALAPPDATA%\VBS4\Settings\` (see [VBS4 Profile Options \(on page 386\)](#)) with user-modified versions of the XML configuration files, stored at the `path` location (a path to the folder).
- Override the [Video Settings \(on page 165\)](#) overall preset:
 1. Create a file called `VideoSettings.xml` at the `path` location (a path to the folder containing `VideoSettings.xml`).
 2. Set the file content as follows, where `preset_value` is any of the Video Settings presets (`Low`, `Normal`, `High`):

```
<?xml version="1.0"?>
<VideoSettings>
    <video_settings_preset>preset_value</video_settings_preset>
</VideoSettings>
```

3. Start VBS4 with `-settingsOverrideDir=path`.



WARNING

The `path` must be absolute (for example, the `New_Video_Settings_Preset` folder contains `VideoSettings.xml`: `-settingsOverrideDir=C:\New_Video_Settings_Preset`).

- **-settingsImport=filename**

Overrides any of the default XML configuration settings in the various XML configuration files from the default Profile folder at `%LOCALAPPDATA%\VBS4\Settings\` (see [VBS4 Profile Options \(on page 386\)](#)) with user-modified versions of the XML configuration settings, stored in the `filename` file.

WARNING

The `filename` must use absolute (for example, `-settingsImport=C:\Overridden_VBS4_Settings\MySettings.xml`).

It is possible to override settings from different categories (for example, [Audio \(on page 408\)](#), [Video \(on page 387\)](#)) using a single XML file. For more information, see [Overriding VBS4 Profile Options \(below\)](#).

Also, you can specify the `-settingsImport` multiple times, if the overridden settings are divided between several XML files, according to their setting categories:



EXAMPLE

```
-settingsImport=C:\Overridden_VBS4_Settings\MyAudioSettings.xml -  
settingsImport=C:\Overridden_VBS4_Settings\MyVideoSettings.xml
```

3.6.4.1 Overriding VBS4 Profile Options

The following example demonstrates how [VBS4 Profile Options \(on page 386\)](#) from different categories ([Video \(on page 387\)](#), [User Interface \(on page 410\)](#), [Audio \(on page 408\)](#), [Simulation \(on page 417\)](#)) can be overridden, using the `-settingsImport` command-line option.

WARNING

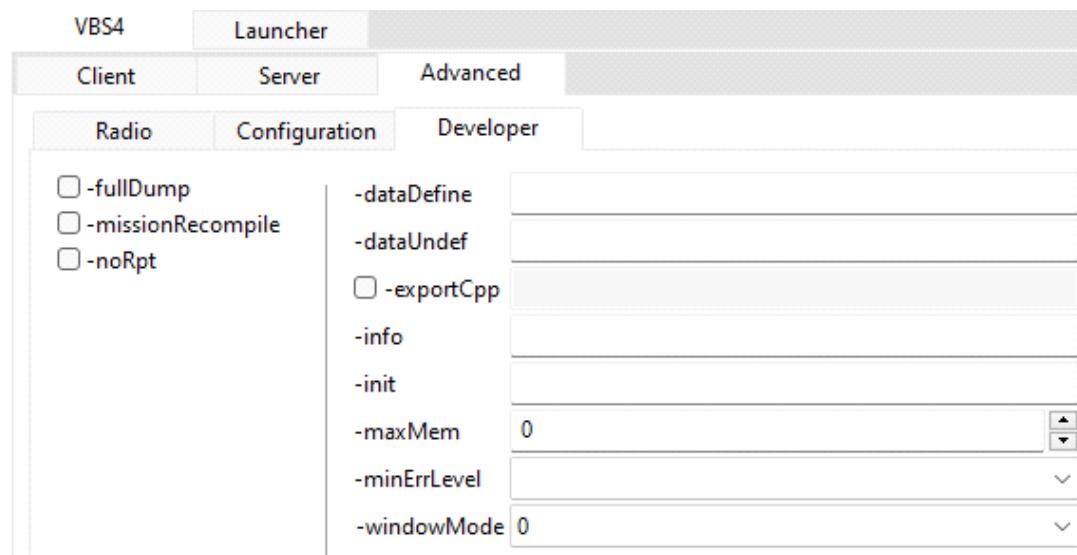
It is important to keep all the overridden Profile options in the `<UnifiedRootView>` XML tag.

```
<UnifiedRootView>  
  <VideoSettings>  
    <>window>  
      <vsync>false</vsync>  
    </window>  
  </VideoSettings>  
  <UISettings>  
    <Appearance>  
      <UiScale>125</UiScale>  
    </Appearance>  
  </UISettings>
```

```
<AudioSettings>
  <volumeFX>4.000000000000000</volumeFX>
  <volumeUI>4.000000000000000</volumeUI>
  <volumeSpeech>4.500000000000000</volumeSpeech>
</AudioSettings>
<SimulationSettings>
  <GunneryStats>
    <AarGunneryEnableStats>true</AarGunneryEnableStats>
    <AarGunneryLogCannonAndMachinegun>true</AarGunneryLogCannonAndMachinegun>
  </GunneryStats>
</SimulationSettings>
</UnifiedRootView>
```

3.6.5 Advanced - Developer

Use the Developer options to control how VBS4 runs and to control reporting and logging options.



- **-fullDump**

Create a full dump during a VBS4 crash to: `%LOCALAPPDATA%\VBS4\`.

NOTE

A full dump log file can have the size of several gigabytes. However, it can be compressed using any standard compression utility to several hundred megabytes.

- **-missionRecompile**

By default, configuration functions (SQF Function Library functions, defined in class **CfgFunctions**) are loaded only on VBS4 startup. This parameter forces configuration function reload on each Scenario restart / reload.

- Advantages: Any changes made to custom content configuration functions are applied after Scenario restart or new Scenario load.
- Disadvantages: Slower Scenario load times.

- **-noRpt**

Disables writing to report file (to prevent slowdown due to potential message flood).

- **-dataDefine=name**

Specify a define or multiple defines which should be enabled during VBS4 startup so that the parameters in configs that are wrapped in those defines are loaded into VBS4.

To see the effects of these parameters in configs, the config cache must be rebuilt. To enforce this, delete the cache folder in your VBS4 folder.

- **-dataUndef=name**

Disable a define or multiple defines from being loaded during VBS4 startup.

- **-exportcpp=path**

Generates a full listing of the **config.cpp** used by VBS4.

path is the path where the data is dumped (for example, **-exportcpp=c:\Bohemia Interactive**). The data consists of two files:

- **Allconfig.cpp** - An overall **config.cpp** file that contains all the **config.cpp** files used. It is a reference for all PBOs / CBOs present in the VBS4 installation.
- **ConfigAll.txt** - A simplified inheritance reference for all VBS4 content.

- **-info=path**

Writes the following exe information into a specified file - supported versions for:

WRP, P3D, AAR, ParamFile, SQM, Mission, RTM, WorldSerialize, FXY, UserInfo.cfg, CampaignVersion, RolesSerialize.

Information is also provided on: RVMAT version, AAR Plus version, versions for each AAR Plus module, BIS signature version, TextureHeader version, TextureHeaderManager version.

path is the path to a file where the information is dumped (for example, **-info=c:\exedump.txt**) or leave the string after **-info=** empty, file **info.txt** is created in exe directory.

 **NOTE**

Requires at least the "=".

- **-init=command**

command is a scripting command to run, once in the main menu (often used with the [playMission](https://sqf.bisimulations.com/display/SQF/playMission) (<https://sqf.bisimulations.com/display/SQF/playMission>) command, as **-init=playMission["Poland_Battlespace", "Basic_Movement"]**).

- **-maxmem=N**

N is the limit for memory allocation (in MB).

 **NOTE**

If this setting is too low for your scenario, you may experience performance issues.

- **-minerrlevel=N**

Error messages can now be suppressed by specifying a minimum Errorlevel to trigger an error/ warning message.

Possible values for *N* are 0 - 6:

- **0 = EMNote:** Errors that may be ignored with marginal impact.
- **1 = EMMissingData:** Some data-missing error with no great impact on game play.
- **2 = EMWarning:** Application is able to continue, but with limited functionality.
- **3 = EMError:** Application is not able to perform requested task, but is able to continue.
- **4 = EMCritical:** Application is not able to continue.
- **5 = EMDisableAll:** No error level, disable all errors.
- **6 = EMDisableInfo:** Suppress drawing of red / yellow network icon.

- **-windowmode=N**

Defines the window mode to use for VBS4, where *N* may be:

- **0** - VBS4 starts in normal mode - default.
- **1** - VBS4 starts without a display window. A VBS4 icon displays in the Microsoft Windows taskbar to close VBS4.

NOTE

In this mode, VBS4 outputs log messages to a **ConsoleLog.txt** file at the following location: **%LOCALAPPDATA%\VBS4**

- **2** - VBS4 starts with only a console window to display log outputs.

NOTE

This option is primarily intended to support VBS4 operating as a service when use of the VBS4 UI is not required. For example, when VBS4 acts as a terrain server for VBS IG.

- **3** - VBS4 starts without creating any windows (no Dedicated Server window, no splash screen, and so on). Error popup messages are not displayed as windows (similar to when using **-unattended**, they are only logged). Primarily used to start VBS4 in an environment where no display is present.

NOTE

If **-windowmode=N** is anything other than **0**, **-nosound** (on page 80) is automatically applied.

3.6.6 Extra Parameters

Additional command-line options can be executed through VBS Launcher.

In the **Extra Parameters** field, enter your command-line options, separated by spaces.

Parameters	<input type="text" value="-admin -forceSimul -window"/>	<input type="button" value="?"/>
Extra parameters	<input type="text"/>	<input type="button" value="?"/>

The Extra Parameters are added to the **Parameters** field as you type.

- **-aarconnect=ipaddress_or_dnsname**

Enables a client computer to automatically connect (using an IP address or DNS name) to a broadcast of an AAR recording, streamed from a host computer.

 **NOTE**

If the host computer is also the client computer, `ipaddress_or_dnsname` can be set to `localhost`.

 **EXAMPLE**

`-aarconnect=00.0.00.00`

For more information, see in the VBS4 AAR Manual.

- **-aiDebuggingServerPort=N**

Sets the port for connecting the Behavior Tree Debugger in VBS Control Editor with VBS4.

For more information, see Debugging Different VBS3 Instances in the VBS Control Editor Manual.

Default: `-aiDebuggingServerPort=49001`

- **-alignViewWithHead**

Sets the alignment of the 1st person view to the head. If this parameter is not set, the 1st person view is aligned with the world "up" vector.

 **NOTE**

This only applies to EPC (External Pose Control) units.

- **-benchmark** or **-benchmark="graphics_preset"**

Activates the Benchmark Tool. For more information and the possible `graphics_preset` values, see [Benchmark Tool \(on page 330\)](#).

- **-bgControllerInput**

Enables joystick / Xbox controller functionality, even when the player is not focused on VBS4 (for example, when the VBS4 window is open in the background).

- **-compileCacheSize=N**

N sets the number of scripts to cache for script executions, user actions, and event handlers. On reaching the limit, the cache clears and previously executed scripts compile again before execution.

Advantages: Better performance.

Set **-compileCacheSize=0** to disable the cache.

Default: **-compileCacheSize=40000**

- **-cpuCount=N**

VBS4 automatically detects your hardware and configures **-cpuCount** accordingly. Use this parameter to override the auto detect setting and manually set the number of CPUs / cores available. Change *N* to a number less or equal than numbers of available cores.

To simulate dual core on a quad core, set **-cpuCount=2** and then change the affinity to 2 cores to make sure additional cores are never used when over-scheduling occurs. It may be also possible to set the affinity in the OS before you launch the process.

- **-dualCPU**

Enables usage of CPU-thread affinities on computers with more than one CPU, to split rendering from visual-data loading.

i **NOTE**

The option will be improved in future releases of VBS4 and does not guarantee stutter-free performance.

- **-epenet=0**

The simulation of close-object collision is enabled by default. Setting **-epenet=0** disables it.

- **-exThreads=N**

VBS4 automatically detects your hardware and configures exThreads accordingly (3 for dual core and 7 for quad core). Use this parameter to override the auto detect settings to change the number of threads used. Change *N* to either 0, 1, 3, 5, 7.

All file operations go through a dedicated thread. This offloads some processing from the main thread, however it adds some overhead at the same time. The reason why threaded file ops were implemented was to serve as a basement for other threads ops. When multiple threads are running at the same time, OS is scheduling them on different cores. Geometry and Texture loading (both done by the same thread) are scheduled on different cores outside the main rendering loop at the same time with the main rendering loop.

N	Geometry loading	Texture loading	File operations
0	0	0	0
1	0	0	1
3	0	1	1
5	1	0	1
7	1	1	1

NOTE

Setting **-exThreads=0** may cause performance issues for AAR recording and playback for events with high FPS rates.

- **-forceSimpleBuildings**

Treats buildings with `simulation = "house"` as `simulation = "housesimple"`.

Advantages: Reduces the memory load of buildings and improves FPS performance.

Disadvantages: Disables building animations, user actions, lights, and the visual appearance of entrances to underground parts of buildings. Simple buildings cannot be moved in the editor or be used in scripts. A player is still able to walk down the stairs of an underground bunker or see other players sinking into the ground while going down the stairs.

- **-forceStart=N**

The number of seconds to wait after last server state change.

- With **autostart** enabled, VBS starts even when the specified number of clients is not reached.
- The client stays in the network lobby. When a timeout occurs, a role is selected (the client can be kicked out, in some cases).
- The client is kicked out when a timeout occurs, before the briefing screen appears (with briefing skipped - **Briefing = 0;** in **Description.ext** file located in mission folder).
- The client is kicked out when a timeout occurs before the client is initialized (during loading screen after the briefing screen).
- The client is kicked out when a timeout occurs before the client is synchronized (during loading screen after the briefing screen).

- **-hmdVendor=vendor**

Use to enable VR motion controllers. For more information and available **vendor** values, see [Virtual Reality Headsets \(on page 306\)](#).

i **NOTE**

This parameter must be used together with the **-hmd** parameter.

- **-igWeaponHost**

Starts VBS4 with the IGWeaponHost component enabled, which is used for XRTP (XR Training Platform) communication. For more information, see XRTP Server Configuration in the VBS Blue IG Manual.

- **-ip=ipaddress**

Enables support for Multihome servers.

- **-limitedNetwork**

Disables computing errors for network entities so that no object updates are sent over the network.

- **-limitfps=N**

N specifies the maximum FPS the engine uses. Only network updates are performed in the remaining time.

- **-logInterop=N**

Enables logging of interop messages for combined simulation to the RPT file at:

%LOCALAPPDATA%\VBS4\VBS4.RPT

The *N* values are:

- 0 (default) - no logging
- 1 - logs interop error messages
- 2 - logs interop error and info messages

- **-logLevel=N**

Controls the log level (*N*) in the RPT file at:

%LOCALAPPDATA%\VBS4\VBS4.RPT

The *N* values are:

- 0 - Debug
- 1 (default) - Info
- 2 - Warning
- 3 - Error
- 4 - Fatal

- **-malloc=allocator**

Sets the memory allocator string to be used.

In some instances, Windows memory manager may move VBS4 to use swap file memory, causing significant performance impacts. This typically occurs when multiple instances of VBS4 run on the same computer or another application requires a large amount of memory.

If you experience these issues and suspect that swap file memory is the cause, prevent Windows from using swap files with the following command line start parameter:

-malloc=tbb4malloc_bi64_lock

- **-memoryProfilingLowLevel=N**

Enables the low-level memory profiler. The default buffer size (*N*) for profiling is 40000 MB.

For more information, see [Low-Level Memory Profiler \(on page 329\)](#).

- **-netlog**

Dedicated Server: Command to record traffic from the game server in BI format.

- **-noAI**

Completely disables AI related computing.

- Advantages: Better performance.
- Disadvantages: AI units are motionless and inactive.

- **-noCB**

Turns off multi-core use. It slows down rendering but may resolve visual glitches.

- **-nodamage**

Disables all damage from any internal ammo source within VBS4.

 **NOTE**

It is still possible to set damage through scripting, even if this option is on.

- **-noFilePatching**

Ensures that only PBOs are loaded, and unpacked data is not loaded.

- **-noHeliWindSource**

Prevents helicopters from generating wind. Provides a performance improvement by simplifying particle simulation.

- **-nosplash**

Starts VBS4 without the splash screen.

- **-noTracks**

Disables vehicle tracks from appearing in the simulation.

- **-noUnderground**

The command disables underground cutting.

Advantages: Improved FPS performance.

Disadvantages: Disables the visual appearance of the entrances to all underground objects, including trenches and holes. A player is still able to walk down the stairs of an underground bunker or see other players sinking into the ground while going down the stairs. An alternative option is [-forceSimpleBuildings \(on page 97\)](#).

 **NOTE**

The change is purely visual and affects VBS Editor, in-simulation, and in AAR.

- **-noXCtrl**

Disables the creation and polling of Xbox controllers after startup.

- Advantages: Better performance.
- Disadvantages: Xbox controller does not work.

- **-oldActionMenu**

Re-enables the old VBS4 gameplay functionality for the Action Menu and the Quick Menu.

For more information on the old Action Menu / Quick Menu functionality, see the respective topics in the VBS4 Trainee Manual of VBS4 23.1.

- **-oldGameplay**

Re-enables the old VBS4 gameplay functionality for the following features:

- Hand grenades and Leaf Sights in grenade launchers. For more information on the gameplay differences, see Grenade Simulation in the VBS4 Trainee Manual.

- **-par=filename**

Command to read startup parameters from a file designated by *filename*. When the parameter file extension is **.par**, the following configuration structure is assumed:

```
class Arg {  
    nodamage = "-nodamage";  
    logInterop = "-logInterop=2";  
};
```

With any other extension (like **.txt**), plain text is assumed, with one command line option per line:

```
-nodamage -logInterop=2
```

In both cases, the file is preprocessed before parsing, allowing C++ style comments and **#defines** to be used.

i **NOTE**

Parameters used to start plugins, such as **-gateway**, cannot be included in a file for use with **-par**.

Also, **.par** files do not support some low-level parameters, namely: **-cpuCount** - **malloc** **-exthreads** **-maxMem**.

- **-password=password**

Password for logging into a password-protected Dedicated Server (as set in the Dedicated Server **server.config**).

- **-pid=filename**

File to write the server PID (Process ID) to. The file is removed automatically when the **.exe** is stopped. Only works for Dedicated Servers.

- **-scriptInterruption=N**

Enable script interruption.

N can have these values:

- **0** - No script interruption, all scripts are finished within one frame.
- **1** - No script interruption, time for scripts is limited within each frame.
- **2** - Scripts may be interrupted, time for scripts is limited within each frame, every script is started (after limit for limited time - 0.5 ms).
- **3** - Scripts may be interrupted, time for scripts is limited within each frame. (Default)

- **-simulationCache=N**

This parameter reduces the frequency of a number of resource-heavy computations related to external entities. Affected calculations are only performed once per *N* frames.

Advantages: Better performance.

- **-stealthViewerHost**

Starts VBS4 with the StealthViewerHost component enabled, which is used for StealthViewerClient communication. For more information, see *Stealth Viewer Symbols* in the VBS Blue IG Manual.

- **-timeForScripts=time**

Change **time** limit (in ms, default is 3 ms) for scripts in game.

- **-timeForScriptsInRTE=time**

Change **time** limit (in ms, default is 15 ms) for scripts in Execute mode.

- **-timeForScriptsOnLoad=time**

Change **time** limit (in ms, default is 50 ms) for scripts on loading screen.

- **-ttl=level**

Time-To-Live (TTL) for multicast packets. The IP multicast routing protocol uses the Time To Live (TTL) field of IP datagrams to decide how far from a sending host a given multicast packet should be forwarded. *level* can have the following values:

- 0 - Restricted to the same host. Does not output by any interface.
- 1 - Restricted to the same subnet. Is not forwarded by a router.
- <= 32 - Restricted to the same site, organization, or department.
- <= 64 - Restricted to the same region.
- <= 128 - Restricted to the same continent.
- <= 255 - Unrestricted in scope. Global.

Default value: 32

- **-unattended**

Error popups are not displayed as windows, they are just logged in the RPT log.

- **-vbsHostExerciseID=ExerciseID**

Specifies an *Exercise ID* that the VBS Host announces over SSDP for potential VBS Blue IG clients to use for connections. A VBS Blue IG client started using an Exercise ID automatically connects to the matching VBS Host.

NOTE

If the Exercise ID is not specified, the default ID is the PC name of the VBS Host.

- **-vbsHostPort=nnnn**

Specifies a port number *nnnn* to use for communication between VBS4 and VBS Blue IG. Only required when **-vbsHostExerciseID** is not used or if there is a connection issue.

NOTE

By default the port is set to 0 and a random available port is picked by VBS4.

Specify the same port by starting VBS Blue IG with **-vbsHostPort=nnnn** or by specifying the **Host Reliable Socket Port** in the **VBSEExternalNetworking.xml** configuration file.

- **-VBSRadioDebug=5**

Logs additional information to the VBS Radio log file.



WARNING

-vbsRadioDebug must be deselected in the **Advanced > Radio** tab to enable the additional logging level to take effect.

- **-virtualClients=N**

The number of virtual network clients.

Their purpose is to assist with profiling a networking session. Virtual clients can be manually assigned in the networking lobby, if not assigned manually they are assigned to the remaining free slots in the mission. This allows normal and virtual clients to come together in one session.



NOTE

Virtual clients are invulnerable and cannot be controlled by users, they stand on the spot and continually turn 360 degrees (causing network traffic). They are handled like regular players, so they can only occupy playable slots.

3.7 Dedicated Server

A VBS4 Dedicated Server is an instance of VBS4 that runs for the sole purpose of Hosting Scenarios and communicating with clients during Scenario Execution. It does not render the simulation in 2D / 3D views, and it is not possible to use the Dedicated Server instance to control a unit within a mission.

The main differences between a VBS4 Client and a Dedicated Server are:

- You cannot edit a Battlespace if you are using a Dedicated Server (Battlespaces Mode is bypassed and your VBS4 Clients start in the Networking Lobby).
- The server administrator must use the [Server Administration Commands \(on page 122\)](#) to change the state of the server (for example, to restart a mission, or start a new one).

To execute a scenario using a Dedicated Server:

1. Start the Dedicated Server using the **VBS4 Online Dedicated Server** or **VBS4 Offline Dedicated Server** (**-server**) options.
For more information, see the [Server \(on page 81\)](#) Command-Line and Launcher Options
2. Start at least one Admin Client using the **VBS4 Online** or **Offline** options and the **admin** option, specifying the IP Address to **Connect to the Dedicated Server**.

Do one of the following:

- To connect directly to the Dedicated Server, input the **Server IP** using the IP address or DNS name of the computer hosting the Scenario (**-connect=host_IP_address_or_DNS_name**).

VBS4 starts and opens the Multiplayer Battlespaces selection panel.

- Leave the **Server IP** blank to connect later.

VBS4 starts in the Main Menu. Use the Training tab **Connect to Server** option to start the Scenario.

For more information, see the [Client \(on page 77\)](#) Command-Line and Launcher Options.

3. On the Admin Client, use the Training UI to start the scenario.

For more information, see Dedicated Server Scenario Execution in the VBS4 Instructor Manual.

4. Start the Trainee Clients using the **VBS4 Online** or **Offline** option.

 **WARNING**

All VBS4 Clients, Dedicated Servers, and Simulation Clients that participate in the Scenario Execution must use the same **Configuration** option:

- **Online:** When a VBS World Server is required, all computers must use the **Online** option connected to the same VBS World Server (`-worldServer=VWS_ipaddress_or_dnsname`)
- **Offline:** When a VBS World Server is not required, all computers must use the **Offline** option (`-worldServer` not specified).

5. On the Trainee Clients, use the Training UI to join the scenario.

For more information, see Joining a Scenario in the VBS4 Trainee Manual.

The Administrator that starts the Scenario Execution on the Dedicated Server is the Server Admin with additional control over the scenarios.

For more information, see:

- Server Management.
- Server Administration Commands in the VBS4 Administrator Manual.

Secondary Admins that join a Scenario Execution do not have these privileges but can assume Server Admin control using the Server Management **Become Server Admin** option.

This section covers the following aspects of configuring and using a Dedicated Server:

- [Dedicated Server System Requirements \(on the next page\)](#) - Lists the Dedicated Server system requirements.
- [Basic Dedicated Server Setup \(on page 109\)](#) - Describes the basic Dedicated Server network setup, as well as other frequently used network setups.
- [Dedicated Server Configuration \(on page 115\)](#) - Describes the Dedicated Server configuration options.

3.7.1 Dedicated Server System Requirements

The VBS4 Dedicated Server has same system requirements as a VBS4 Client.

Bohemia Interactive Simulations recommends the following hardware requirements for VBS4 Clients:

VBS4	Recommended	Optimal
CPU	Intel Core i7-12700K (or better) Ryzen 9 7900X	Intel Core i9-12900K (or better) Ryzen 9 7950X
RAM	32GB DDR4 (or better)	64GB DDR4 (or better)
GPU	Nvidia GeForce RTX 3070 (or better) DirectX 11	Nvidia GeForce RTX 3080 (or better) DirectX 11
<div style="border: 2px solid red; padding: 10px;">  WARNING <p>AMD GPUs are not currently supported.</p> </div>		
Disk	512GB SSD for OS and VBS4	1TB SSD for OS and VBS4
OS	Windows 10 (v1607+) or 11, 64-bit	Windows 10 (v1607+) or 11, 64-bit
<div style="border: 2px solid red; padding: 10px;">  WARNING <p>VBS4 uses the Windows account name as the VBS4 user name. This name can only contain printable ASCII (https://www.w3schools.com/charsets/ref_html_ascii.asp) characters. VBS4 may crash if characters outside this range are used. Modify the Windows account name before starting VBS4 if it contains non-ASCII characters.</p> </div>		
Network	1 Gbps / 2.5 Gbps	1 Gbps / 2.5 Gbps

NOTE

VBS4 does not require expensive professional graphics cards (designed for CAD work, CGI, or other complex scientific calculations). These cards do not provide any additional benefits compared to graphics cards designed for gaming.

VBS4 installations that are intended to be used as Dedicated Servers or Simulation Clients can meet the VBS World Server requirements instead of the more graphically demanding VBS4 requirements.

Third-party cybersecurity software may increase load time and impact VBS4 performance.

WARNING

To avoid potential UI display issues, do not use USB hubs or adapters to connect monitors. Also, support of the new map view (see Advanced New Map and Map Layers) is limited on 4K monitors. Delays may occur when moving / dragging the map.

NOTE

The hardware listed is not exclusive. Compare your hardware to the listed items for an indication of performance.

Operational usage can affect performance requirements. Increasing visual fidelity (detail, distance, and / or resolution), as well as scenario complexity, can have a significant impact on performance, and may warrant increasing the system specification to the next performance tier.

For hardware queries, contact us at <https://bisimulations.com/company/contact-us>.

Dedicated Servers use the following ports:

Ports	Default	Final Port
Server (UDP)	2302	Default + (12*x) x - 0 to 15, based on the number of network servers on a single computer.
Client (UDP)	2304	Default + (12 * x) x - 0 to 15, based on the number of network clients on a single computer.
Multicast	2308	Default + (12 * x) x - 0 to 150, random number (to avoid the same multicast port on the network).
Sending AAR (TCP)	1337	1337 Sending the AAR over the network in a multiplayer scenario.
Sending Face Textures (TCP)	1588	Default port + player identity (0 to 255) + (200 * ID of concurrent sending of face textures (0 to 7)) Sending custom face textures (set using setFace (https://sqf.bisimulations.com/display/SQF/setFace)) over the network in a multiplayer scenario.

TIP

You may also consider running the VBS4 Dedicated Server as a Windows service, and enable automatic restart in case of a crash.

3.7.2 Basic Dedicated Server Setup

A Dedicated Server is a computer with VBS4 installed, which is started using the `-server` command-line option (for more information, see the [Server \(on page 81\)](#) options in VBS Launcher).

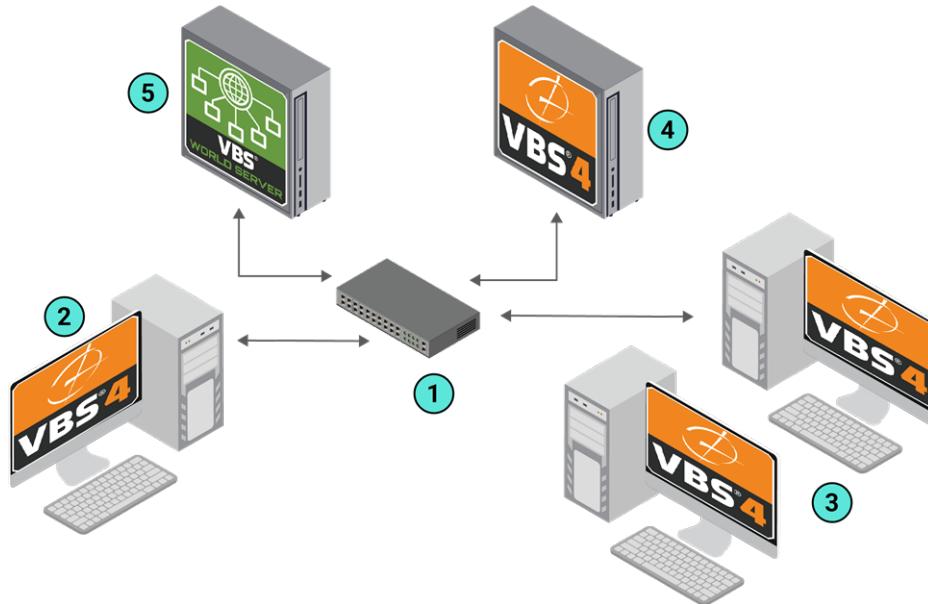
This section covers the following aspects:

- [Basic Network Layout \(below\)](#) - Describes the basic network layout to run a Dedicated Server, as well as other network layouts.
- [Prepare the Dedicated Server \(on page 111\)](#) - Describes what needs to be prepared, before the Dedicated Server can be started.
- [Start the Dedicated Server \(on page 111\)](#) - Describes how to start the Dedicated Server.
- [Dedicated Server Console \(on page 112\)](#) - Describes the Dedicated Server console, and what it contains.
- [Connect Clients \(on page 113\)](#) - Describes how clients can connect to the Dedicated Server.
- [Control the Dedicated Server \(on page 114\)](#) - Describes how to control a running Dedicated Server.
- [Stop the Dedicated Server \(on page 114\)](#) - Describes how to stop the Dedicated Server.

3.7.2.1 Basic Network Layout

The most basic network layout to run a Dedicated Server is as follows:

This diagram displays a Dedicated Server used for an Offline Scenario. For Online Scenarios all computers connect to a separate VBS World Server that streams the Whole-Earth Terrain and provides access to stored Battlespaces.



- | | |
|---|--|
| 1 | Router |
| 2 | VBS4 Admin Clients (and Recording AAR) |
| 3 | VBS4 Trainee Clients |
| 4 | VBS4 Dedicated Server |
| 5 | VBS World Server |

- The computers are connected to the router using network cables.
- Since this is a closed simulation network, all firewalls and virus scanners should be disabled.
- Install VBS4 on all computers.
- You need to have valid WIBU keys for all computers.

The other common network layouts, where a Dedicated Server is used, are:

- **Group Training** - Intended for training scenarios, with multiple participants.
- **High-Load Training Exercises** - Intended for even larger training scenarios, with many participants and a very large number of simulation objects.
- **Multi-Room Combined Simulation** - Intended for multiple Dedicated Servers running VBS Gateway, where VBS4 instances appear as external entities in other VBS4 instances.
- **Multi-Product Combined Simulation** - Intended for a Dedicated Server running VBS Gateway connected to other HLA / DIS products, besides VBS4.
- **Specialist Display Solutions** - Intended for a Dedicated Server running as a Host connected to VBS Blue IG.

For more information, see [VBS4 Deployment Options \(on page 16\)](#).

The Dedicated Server should have the most powerful hardware you have available. While the Dedicated Server does not need a high-end video card, as it only displays a console box, a powerful CPU and a large RAM are required. For more information, see [Dedicated Server System Requirements \(on page 107\)](#).

To assist with performance, [Simulation Clients \(on page 128\)](#) can be used (see [Example Setup \(on page 133\)](#) for an example).

The Admin Client is intended for the person running the exercise. This person logs into VBS4 as an administrator, and also as the server administrator.

Since the administrator usually logs into the mission along with the other trainees, an entity must be placed for them in the mission at the design stage. If they wish to remain unobserved, they can use a spectator unit (for more information, see Spectator Units in the VBS4 Editor Manual).

3.7.2.2 Prepare the Dedicated Server

Add the Scenario to the Dedicated Server

You need to place the scenario on the Dedicated Server, so that VBS4 can start it.

NOTE

VBS4 automatically copies the selected Battlespace to the Dedicated Server.

Mission scripts (such as `init.sqf`) do not reload when the mission restarts on Dedicated Server.

3.7.2.3 Start the Dedicated Server

Start the Dedicated Server from VBS Launcher.

Follow these steps:

1. In the **Modules** tab, make sure that VBS4 is selected.
2. In the **VBS4 > Server** tab, select **VBS4 Online Dedicated Server** or **VBS4 Offline Dedicated Server** depending on whether a VBS World Server connection is required.
Alternatively, in the **Preset** drop-down, select **Dedicated Server**.
3. **Optional:** To use a custom profile, in the **Advanced > Configuration** tab, specify the **VBSProfile** file in **Custom profiles directory (-profiles)**.
4. **Optional:** To use a custom configuration file for the Dedicated Server, in the **Server** tab specify the file path in **Custom Server Config (-config)**.
5. **Optional:** Click the **Save** icon to save the settings as a new VBS Launcher preset (see [Modifying Presets \(on page 65\)](#) for more information).



6. Click **Launch Modules**.

Alternatively, you can create a shortcut to **VBS4.exe** and add the **-server** command-line option to the **Target** field in the shortcut. For example, the **Target** field can be:

```
"C:\Bohemia Interactive\VBS4\VBS4.exe" -server
```

You can also create a batch file in the VBS4 installation folder, which contains the following:

```
start "" VBS4.exe -server
```

NOTE

Running more than one Dedicated Server on the same computer is not supported.

3.7.2.4 Dedicated Server Console

After the Dedicated Server starts, the Dedicated Server console window appears, displaying Dedicated Server updates (for example, when a mission loads or a client connects).

NOTE

You cannot control the Dedicated Server from this console.

The console is not available when the Dedicated Server is running on VBS World Server or if VBS4 is started with `-windowMode=1`. Instead, the console output is written to a `ConsoleLog.txt` file in the following folder:

- On VBS4 clients or servers, one of the following:

- Default VBS4 Profile location:

`%LOCALAPPDATA%\VBS4\`

- Other VBS4 Profile location:

`Path\Settings\Streaming.xml`

`Path` is specified using the `-profiles=Path` command-line option - for more information, see [Command Line and Launcher Options \(on page 76\)](#)

- On VBS World Server:

`WS_Installation\Services\vbs4\profiles\`

Image-23: Dedicated Server console with server updates



VBS4 O:\VBS4\VBS4.exe -admin -forceSimul -server -window

```
16:24:20 Dedicated host created.  
16:24:39 Multicast port 5512 used.  
16:24:39 Host identity created.  
16:26:39 Player MIKE.PLATT connecting.  
16:26:40 Player MIKE.PLATT connected (id=999).  
16:26:40 Admin MIKE.PLATT logged in.  
16:27:02 Game started.  
16:27:02 Simulating 0 vehicles, 0 AIs, 0 groups, 0 subgroups, 6 objects  
16:27:26 Player MIKE.PLATT disconnected.  
16:27:26 Admin MIKE.PLATT logged out.  
16:27:26 Game finished.  
16:27:26 All users disconnected, waiting for users.
```

3.7.2.5 Connect Clients

When the Dedicated Server is running, other VBS4 Clients on the same network are now able to connect to it.

To connect an Admin Client, follow these steps:

1. Start VBS4 as an **Administrator** on the VBS4 Admin Client.

Start VBS Launcher, and in the **VBS4 > Client** tab, select the **VBS4 Configuration** to use:

- **VBS4 Online** or **Offline** depending on whether a VBS World Server connection is required.
- Select **admin**.
- Do one of the following:
 - To connect directly to the Dedicated Server, input the **Server IP** using the IP address or DNS name of the computer hosting the Scenario (*-connect=host_IP_address_or_DNS_name*).
 - VBS4 starts and opens the Multiplayer Battlespaces selection panel.
 - Leave the **Server IP** blank to connect later.
VBS4 starts in the Main Menu. Use the Training UI **Connect to Server** option to start the Scenario.

2. Use the Training UI to start the Scenario:

- If the Dedicated Server was not specified in VBS Launcher, click **Connect to Server** to select one.
- After Dedicated Server connection, use the Multiplayer Battlespaces panel to select and start the Scenario.

The Admin Client is connected and the Network Lobby opens to manage trainee assignments.

For more information, see Dedicated Server Scenario Execution in the VBS4 Instructor Manual.

To connect Trainee Clients, follow these steps:

Start VBS4 on the VBS4 Trainee Clients.

Start VBS Launcher, and in the **VBS4 > Client** tab, select the **VBS4 Configuration** to use:

VBS4 Online or **Offline** depending on whether a VBS World Server connection is required.

Do one of the following:

- To connect directly to the Dedicated Server, input the **Server IP** using the IP address or DNS name of the computer hosting the Scenario (*-connect=host_IP_address_or_DNS_name*).
VBS4 starts and opens waiting for the Administrator to start the Scenario.

- Leave the **Server IP** blank to connect later.

VBS4 starts in the Main Menu. Use the Training UI **Connect to Server** option to start the Scenario.

If the **Server IP** was not selected, Trainees use the Training UI to connect to the Dedicated Server.

When the Administrator starts the Scenario Trainees are taken to the **Network Lobby**.

For more information, see Joining a Scenario in the VBS4 Trainee Manual.

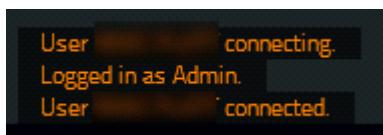
3.7.2.6 Control the Dedicated Server

Since it is not possible to control the Dedicated Server through the Dedicated Server console, commands must be issued using a VBS4 client that is connected to the Dedicated Server.

Prerequisites

- Only the client logged in as the **Dedicated Server administrator** is able to control the Dedicated Server.

The VBS4 client that logs in as the Dedicated Server administrator has **Logged in as admin** displayed in the bottom-right of the VBS4 screen, when they connect to the Dedicated Server.



- This VBS4 client must also be a **VBS4 Administrator** (running a VBS4 instance started with the `-admin` command-line option).

For a list of Dedicated Server commands and how to run them, see [Server Administration Commands \(on page 122\)](#).

WARNING

Be aware that:

- Only **one** Dedicated Server administrator is permitted at any time.
- Only a Dedicated Server administrator can assign players to slots.

3.7.2.7 Stop the Dedicated Server

To stop the Dedicated Server, click the **X** in the top-right corner of the Dedicated Server console, or run the `#exitAll` command (see [Server Administration Commands \(on page 122\)](#)) on the VBS4 client with administrator status.

3.7.3 Dedicated Server Configuration

This section explains various aspects of Dedicated Server configuration.

- [Basic Server Configuration \(on the next page\)](#) - Describes the parameters required for a basic Dedicated Server configuration.
- [Server Startup Parameters \(on page 119\)](#) - Describes the Dedicated Server startup parameters.
- [Server Configuration File \(on page 121\)](#) - Describes the Dedicated Server configuration file parameters.
- [Server Administration Commands \(on page 122\)](#) - Describes the administrator and user commands used to control the Dedicated Server.
- To configure the Dedicated Server service on VBS World Server see [Configure Dedicated Server for VBS World Server \(on page 123\)](#).

3.7.3.1 Basic Server Configuration

Dedicated Server configuration has the following stages:

1. [Startup Parameters \(below\)](#) - Specify VBS4 startup parameters to start the Dedicated Server.
2. [Connectivity Settings \(below\)](#) - Specify the settings to configure Dedicated Server connectivity.
3. [\(Optional\) Game Settings \(on the next page\)](#) - Specify the required settings in the Dedicated Server configuration file to configure various game settings.
4. [\(Optional\) Performance Tuning \(on page 118\)](#) - Tune the Dedicated Server for better performance.

See [Suggested File Locations \(on page 118\)](#) for suggested configuration file locations.

3.7.3.1.1 Startup Parameters

The startup parameters are command-line options (see [Command Line and Launcher Options \(on page 76\)](#)) that launch VBS4 in Dedicated Server mode.

The main startup parameters are:

- **-server** - Starts VBS4 in Dedicated Server mode.
- **-config** - Specifies the Dedicated Server configuration file (**server.config**) to use.

For more information, see [Server Startup Parameters \(on page 119\)](#).

3.7.3.1.2 Connectivity Settings

The VBS4 configuration file (see [VBS4.xml Options \(on page 373\)](#)) is used to configure the Dedicated Server connectivity, mainly for performance tuning.

Inside your **VBS4.xml**, set the **allowJoinInProgress** setting to 0:

```
<Value>
  <Name>allowJoinInProgress</Name>
  <Value>0</Value>
</Value>
```

This determines if the Join-in-Progess (JIP) functionality is enabled / disabled on the Dedicated Server.

If disabled (set to 0), players without a chosen role are unable to access the mission. Since a Dedicated Server is often connected to many clients, it is recommended to disable JIP (enabled by default).

3.7.3.1.3 (Optional) Game Settings

The name of the Dedicated Server configuration file is determined by the `-config` command-line option, when launching the Dedicated Server.

EXAMPLE

```
-config=server\server.config
```

In this example, the Dedicated Server searches the `\VBS_Installation\server\` folder for a file called `server.config`.

NOTE

You must create this file manually if it does not exist. VBS4 does not create this file by default.

The most common settings used in the Dedicated Server configuration file (`server.config`) are:

- **Host Name** - Server host name, to enable clients to find it. Controlled by the `hostname` setting.
- **Maximum Number of Players** - The maximum number of player clients that can participate in a multiplayer scenario on the Dedicated Server. Controlled by the `maxPlayers` setting.

EXAMPLE

```
hostname="Test DS";  
maxPlayers=10;
```

For more information, see [Server Configuration File \(on page 121\)](#).

3.7.3.1.4 (Optional) Performance Tuning

Use the network parameters in [VBS4.xml](#) to control connection performance aspects such as bandwidth, latency, packet size, and so on. For more information, see [VBS4.xml Options \(on page 373\)](#).

Use the `#monitor` command (see [Server Administration Commands \(on page 122\)](#)) to monitor server resource usage. The server never runs at more than 50 FPS. When running slower, it always uses all available CPU processing power to maintain the smoothest possible gameplay. When running at less than 15 FPS, you can consider the server overloaded, which means that the mission currently running is probably too complex for the given server.

3.7.3.1.5 Suggested File Locations

To make the Dedicated Server configuration files easier to manage, it is recommended having them located in a sub-folder within the VBS4 installation folder (for example, a folder called [server](#)).



EXAMPLE

Assuming VBS4 is installed at: `"C:\Bohemia Interactive\VBS4\"`

And the `Start in` property of the Windows shortcut is set to:

`"C:\Bohemia Interactive\VBS4\"`

The shortcut is set to:

`"C:\Bohemia Interactive\VBS4\VBS4.exe" -config=server\server.config`

- Dedicated Server other configuration file, located in:

`"C:\Bohemia Interactive\VBS4\server\server.config"`



NOTE

The required shortcut command may be longer than the maximum length of the Windows shortcut **Target** field. If so, create a batch file to start the server and point the shortcut to it.

Default Configuration File Locations

If you do not specify names and locations of configuration files default files and locations are used:

- Dedicated Server other configuration file (`server.config`) is not used by default and has to be created manually.

3.7.3.2 Server Startup Parameters

The following command line-options are available for Dedicated Servers.

As part of the Dedicated Server startup, you should also consider the implications of [Multicast \(on page 135\)](#) for LAN setups, and the performance boost that can be gained by using [Simulation Clients \(on page 128\)](#).

- **-server**

Starts VBS4 in Dedicated Server mode.

- **-worldServer=ipaddress_or_dnsname**

Specifies a connection to a VBS World Server (using an IP address or DNS name) that streams the Whole-Earth Terrain and provides access to stored Battlespaces.

For Offline use cases, do not specify **-worldServer**.

- **-config=filename**

Server configuration file (processed after startup).

- **-port=number**

Selects the Dedicated Server UDP port (default: 2302).

- **-multicast=0**

Enables / disables multicast.

NOTE

Multicast is enabled in VBS4 by default.

Network update messages (such as [UpdateMan](#), [UpdatePositionMan](#), [UpdateTank](#)) are multicast to the server and to every client. There is no need to use a command-line option to enable it.

- Default multicast address (225.6.7.8) is used.
- **LAN Only** - Multicast only works in a LAN setup, not over the internet. The error message "Multicast connection rejected" is shown when trying to use multicast over the internet.
- **Disable Multicast** - Use **multicast=0** to disable multicast.
- **-multicast=address**

Defined multicast address is used.

- **-profiles=path**

Enables you to choose an alternate user profile, where *path* specifies the user-profile data location. The Windows user account needs permissions to read from and write to the location folder.

You can specify either an absolute path (for example, `D:\VBS4\profiles\`) or a relative one, beneath the VBS4 installation folder (for example, `\profiles\wide\`).

The default user profile location is `%LOCALAPPDATA%\VBS4\`, where the `\Settings\` sub-folder holds the main user-profile data. For more information, see [VBS4 Profile Options \(on page 386\)](#).

 **NOTE**

The Dedicated Server does not have its own profile. Clients logging into the Dedicated Server either use their own profile or the administrator profile. For more information, see [Simulation Settings](#).

 **EXAMPLE**

```
VBS4.exe -server -config=server.config -port=2302
```

A full list of command-line options is available in [Command Line and Launcher Options \(on page 76\)](#).

3.7.3.3 Server Configuration File

Use the Dedicated Server configuration to configure various game settings, such as server name, persistence, logging, and welcome messages. The file is not VBS4 by default and must be created manually, with a specified path. The naming convention for the file is `server.config` or `server.cfg`, but the file name is arbitrary. It can be referred to using the `-config` option.



EXAMPLE

```
-config=server\server.config
```

This example searches `\VBS_Installation\server\` for `server.config`.

Parameter	Description
<code>hostname="Server #1";</code>	Server host name, visible in the VBS4 browser.
<code>maxPlayers = 10;</code>	The maximum number of players that can connect to the server.
<code>disableVoN=1;</code>	Enables / disables the Voice over Net (VoN). If set to 1, VoN is not available (default: 0).
<code>vonCodecQuality=10;</code>	Sets VoN codec quality. Can be from 1 to 10 (default: 3).
<code>persistent=1;</code>	Enables / disables persistent battlefield (default: 0).

3.7.3.4 Server Administration Commands

The Server Administrator (also known as *Game Master*) can control the Dedicated Server, using server commands.

The following network commands are available (type / in the simulation and then type the command):

Command	Description
#mission filename	Selects a mission with a known name.
#missions	Selects a mission.
#reassign	Restarts the mission and reassigns roles.
<div style="border: 1px solid #0070C0; padding: 5px; margin-top: 10px;"><p>NOTE</p><p>Use this instead of the deprecated <code>#restart</code> command.</p></div>	
#kick (name or ID)	Allows you to kick out the player with the specified nickname ("kick out" means to remove them from the multiplayer game).
#shutdown	Shuts down the server.
#init	Reloads the server configuration file, previously loaded by the <code>-config</code> command-line option.
#monitor (interval in sec)	Shows the server performance information. Interval <code>0</code> stops monitoring. The client needs to be the Server Admin on the server to see the <code>#monitor</code> command output. The first administrator client who connects to the Dedicated Server becomes the Server Admin automatically. Use the <code>#login</code> command on another administrator client to become the Server Admin. To check if a player is the Server Admin, use the isGameMaster (https://sqf.bisimulations.com/display/SQF/isGameMaster) command (you can run this command in Execute mode, in a watch field of the Developer Console dialog in the Tools menu).
#exitAll	Shuts down VBS4 on all computers that are on the network.

NOTE

The Server Admin also has additional Main Menu options during a Scenario Execution.
For more information, see Server Management in the VBS4 Instructor Manual.

3.7.3.5 Configure Dedicated Server for VBS World Server

VBS World Server automatically runs a Dedicated Server as a service, that is available to use as a Host for Scenario Execution.

NOTE

For most use cases, Scenario Executions are hosted on a separate Dedicated Server or on a VBS4 Admin Client. For more information, see Scenario Execution.

The operation of the Dedicated Server service is configurable by modifying the VBS4 configuration file on the VBS World Server.

Follow these steps:

1. Stop VBS World Server.

- Run `\Installation\vws_shutdown.exe`

NOTE

Any connected VBS4 Clients are disconnected.

2. Open `\VBS4service.json` in a text editor in the following folder:

`\Installation\Services\VBSAgent\settings\Default\`

3. Locate the following text:

```
"params": "-vbsradio -server -blue -profiles=profiles -maxmem=15000 -  
worldserver=127.0.0.1 -unattended -setNodeAttribute=\"WMS Blue_hgt::Port::7071\" -  
setNodeAttribute=\"WMS Blue_shaded_relief::Port::7071\" -setNodeAttribute=\"WMS  
Blue_ortho_height::Port::7071\" -setNodeAttribute=\"WMS Blue_alb::Port::7071\" -  
setNodeAttribute=\"WMS Blue_ortho_photo::Port::7071\" -setNodeAttribute=\"WMS  
Blue_srf::Port::7071\" -setNodeAttribute=\"WFS PointsMapVecData::Port::7071\" -  
setNodeAttribute=\"WFS LinesMapVecData::Port::7071\" -setNodeAttribute=\"WFS  
LinesRoads::Port::7071\" -setNodeAttribute=\"WFS LinesContours::Port::7071\" -  
setNodeAttribute=\"WFS PolygonsMapVecData::Port::7071\" -setNodeAttribute=\"WFS  
PolygonsWater::Port::7071\" -setNodeAttribute=\"WFS PolygonsForests::Port::7071\" -  
-setNodeAttribute=\"WFS PolygonsBuildings::Port::7071\" -setNodeAttribute=\"HTTP  
Server::Port::25501\" -setNodeAttribute=\"WorldServer::Prefix to  
add::http://localhost:6707/blueserver/\\"",
```

4. Add parameters as required with the most applicable command line parameters listed below:

- **-server**

Specifies a **VBS4 Dedicated Server** running in console mode that VBS4 Clients connect to.

For more information, see [Dedicated Server \(on page 105\)](#).

- **-gateway**

Start VBS4 with VBS Gateway as the HLA / DIS gateway.



WARNING

VBS Gateway is off by default. Use **-gateway** to start VBS4 with VBS Gateway.

- **-vbsHostNet**

Enable **VBSExternalNetworking** on VBS4, and run it in broadcast mode with VBS Blue IG.

For more information, see the VBS Host Overview, and Start Up Parameters in the VBS Blue IG Manual.

- **-multicast=ipaddress:port**

By default, multicast is enabled in VBS4 and network update messages (UpdateMan, UpdatePositionMan, UpdateTank) are multicasted to every client and to the server.

Use **-multicast=ipaddress** to define a specific multicast IP address to use. Specify **-multicast=ipaddress:port** to define a port to use.

- Default multicast address 225.6.7.8 is used.
- If *port* is not specified, the port selected is output to the Dedicated Server Console.
- Multicast only works over LAN, not over the internet. The error message "Multicast connection rejected" displays when VBS4 attempts to use multicast over the internet.
- Disable Multicast - specify **multicast=0**.

- **-port=N**

Select port number *N* for the Dedicated Server. The default port is 2302.

- **-config=filename**

Specify the Server configuration file to use where *filename* is the path to the file.

For more information, see [Server Configuration File \(on page 121\)](#).



EXAMPLE

Adding parameters to disable Multicast and enable VBS Gateway.

```
"params": "-vbsradio -server -blue -profiles=profiles -maxmem=15000 -  
worldserver=127.0.0.1 -multicast=0 -gateway -unattended -  
setNodeAttribute=\"WMS Blue_hgt::Port::7071\" -setNodeAttribute=\"WMS Blue_  
shaded_relief::Port::7071\" -setNodeAttribute=\"WMS Blue_ortho_  
height::Port::7071\" -setNodeAttribute=\"WMS Blue_alb::Port::7071\" -  
setNodeAttribute=\"WMS Blue_ortho_photo::Port::7071\" -  
setNodeAttribute=\"WMS Blue_srf::Port::7071\" -setNodeAttribute=\"WFS  
PointsMapVecData::Port::7071\" -setNodeAttribute=\"WFS  
LinesMapVecData::Port::7071\" -setNodeAttribute=\"WFS  
LinesRoads::Port::7071\" -setNodeAttribute=\"WFS LinesContours::Port::7071\" -  
setNodeAttribute=\"WFS PolygonsMapVecData::Port::7071\" -  
setNodeAttribute=\"WFS PolygonsWater::Port::7071\" -setNodeAttribute=\"WFS  
PolygonsForests::Port::7071\" -setNodeAttribute=\"WFS  
PolygonsBuildings::Port::7071\" -setNodeAttribute=\"HTTP  
Server::Port::25501\" -setNodeAttribute=\"WorldServer::Prefix to  
add::http://localhost:6707/blueserver/\\"",
```

5. If VBS Radio uses Pitch Talk Radio Servers running on their own dedicated computers or you want to specify specific multicast settings for VBS Radio, add the applicable VBS Radio launch parameters:

- **-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 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 \(on page 135\)](#).

- `-prtimulticastaddress=ipaddress`

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

- `-prtimulticastport=port`

Multicast Port - input the port to use for multicast.

6. Add any other additional startup parameters as required.

For information about the full set of available parameters, see [Command Line and Launcher Options \(on page 76\)](#).

7. Save `VBS4service.json`.

8. Apply the changes made to the VBS4 configuration file:

- Run `\Installation\vws_configure.exe`

When a scenario execution starts VBS World Server runs a Dedicated Server as a service, using the parameters specified in the batch file.

NOTE

The console is not available when the Dedicated Server is running on VBS World Server. Instead, the console output is written to a `ConsoleLog.txt` file in the following folder:

`/Installation/Services/vbs4/profiles/`

3.8 Simulation Clients

A Simulation Client (simclient or SC) is a player-invisible client that handles a certain number of AI units, vehicles, and network objects (entities), and / or AAR simulation instead of the Dedicated Server (DS). Using SCs should improve server performance by offloading time consuming calculations to other computers.

Simulation Clients have same system requirements as VBS4 Clients.

Bohemia Interactive Simulations recommends the following hardware requirements for VBS4 Clients:

VBS4	Recommended	Optimal
CPU	Intel Core i7-12700K (or better) Ryzen 9 7900X	Intel Core i9-12900K (or better) Ryzen 9 7950X
RAM	32GB DDR4 (or better)	64GB DDR4 (or better)
GPU	Nvidia GeForce RTX 3070 (or better) DirectX 11	Nvidia GeForce RTX 3080 (or better) DirectX 11
<div style="border: 2px solid red; padding: 10px; text-align: center;"> WARNING AMD GPUs are not currently supported.</div>		
Disk	512GB SSD for OS and VBS4	1TB SSD for OS and VBS4
OS	Windows 10 (v1607+) or 11, 64-bit	Windows 10 (v1607+) or 11, 64-bit
<div style="border: 2px solid red; padding: 10px; text-align: center;"> WARNING VBS4 uses the Windows account name as the VBS4 user name. This name can only contain printable ASCII (https://www.w3schools.com/charsets/ref_html_ascii.asp) characters. VBS4 may crash if characters outside this range are used. Modify the Windows account name before starting VBS4 if it contains non-ASCII characters.</div>		
Network	1 Gbps / 2.5 Gbps	1 Gbps / 2.5 Gbps

NOTE

VBS4 does not require expensive professional graphics cards (designed for CAD work, CGI, or other complex scientific calculations). These cards do not provide any additional benefits compared to graphics cards designed for gaming.

VBS4 installations that are intended to be used as Dedicated Servers or Simulation Clients can meet the VBS World Server requirements instead of the more graphically demanding VBS4 requirements.

Third-party cybersecurity software may increase load time and impact VBS4 performance.

WARNING

To avoid potential UI display issues, do not use USB hubs or adapters to connect monitors. Also, support of the new map view (see [Advanced New Map and Map Layers](#)) is limited on 4K monitors. Delays may occur when moving / dragging the map.

NOTE

The hardware listed is not exclusive. Compare your hardware to the listed items for an indication of performance.

Operational usage can affect performance requirements. Increasing visual fidelity (detail, distance, and / or resolution), as well as scenario complexity, can have a significant impact on performance, and may warrant increasing the system specification to the next performance tier.

For hardware queries, contact us at <https://bisimulations.com/company/contact-us>.

The balancing process is handled by the DS. The automatic balancing of units and vehicles is based on their groups. It is also possible for the user to control the balancing strategy through [Balancing Script Commands \(on page 132\)](#).

Types of Simulation Client:

- **Simulation** - Handles the AI simulation of units, vehicles and network objects.
- **AAR** - Handles simulation for AAR recording.

NOTE

Server performance benefits are only gained by installing and running SCs on different computers to the DS.

Simulation Clients are simple to set up. In a typical scenario they run on separate computers to the DS (see [Example Setup \(on page 133\)](#)).

To start a Simulation Client:

- In VBS Launcher: Open the **VBS4 > Client** tab. Select **simulationclient** and then the type of simulation client to run.
- With the command line: Start VBS4 with the **-simulationClient=type** command line parameter, and the **-connect** parameter specifying the IP address or DNS name of the Dedicated Server to connect to.

NOTE

To prevent the SC logging into the DS as the administrator, do not start the SC with the **-admin** command line parameter. You are not able to run the same instance of VBS4 with the **-server** and **-simulationClient** parameters at the same time. The recommended way to avoid these situations is to connect and start all required simulation clients and the dedicated server before starting the mission.

- **-simulationClient=type**

Player-invisible client to take care of a certain number of units, vehicles and network objects, and / or AAR from server (use the **-connect** command-line parameter to connect to a computer other than localhost).

Possible types:

- **0** - Simulation Client (same as **-simulationClient**)
- **1** - AAR Simulation Client
- **2** - Simulation + AAR Simulation Client

NOTE

Generally, it is recommended to use SC type 1 (**-simulationClient=1**) for AAR recording rather than SC type 2.

- **-connect=ipaddress_or_dnsname**

Connects a Simulation Client to the Dedicated Server at the given IP address or DNS name.

Setting this parameter to "**-connect=#auto**" connects an SC automatically to the first server found.

WARNING

If an AAR Simulation Client (**-simulationClient=1** or **-simulationClient=2**) is used, and you want radio transmissions to be recorded, do not use the **-disableVBSRadio** parameter on the Simulation Client.

3.8.1 AAR Simulation Client Location

When using an AAR Simulation Client, the AAR file saves on the computer running the AAR Simulation Client.

On the Simulation Client computer, the AAR is saved to: `\Documents\VBS4\AAR\`

When a Dedicated Server or Simulation Client is used, after the AAR is downloaded to the Admin Client from the Dedicated Server / Simulation Client, it is automatically deleted from the Dedicated Server / Simulation Client.

The AAR download location on the VBS4 Admin Client is:

`\Documents\VBS4\Battlespaces\Battlespace_Name\AAR\`

WARNING

If the AAR fails to download (for example, it only gets downloaded partially), delete the faulty AAR files from the Admin Client and manually copy the AAR files from the Dedicated Server / Simulation Client.

To allow the Admin Client to access and playback the AAR, the following options are available:

1. Run the AAR Simulation Client on the Admin Client computer that plays the AAR. The AAR Simulation Client takes advantage of different CPU Cores and does not use the GPU at all, so it should offer performance gains without affecting the performance of the Admin Client.
2. When the AAR Simulation Client runs on a different computer to the Dedicated Server and Admin Client instance, you must download it before you can access it for playback.

WARNING

If you want to use an AAR Simulation Client to record a mission that includes VBS Radio, specify the computers running the Pitch Servers in the VBS Launcher Radio tab. For more information, see Starting VBS Radio in the VBS Radio Manual.

3.8.2 Related Command Line Parameters

- `-multicast`

For the Dedicated Server. Network update messages (UpdateMan, UpdatePositionMan, UpdateTank, and so on) are multicast to every client and to the server. The default multicast address (225.6.7.8) is used.

- `-connect=ipaddress_or_dnsname`

Connects a Simulation Client to the Dedicated Server at the given IP address or DNS name. Setting this to "`-connect=#auto`" automatically connects an SC to the first server found.

3.8.3 Balancing Script Commands

These scripting commands can control the load balancing strategy after the DS and SCs start.

NOTE

Balancing script commands do not affect AAR Simulation Clients.

- `setBalancingThreshold`

Defines load balancing setting for SCs.

Once the number of entities handled by an SC (units, vehicles, and physX objects) deviates from the **average** by the specified threshold, they are transferred ("balanced") to either another SC or the DS.

NOTE

"Average" refers to the number of clients the DS and each SC should be looking after based off the `setBalancingOffload` setting. For example, if `setBalancingOffload` was set to a value of 1 (`setBalancingOffload 1`), then the DS and each SC should be handling the same percentage of entities. For a 1 DS, 3 SC setup this would be 25%.

So if there are 100 entities, then each SC and the DS should on **average** be looking after 25 entities each. When the actual number of entities being handled by an SC or DS exceeds this amount by the threshold value, the extra entities are transferred to another SC.



EXAMPLE

`setBalancingThreshold 1` - no balancing threshold, workload is distributed equally among all SCs.

`setBalancingThreshold 1.1` - 10% deviation from the average is allowed.

`setBalancingThreshold 2` - 100% deviation from the average is allowed. There must be twice as many entities on an SC before they are redistributed.

Default value is 1.1 (10 % deviation).

- `setBalancingOffload`

Defines the relative workload of a server, in relation to all connected SCs.



EXAMPLE

`setBalancingOffload 0.5` - The server handles half the number of units, vehicles and network objects as each SC.

- 1 DS, 2 SC. Then average percentage of all objects is:
 $100\% / (2(\text{SC}) + 0.5(\text{DS})) = 40\%$
- So each SC simulates 40% of entities and the DS simulates 20%.

`setBalancingOffload 1` - The server handles the same number of units, vehicles and network objects as each SC.

Default value is 0.

Both commands only have an effect if there is at least 1 Simulation Client present.

3.8.4 Example Setup

- 64-bit Dedicated Server with multicast on PC1



NOTE

Multicast is on by default but only works over a LAN.

- Two SCs on PC2 (`-simulationClient=0 -connect=ipaddress_or_dnsname`).
- Admin Client VBS4 instance and AAR SC running on PC3 (`-simulationClient=1 -connect=ipaddress_or_dnsname`).
- User Client VBS4 instances running on PC4+ (not on PC1 and PC2).

At default settings:

- `setBalancingThreshold 1.1`
- `setBalancingOffload 0`

Each SC handles 50% of entities.

The DS handles 0% of entities.

Once the number of entities being managed by the DS or one of the SCs exceeds the above values by 10%, the excess entities transfer to balance the load back towards the 50%/50%/0% split.

3.8.5 Simulation Client Recommendations

Maintaining performance on the Dedicated Server and Simulation Clients above 20 FPS for the server, and 15 FPS for the clients, should be generally acceptable. Problems within VBS4 start to appear when performance drops below these values (for example, units jumping around, hits not being registered).

Starting an AAR Simulation Client on the same machine as the Dedicated Server is generally recommended, due to simplifying the AAR file download. If you are using an SSD, the impact of running an AAR Simulation Client on the same machine as the Dedicated Server should be negligible (either within a measurement error or within a few percent).

The ideal setup for performance:

- Separate computer for the Dedicated Server (fast SSD, fast CPU, lots of RAM).
- Separate computer for AAR Simulation Client (fast SSD, fast CPU, lot of RAM).
- Separate computer for Simulation Clients (fast SSD, fast CPU, lot of RAM).

You can run multiple Simulation Clients on one computer, but there are a few rules:

- Do not exceed 3 Simulation Clients per computer.
- Each SC is tied to one CPU core, so the number of Simulation Clients running on a computer should be less than, or equal to, the number of CPU cores on the machine.
- You can always introduce more Simulation Clients from a different machine.
- A general rule to follow is to use 1 Simulation Client for every 100 AI units you have in a scenario.

3.9 Multicast

The ability of VBS4 to multicast reduces the strain on a server caused by a large number of clients. VBS4 multicasts non-guaranteed update messages directly from clients, where the units are being simulated to all other clients.

Previously, a large proportion of server resources was spent determining, sorting, and sending non-guaranteed update messages. The multicast solution removes this burden from the server and speeds it up considerably, even with numerous players. As an added benefit, these messages are now delivered with a significantly lower latency, due to not having to go through the server first. The latency speed-up also enables the implementation of a load-balancing mechanism - it is now possible to offload some units to different machines, while still keeping a good response time (see [Simulation Clients \(on page 128\)](#)).

The main advantage of multicast updates is that update messages no longer pass through the server:

- The largest bottleneck on the server is removed and it is sped up considerably, especially with a high number of players.
- Latency of update messages is smaller, especially for client-to-client updates, which are no longer affected by the server FPS (for example, the movement of units remote to the server is smooth, even when the server FPS is low).

NOTE

Multicast is only supported when all Servers and Clients are on the same local network. To enable Clients to connect from outside the local network, disable multicast on the Host computer using `-multicast=0` (unchecked `-multicast` in VBS Launcher automatically adds `-multicast=0` to the **Parameters** field).

3.9.1 Implementation

Multicast is on by default in VBS4. Network update messages (`UpdateMan`, `UpdatePositionMan`, `UpdateTank`, for example) is multicasted to every client and to the server. Default multicast address `"225.6.7.8"` is used.

- `-multicast=0`

Since multicast is on by default in VBS4, this setting turns off multicast.

- `-multicast=ipaddress:port`

Specifies a defined multicast IP address and port to use.

If *port* is not specified, the selected port is output to the Dedicated Server Console.

- **-ttl-level**

Time-To-Live (TTL) for multicast packets. The IP multicast routing protocol uses the Time To Live (TTL) field of IP datagrams to decide how far from a sending host a given multicast packet should be forwarded.

- 0 - Restricted to the same host. Is not output by any interface.
- 1 - Restricted to the same subnet. Is not forwarded by a router.
- <= 32 - Restricted to the same site, organization, or department.
- <= 64 - Restricted to the same region.
- <= 128 - Restricted to the same continent.
- <= 255 - Unrestricted in scope. Global.

Default value: 32

NOTE

VBS Radio uses separate multicast settings. For more information, see the [Advanced - Radio \(on page 85\)](#) Command-Line and Launcher Options.

3.9.2 Multiple NICs

Multicast messages can only be transferred through one NIC (Network Interface Card). By default, the primary NIC (the first connection in the network connections list as set by the NIC binding order) is used.

If you wish to use a different one, you can do so by using the **NetworkInterface** parameter in the **VBS4.xml** file.

Specify the network adapter using its MAC or IP address, as follows:

```
<Value>
  <Name>NetworkInterface</Name>
  <Value>"{"TYPE", "VALUE"}"</Value>
</Value>
```

Where **TYPE** can be **idx**, **mac**, or **ip4** and **VALUE** can be a NIC, MAC address, or IPv4 address (preferably MAC or IPv4).

EXAMPLE

NIC example (where *N* specifies the NIC):

```
<Value>
  <Name>NetworkInterface</Name>
  <Value>"{"idx", "N"}"</Value>
</Value>
```

MAC example:

```
<Value>
  <Name>NetworkInterface</Name>
  <Value>"{"mac", "aa-bb-cc-dd-ee-ff"}"</Value>
</Value>
```

IPv4 example:

```
<Value>
  <Name>NetworkInterface</Name>
  <Value>"{"ip4", "192.168.0.1"}"</Value>
</Value>
```

Previously, the following deprecated parameter was used, where a value of **0** referred to the primary NIC, and a value of **1** referred to the secondary NIC:

```
<Value>
  <Name>NetworkInterface</Name>
  <Value>N</Value>
  <!-- 0 uses the primary NIC-->
  <!-- 1 uses the secondary NIC-->
</Value>
```

Which is now equivalent to:

```
<Value>
  <Name>NetworkInterface</Name>
  <Value>"{"idx", "N"}"</Value>
</Value>
```

As it is backwards compatible, it may still be correctly read by the engine. However, it is automatically replaced by the **NetworkInterface** parameter.

For more information, see [VBS4.xml Options \(on page 373\)](#).

3.10 Automatically Start Network Scenarios

A VBS4 host can automatically start a Scenario when VBS4 starts. The procedures vary depending on which computer is hosting the Scenario).

- [Dedicated Server Hosted Execution \(below\)](#)
- [VBS4 Client Hosted Execution \(on the next page\)](#)
- [VBS World Server Hosted Execution \(on page 140\)](#)

i NOTE

The following considerations apply to all setups:

- Only use the `-admin` parameter on the VBS4 Admin Clients.
- The scenario does not start automatically if there are unfilled playable slots. Use the alternate `-autostart=N` parameter if you want the scenario to automatically start when N player slots are filled.
- When the `-autostart` parameter is not used on a Dedicated Server, or when `-autostart=-1` is used on a Dedicated Server, the `-autostart` parameter on the VBS4 Admin Client is used, if it is set.
- Use a different `Unit Name` for each VBS4 Client computer when setting the `.bat` file `-autoassign` parameter, matching the names assigned to units when Adding Units (see the VBS4 Editor Manual) to the Scenario.

3.10.1 Dedicated Server Hosted Execution

To autostart a Scenario hosted on a Dedicated Server, configure the Dedicated Server.

Follow these steps:

1. Create the `server` folder in your VBS4 installation folder.
2. In the `server` folder, create a `server.cfg` file with the following content:

```
class TestBattlespaces {
    class [SCENARIO_NAME] { // Scenario name, can be anything
        campaign = "";
        // Path to Battlespace
        battlespace =
            C:\Users\USER_NAME\Documents\VBS4\Battlespaces\[SCENARIO_NAME];
    };
};
```

3. Create a **.bat** file with the following content to start the Dedicated Server.

In Offline mode, when you do not need to run the VBS World Server to stream the terrain data to VBS4 Clients, use the following **.bat** file:

```
VBS4.exe -server -config=server\server.cfg
```

In Online mode, when you need to run the VBS World Server to stream the terrain data to VBS4 Clients, use the following **.bat** file:

```
VBS4.exe -server -config=server\server.cfg -worldServer=IP_address_or_DNS_name
```

4. Create a **.bat** file with the following content to start the VBS4 Clients.

In Offline mode, use the following **.bat** file:

```
VBS4.exe -window -admin -connect=IP_address_or_DNS_name -autostart -autoassign=Unit Name
```

In Online mode, use the following **.bat** file:

```
VBS4.exe -window -admin -connect=IP_address_or_DNS_name -worldServer=IP_address_or_DNS_name -autostart -autoassign=Unit Name
```

3.10.2 VBS4 Client Hosted Execution

To autostart a Scenario hosted on a VBS4 Admin Client, configure the Admin Client.

Follow these steps:

1. Create a **.bat** file with the following content to start the VBS4 Admin Client.

In Offline mode, when you do not need to run the VBS World Server to stream the terrain data to VBS4 Clients, use the following **.bat** file:

```
VBS4.exe -admin -window -autostart -autoassign=Unit Name -init=hostMission["Mission Name"]
```

In Online mode, when you need to run the VBS World Server to stream the terrain data to VBS4 Clients, use the following **.bat** file:

```
VBS4.exe -admin -window -autostart -autoassign=Unit Name -init=hostMission["Mission Name"] -worldServer=IP_address_or_DNS_name
```

2. Create a **.bat** file with the following content to start the VBS4 Clients that connect to the Admin Client.

In Offline mode, use the following **.bat** file:

```
VBS4.exe -window -admin -connect=IP_address_or_DNS_name -autoassign=Unit Name
```

In Online mode, use the following **.bat** file:

```
VBS4.exe -window -admin -connect=IP_address_or_DNS_name  
-worldServer=IP_address_or_DNS_name -autoassign=Unit Name
```

3.10.3 VBS World Server Hosted Execution

You can host a scenario on the Dedicated Server that runs on VBS World Server.

In this case, additional configuration is required to enable autostart.

Follow these steps:

1. In your VBS World Server installation folder, run **vws_shutdown.exe**.
2. If it does not already exist, create the folder structure **\SYSTEM\Battlespaces** in:
\WS_Installation\Services\VBS4\profiles\User.
3. Copy the applicable **\Battlespace Name** folder from:
\Documents\VBS4\Battlespaces
to:
\WS_Installation\Services\VBS4\profiles\User\SYSTEM\Battlespaces.
4. Create the **server** folder in:
\WS_Installation\Services\VBS4.
5. In the **\server** folder, create a **server.cfg** file with the following content:

```
class TestBattlespaces {  
    class SCENARIO_NAME { // Scenario name, can be anything  
        campaign = "";  
        // Path to Battlespace  
        battlespace =  
            C:\Users\USER_NAME\Documents\VBS4\Battlespaces\SCENARIO_NAME;  
    };  
};
```

6. Open **VBS4service.json** in:

\WS_Installation\Services\VBSAgent\settings\Default

7. Search for **params**, update to match the following application parameters, and save the changes:

```
"params": "-vbsradio -server -blue -profiles=profiles -maxmem=%memorymax%  
-gateway -worldserver=127.0.0.1 -unattended -multicast=0  
-config=server\\server.cfg",
```

8. In **\WS_Installation**, run **vws_configure.exe**.
9. Create a **.bat** file with the following content to start the VBS4 Clients:

```
VBS4.exe -window -admin -connect=IP_address_or_DNS_name -autostart  
-autoassign=Unit Name -worldserver=IP_address_or_DNS_name
```

3.11 Starting VBS4 with Microsoft Bing Maps

You can stream terrain data to VBS4 from Microsoft Bing™ Maps. This allows you to substitute the default procedural building models with higher-fidelity building models in the 3D View.

WARNING

The following considerations apply:

- In order to stream data from Microsoft Bing Maps, VBS4 requires internet access and a valid Bing Maps Key.
- Combining Microsoft Bing Maps and VBS World Server data is not supported.

TIP

You can find more information about existing and upcoming detailed Earth insets (such as cities) on the [Microsoft Bing Blogs](https://blogs.bing.com/maps?tagname=Bing%20Maps%20Imagery&groupid=9) (<https://blogs.bing.com/maps?tagname=Bing%20Maps%20Imagery&groupid=9>) website.

Follow these steps:

1. Make sure you have a Microsoft Bing Maps account. For more information, go to: <https://www.bingmapsportal.com/>.
2. Go to <https://www.bingmapsportal.com/Application> and log in using your Microsoft Bing Maps account.
3. If you do not have a Bing Maps Key for VBS4, do the following:
 - a. Select **My Account > My Keys**.
 - b. Enter the following:

Field	Value
Application name	Enter "VBS4".
Application URL	Leave blank.
Key Type	In the drop-down, select Basic .
Application Type	Select Windows Application .

- c. Click **Create**.

A Bing Maps Key is created for VBS4.

4. Click **Show key** to display the Bing Maps Key.

The screenshot shows the 'My keys' section of the Bing Dev Center. It displays a table with one row for the key created. The table columns are 'Application name', 'Key details', and 'Actions'. The 'Application name' column shows 'VBS4'. The 'Key details' column contains the following information:

- Key: [Show key](#)
- Application Url:
- Key type: Basic / Windows Application
- Created date: 06/03/2021
- Expiration date: None
- Key Status: Enabled — Preview
- Security Enabled: No

The 'Actions' column includes links for 'Update', 'Copy key', 'Usage Report', 'Enable Security', and 'Disable Preview' (which is currently selected). A search bar at the top right says 'Enter key to search...' with a magnifying glass icon.

5. Use one of the following methods:

- **VBS Launcher**

- a. In the VBS Launcher, under **VBS4 > Client > Bing™ Maps Data**, select **-bingKey** and enter the Bing Maps Key.
- b. Click **Launch Modules**.

- **Batch File**

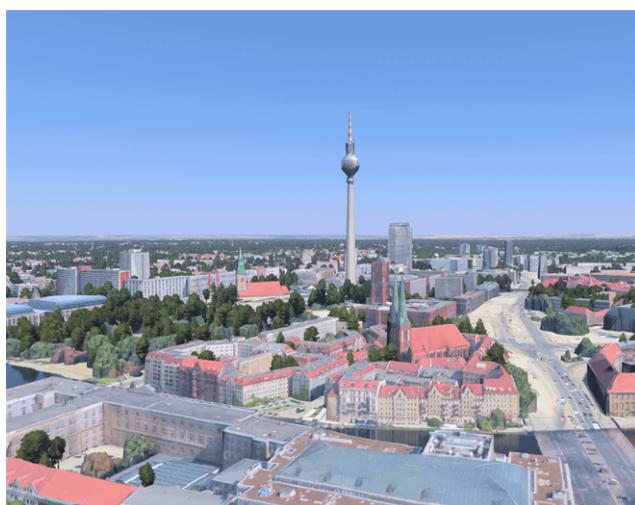
- a. Create a batch (**.bat**) file with the following content in your VBS4 installation folder:

```
VBS4.exe -bingKey=Bing Map Key
```

- b. Run the file.

VBS4 displays the Bing Maps terrain in the 3D View.

Image-24: 3D View of Berlin, Germany



3.12 Launching VBS Gateway

In a combined simulation exercise, one instance of VBS4 acts as the host server and also runs VBS Gateway.

WARNING

VBS Gateway is off by default. You can only access VBS Gateway by starting VBS4 with the `-gateway` option.

To avoid duplication of entities, only one instance of VBS4 should be launched with the `-gateway` command line option.

To enable VBS Gateway on the Dedicated Server running on VBS World Server, [Configure Dedicated Server for VBS World Server \(on page 123\)](#) to add `-gateway` to the Dedicated Server service.

3.12.1 Scenario Preparation with VBS Gateway

Prior to running a combined simulation exercise, configure the VBS Gateway options (see [Configure VBS Gateway in the VBS Gateway Manual](#)), and Entity Mappings (see [Configure Simulation Modeling in the VBS Gateway Manual](#)) for the Scenario.

Use VBS Launcher to start a VBS4 Client as an Administrator with VBS Gateway enabled.

Follow these steps:

1. In the **Client** tab, select the **Configuration** to use:

- **VBS4 Online**

Starts VBS4 Clients connected to a VBS World Server hosting the Whole-Earth Terrain and with access to stored Battlespaces.

- **VBS4 Offline**

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

The VBS4 Client can only access Battlespaces on the VBS4 Client.

WARNING

Do not select or input the **Server IP** address to connect to a Dedicated Server.

2. In the **Client** tab, select **admin** to enable access to Battlespace Management and VBS Editor.

3. Enable VBS Gateway:

In the **Server** tab, select **gateway** to enable access to the VBS Gateway UI from VBS Editor.

4. Click **Launch Modules**.

For more information, see [Starting VBS4 \(on page 55\)](#).

Configure VBS Gateway as part of Scenario Preparation using the **Tools > Show Gateway UI** options in VBS Editor.

For more information, see Configure VBS Gateway and Configure Simulation Modeling in the VBS Gateway Manual.

3.12.2 Scenario Execution with VBS Gateway

Execute Scenarios with VBS Gateway using the following setups:

- Scenario Execution with a Dedicated Server (below)
- Scenario Execution with an Admin Client Host (on page 147)
- Connection Multiple VBS4 Instances (on page 148)

3.12.2.1 Scenario Execution with a Dedicated Server

VBS4 Clients typically connect to a Dedicated Server to act as the host.

Use VBS Launcher to start the Dedicated Server:

1. In the **Server** tab, select the Online or Offline Configuration (both use `-server`) and select `gateway (-gateway)`.
2. Click **Launch Modules** to start the Dedicated Server with VBS Gateway.

NOTE

To enable VBS Gateway on the Dedicated Server running on VBS World Server, [Configure Dedicated Server for VBS World Server \(on page 123\)](#) to add `-gateway` to the Dedicated Server service.

On the VBS World Server, run `\WS_Installation\vws_start.exe`.

Use VBS Launcher to start the VBS4 Clients:

1. Select the **VBS4 Online** or **Offline** Configuration to depending on whether a VBS World Server connection is required.

WARNING

All VBS4 Clients, Dedicated Servers, and Simulation Clients that participate in the Scenario Execution must use the same Configuration option:

- **Online:** When a VBS World Server is required, all computers must use the **Online** option connected to the same VBS World Server (`-worldServer=VWS_ipaddress_or_dnsname`)
- **Offline:** When a VBS World Server is not required, all computers must use the **Offline** option (`-worldServer` not specified).

2. Select **admin** to start VBS4 Admin Clients with access to VBS Editor and the VBS Gateway UI.
3. Do one of the following:
 - To connect directly to the Host or Dedicated Server, input the **Server IP** using the IP address or DNS name of the computer hosting the Scenario (`-connect=host_IP_address_or_DNS_name`).
VBS4 starts and opens in the Multiplayer Battlespaces selection panel.
 - Leave the **Server IP** blank to connect later using the **Connect to Server** option in the Training UI.

WARNING

Do not select **gateway** on any VBS4 Client. The gateway parameter is only required on the Server and selecting it on Clients may duplicate entities.

The administrator controls the networked Scenario and can access the VBS Gateway UI through VBS Editor. For more information, see VBS Gateway UI in the VBS Gateway Manual.

3.12.2.2 Scenario Execution with an Admin Client Host

For small numbers of connected VBS4 clients (less than 8) and a small combined number of total entities in the scenario (less than 40), starting a VBS4 Admin Client acting as the Host is sufficient.

Use VBS Launcher to start a VBS4 Admin Client:

1. In the **Client** tab:
 - Select the **Online** or **Offline** Configuration depending on whether a VBS World Server connection is required.
 - Select **admin** to enable access to VBS Editor and the VBS Gateway UI.
 - Do not select or input a **Server IP** address for a Dedicated Server.
2. In the **Server** tab, select **gateway** (-**gateway**) to act as the Scenario host.
3. Click **Launch Modules** to start VBS4 as a VBS4 Admin Client hosting the Scenario.

Use VBS Launcher to start the VBS4 Trainee Clients:

1. Select the **VBS4 Online** or **Offline** Configuration to depending on whether a VBS World Server connection is required.

WARNING

All VBS4 Clients, Dedicated Servers, and Simulation Clients that participate in the Scenario Execution must use the same Configuration option:

- **Online:** When a VBS World Server is required, all computers must use the **Online** option connected to the same VBS World Server (-**worldServer=VWS_ipaddress_or_dnsname**)
- **Offline:** When a VBS World Server is not required, all computers must use the **Offline** option (-**worldServer** not specified).

2. Do not select **admin**.
3. Do one of the following:
 - To connect directly to the Host, input the **Server IP** using the IP address or DNS name of the computer hosting the Scenario (-**connect=host_IP_address_or_DNS_name**).
VBS4 starts and opens and waits for the Administrator to start the Scenario, which then opens the Network Lobby.
 - Leave the **Server IP** blank to connect later using the **Connect to Server** option in the Training UI.
4. Do not select the **gateway** option in the Server tab.

5. Click **Launch Modules** to start VBS4 connected to the VBS4 Admin Client hosting the Scenario.

The administrator controls the network mission and can access the Gateway UI directly in a web browser or through VBS Editor (Execute). For more information, see VBS Gateway UI in the VBS Gateway Manual.

3.12.2.3 Connection Multiple VBS4 Instances

To demonstrate shared simulation exercises with VBS Gateway, you can connect two instances of VBS4.

Follow these steps:

1. Use VBS Launcher to start two separate VBS4 Admin Clients both as hosts.

In the **Client** tab, select the **VBS4 Configuration** to use:

- **VBS4 Offline**

Starts standalone VBS4 Admin Clients.



WARNING

Do not select or input a Server IP address for a Dedicated Server.

- Select **admin** to enable access to VBS Editor and the VBS Gateway UI.

In the **Server** tab, select **gateway (-gateway)** to act as a Scenario host.

Click **Launch Modules** to start VBS4 as a VBS4 Admin Client hosting the Scenario.

2. On each computer, use VBS Editor to create a Scenario that uses different units and vehicles, but uses the same terrain.
3. On each computer, select the Battlespace, and in the Battlespace Functions Panel under Execute, click **Host**.

On each computer, observe that units and vehicles from the Scenario hosted on the other computer appear.

On each computer, open the VBS Gateway UI to view how the VBS Gateway UI displays each set of entities. For more information, see VBS Gateway UI in the VBS Gateway Manual.

3.13 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 \(on page 153\)](#) to set up communication with specific Pitch Talk servers or to specify specific VBS Radio settings.

3.13.1 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 \(on page 55\)](#).

Configure VBS Radio using the **Tools > Radio Admin** option in VBS Editor. For more information, see Setting Up VBS Radio in the VBS Radio Manual.

3.13.2 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 \(on page 153\)](#) 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 \(on page 153\)](#) 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 -prtимulticast "-prtимulticastaddress=229.229.229.228"  
-prtимulticastport=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 in the VBS Radio Manual.

Specify Client Connections

If the Pitch Talk Servers are running on separate computers from the VBS4 Server, use the [VBS Launcher Radio Tab \(on page 153\)](#) 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 \(on the next page\)](#) 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 \(on page 128\)](#).

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 in the VBS Radio Manual.
- Trainees can communicate with VBS Radio, see Using VBS Radio in the VBS Radio Manual.

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\prt\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`

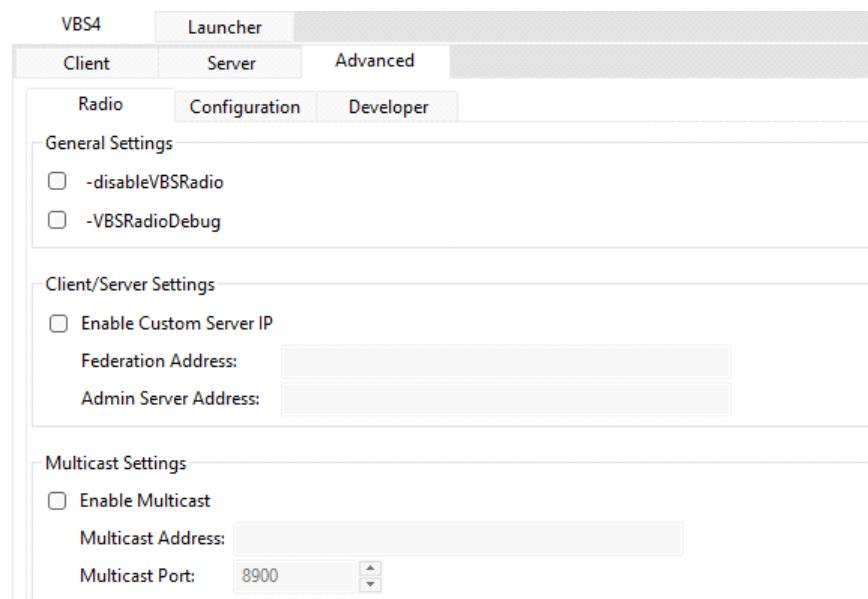
- **Client Computers** - Shows log messages for events on the client.

`VBSPitchRadio-date-time-pid.log`

3.13.3 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-25: 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 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 \(on page 135\)](#).

- **-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 **prt1516eLRC.settings** file at:

\VBS_Installation\lib64\pitchTalk\prt1\conf

Locate the **LRC.UDP.multicastTTL** 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.

3.14 Quick Start: VBS Blue IG with VBS4 Host

This guide explains the most basic usage of VBS Blue IG with VBS4. The following steps cover the creation of a single-view IG project with VBS4 as the host. In this example, both the VBS4 Host and the VBS Blue IG Client run on **one** computer.

WARNING

Using a single computer to run VBS4 and VBS Blue IG is not recommended for a production system.

- [VBS4 Computer Setup \(below\)](#)
- [VBS Blue IG Computer Setup \(on the next page\)](#)

NOTE

For a more detailed procedure for setting up VBS Blue IG with VBS4 and multiple computers, see [Configure VBS Blue IG and VBS4](#) in the VBS Blue IG Manual.

3.14.1 VBS4 Computer Setup

Start a VBS4 Admin Client to act as the simulation host.

Follow these steps:

1. Use VBS Launcher to start the VBS4 Admin Client with the following parameters selected:
 - a. In the **VBS4 > Client** tab, select:
 - **VBS4 Offline**
 - **admin**
 - Other Client parameters as required.
 - b. Click the **VBS4 > Server** tab, and select the parameter **-vbsHostNet**.

NOTE

By default, the Exercise ID is the PC name of the VBS Host.

2. Click **Launch Modules** to start the VBS4 Admin Client.

For more information, see [Starting VBS4 \(on page 55\)](#).

3. Prepare a Scenario that includes an IG View Object:

- a. Create a Battlespace at a selected location.
- b. Select the Battlespace, highlight **Editor** and click **Create** to open VBS Editor in Prepare mode.
- c. Add a **Unit** and an **IG View Object** to the scenario.
- d. Right-click the IG View Object, select **Link to Unit**, and click the Unit.
- e. Save the Scenario.

For more information, see Scenario Preparation in the VBS4 Editor Manual.

4. Execute the Scenario:

- a. Select the Battlespace, highlight **Execute** and click **Host** to open the Network Lobby.
- b. Select the Unit to assign yourself control.
- c. Click **OK**, and then **OK** to start the Scenario.

For more information, see Scenario Execution in the VBS4 Instructor Manual.

3.14.2 VBS Blue IG Computer Setup

Set up VBS Blue IG to act as a client to the simulation host.

Follow these steps:

1. Launch **BlueIG.exe**.
2. Press **Esc** to show the mouse cursor.

VBS Blue IG starts, and loads the scene.

If the view does not display in the expected manner or you have other connection issues, see Cannot Connect to VBS Host in the VBS Blue IG Manual.

NOTE

For a more detailed procedure for setting up VBS Blue IG with VBS4 and multiple computers, see Configure VBS Blue IG and VBS4 in the VBS Blue IG Manual.

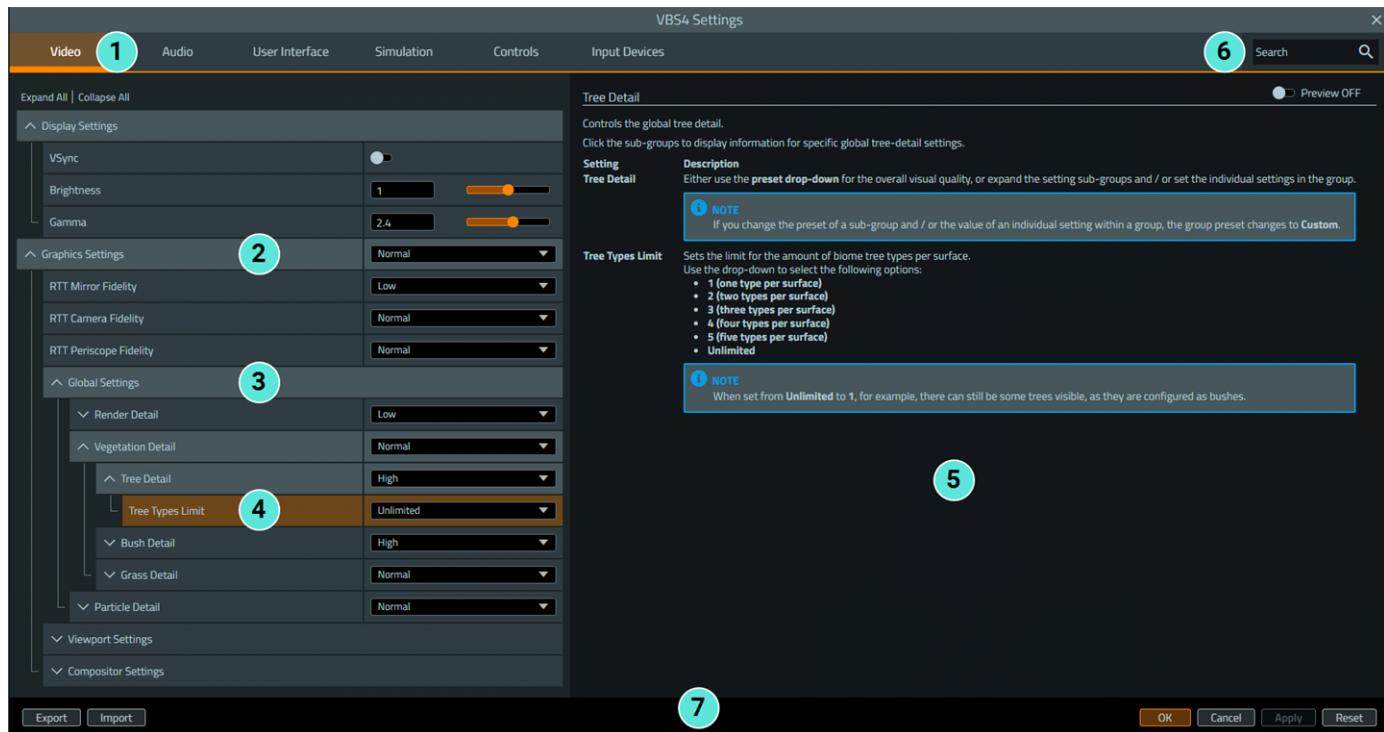
4. VBS4 Settings

All users can access VBS4 Settings to control various aspects of VBS4.

- In the VBS4 Toolbar, click the **Settings Icon**:



The VBS4 Settings panel opens.



- | | |
|---|---------------------------|
| 1 | Settings Tab |
| 2 | Settings Group |
| 3 | Settings Sub-Group |
| 4 | Individual Setting |
| 5 | Settings Help |
| 6 | Settings Search |
| 7 | General Settings Controls |

- In the applicable Settings Tabs, click **Expand All / Collapse All** to expand / collapse the settings hierarchy.
- Select a Settings Tab to open the applicable Settings Group and view the Settings Help.
- Select a Settings Group to display the applicable Settings Sub-Groups and Individual Settings.

- Set the Individual Settings.
- Use the Settings Search to dynamically search for an Individual Setting.

Type the name of the Individual Setting you want to find, and click the search result to navigate to the Individual Setting.



- Click **OK** to save your setting changes and close the Settings panel.
- Click **Apply** to save your setting changes.
- Click **Cancel** to reset any unsaved changes and close the Settings panel.
- Click **Reset** to restore the default VBS4 Settings.
- Click **Export / Import** to export / import the settings - see [Exporting / Importing Settings \(on page 161\)](#).

For more information about the Settings Categories, see the following topics:

- [Video Settings \(on page 165\)](#)
- [Audio Settings \(on page 236\)](#)
- [User Interface Settings \(on page 239\)](#)
- [Simulation Settings \(on page 251\)](#)
- [Controls Settings \(on page 265\)](#)
- [Input Devices Settings \(on page 304\)](#)

NOTE

VBS4 Settings are part of your VBS4 Profile data.

The Profile data is stored in:

- `%LOCALAPPDATA%\VBS4\`, which is the default location.
- An alternate location, which can be specified using the [-profiles=path \(on page 88\)](#) command-line option.

The Profile configuration consists of the following XML files:

- **Video Profile Configuration:**

`\Profile_Path\Settings\VideoSettings.xml`

- **Audio Profile Configuration:**

`\Profile_Path\Settings\AudioSettings.xml`

- **User Interface Profile Configuration:**

`\Profile_Path\Settings\UISettings.xml`

- **Simulation Profile Configuration:**

`\Profile_Path\Settings\SimulationSettings.xml`

- **Controls Profile Configuration:**

`\Profile_Path\Settings\ControlsSettings.xml`

- **Input Devices Profile Configuration:**

`\Profile_Path\Settings\InputSettings.xml`

- **General Profile Configuration:**

`\Profile_Path\Settings\VBS4.USER.xml`

For more information about the parameters in the Profile configuration, see [VBS4 Profile Options \(on page 386\)](#).

4.1 Exporting / Importing Settings

You can export and import VBS4 Settings to an XML file. Use this feature to create saved Settings or for transfer between computers:

- [Export Settings \(below\)](#)
- [Import Settings \(on page 163\)](#)

4.1.1 Export Settings

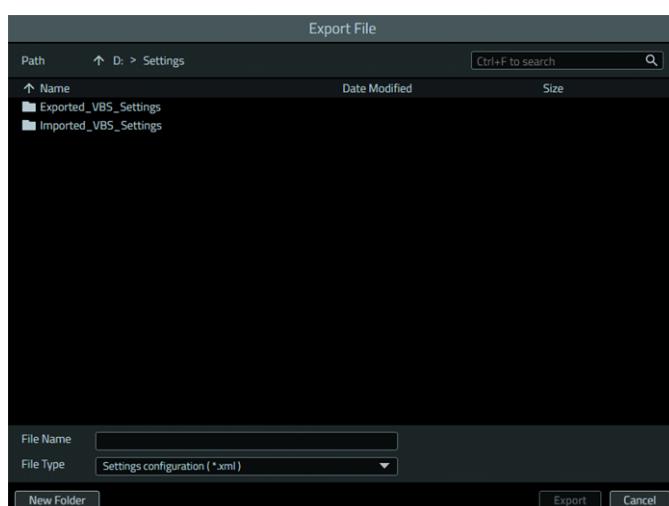
To export the Settings, click **Export**.

The Export Settings dialog opens.



Select the Setting Tab / Category you want to export, and click **Confirm**.

The Export File dialog opens.



NOTE

The default path for the Export File dialog is the Microsoft Windows \Documents\ folder.

Use the following dialog controls:

- In **Path**, enter the file path, where you want to save the exported Settings XML file.

Click the **Arrow** icon to go one level up in the file path structure.



- Use the Search bar to find a specific folder, where you want to save the exported Settings XML file, or an existing Settings XML file that you want to replace with the latest export data.



- To sort the folders and files according to their name / modification date / size, click the **Arrow** icon in the **Name**, **Date Modified**, and **Size** columns.



- In **File Name**, enter the file name for your exported Settings XML file.
- In **File Type**, select the file type for your exported Settings XML file.

NOTE

Bohemia Interactive Simulations recommends using the default Settings Configuration (XML) file type.

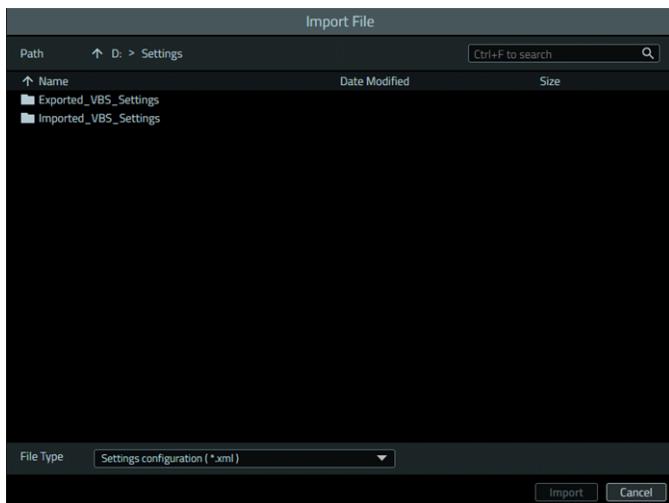
- Click **New Folder** to create a new folder, to save the exported Settings XML file in.
- Click **Export** to save the exported Settings XML file, or **Cancel** to cancel the export.

The Settings are exported to the XML file which can then be used to

4.1.2 Import Settings

To import the Settings, click **Import**.

The Import Settings dialog opens.



i NOTE

The default path for the Import File dialog is the Microsoft Windows `\Documents\` folder.

Use the following dialog controls:

- In **Path**, enter the file path of the imported Settings XML file.

Click the **Arrow** icon to go one level up in the file path structure.



- Use the Search bar to find a specific folder, or the Settings XML file that you want to import.



- To sort the folders and files according to their name / modification date / size, click the **Arrow** icon in the **Name**, **Date Modified**, and **Size** columns.



- In **File Type**, select the file type for your imported Settings XML file.

i NOTE

Bohemia Interactive Simulations recommends using the default Settings Configuration (XML) file type.

- Select the Settings XML file you want to import, then click **Import** to import it, or **Cancel** to cancel the import.

The Settings are imported.

 **WARNING**

Bohemia Interactive Simulations does not recommend modifying the Settings Configuration XML files directly. Instead, use the VBS4 Settings UI.

4.2 Video Settings

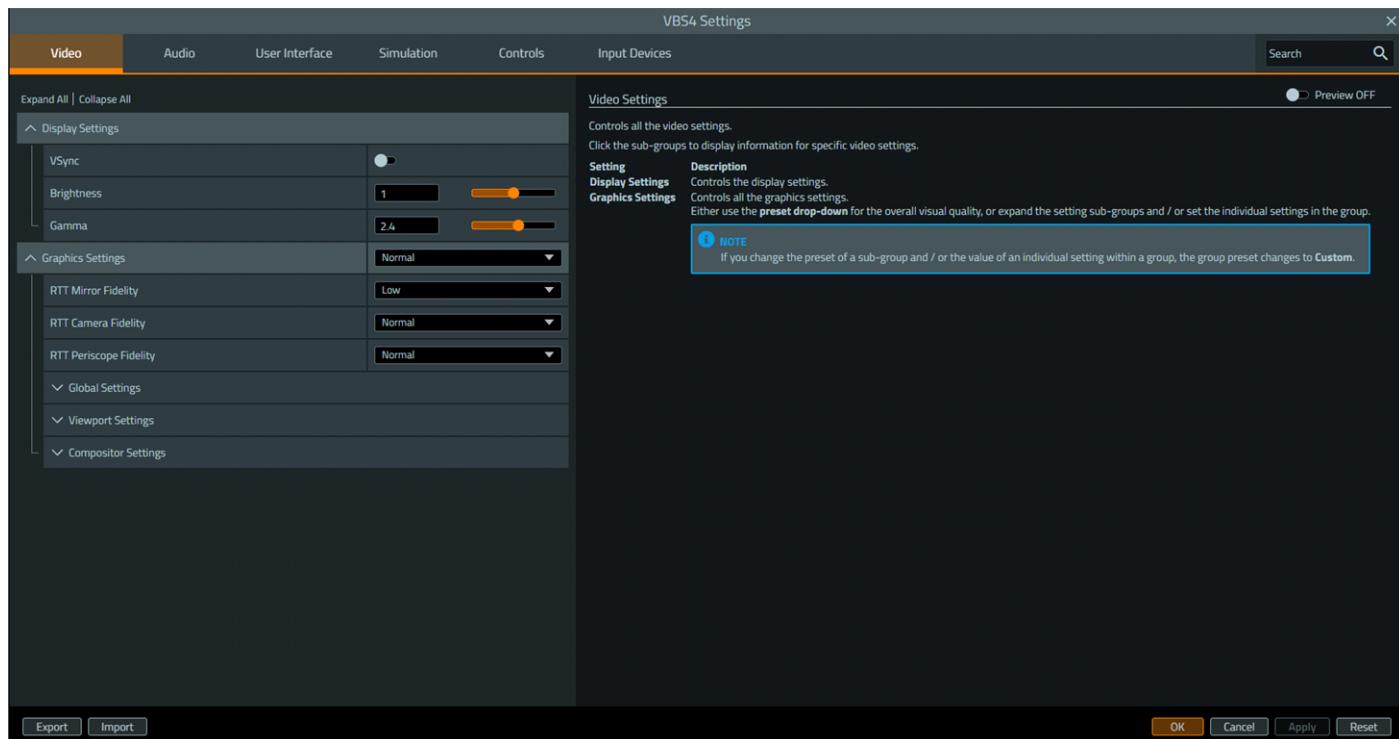
All users can manage their Video Settings from the VBS4 Settings panel.

For more detailed information on the Video Settings (such as performance impact and recommended values), see [Video Settings Explained \(on page 195\)](#).

In the VBS4 Toolbar, click the **Settings Icon**, and select the **Video Tab**.



The VBS4 Settings Panel displays the Video Settings.



WARNING

Changing the Video Settings resets any snow modifications. For more information, see Weather Settings in the VBS4 Editor Manual.

Follow these steps:

1. Expand the video setting categories and modify the required settings.

TIP

Click **Expand All / Collapse All** to expand / collapse the settings hierarchy.

2. Use Preview to view the effect of Video Settings.

Select **Preview ON** to hide the Video Settings Help and view a part of the scenery instead.

3. Click **Apply**.

VBS4 saves your Video Settings changes.

4. Click **OK**.

VBS4 updates and applies your Video Settings.

To restore VBS4 to its default settings, click **Reset**.

To export / import the settings, see [Exporting / Importing Settings \(on page 161\)](#).

NOTE

Video Settings are mainly stored in your VBS4 Profile in the following file:

- Default VBS4 Profile location:

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

- Other VBS4 Profile location:

`\Path\Settings\VideoSettings.xml`

`Path` is specified using the `-profiles=Path` command-line option - for more information, see [Command Line and Launcher Options \(on page 76\)](#).

For more information about the Video parameters in the Profile configuration, see [VBS4 Profile Options \(on page 386\)](#).

For more information on the Video Settings high-level categories, see:

- [Display Settings \(on the next page\)](#)
- [Graphics Settings \(on page 168\)](#)
 - [Global Settings \(on page 170\)](#)
 - [Viewport Settings \(on page 175\)](#)
 - [Compositor Settings \(on page 194\)](#)

4.2.1 Display Settings

Controls the display settings.

Setting	Description
VSync	Toggles the display vertical synchronization on / off. This option limits the frame rate to the refresh rate. <div style="border: 1px solid green; padding: 10px;">✓ TIP Enable this option to prevent screen tearing and lower power consumption.</div>
Brightness	Enter a value, use the up / down arrows in the number field, or the slider to set the brightness of the rendered scene.
Gamma	Enter a value, use the up / down arrows in the number field, or the slider to adjust gamma to reflect monitor capabilities. By default, the value is 2.4, which corresponds to a standard conversion to sRGB space. <div style="border: 1px solid blue; padding: 10px;">i NOTE This setting applies to the rendered scene, but not to the VBS4 UI (for example, menus).</div>

4.2.2 Graphics Settings

Controls all the graphics settings.

Setting	Description
Graphics Settings	<p>Overall graphics settings.</p> <p>For presets, either use the preset drop-down for the overall visual quality, or expand the setting sub-groups and / or set the individual settings in the group.</p> <p>NOTE If you change the preset of a sub-group and / or the value of an individual setting within a group, the group preset changes to Custom.</p> <p>Select from the following preset values:</p> <ul style="list-style-type: none">• Low - Overall low graphics settings.• Normal - Overall medium graphics settings.• High - Overall high graphics settings.• Custom - Overall custom graphics settings (cannot be selected directly). <p>NOTE Low and Normal Graphics Settings presets may produce visual defects on height changes in terrain deformation details, such as vehicle tracks in snow. Instead of using the High preset, you can increase the Terrain Vertex Count video setting to reduce these visual effects.</p>

Setting	Description
RTT Mirror Fidelity	<p>Render To Texture (RTT) level of detail for mirrors (such as vehicle rear-view mirrors). Use the drop-down to select from the following preset values:</p> <ul style="list-style-type: none">• Off - Objects are not reflected in mirrors.• Low - Low level of detail for objects reflected in mirrors.• Normal - Medium level of detail for objects reflected in mirrors.• High - High level of detail for objects reflected in mirrors.
	<div>NOTE</div> <p>RTT fidelity presets are based on other Video Settings. This means that if you use different Video Settings, using the same RTT fidelity preset may have different results.</p> <div>WARNING</div> <p>Lower values may cause some visual effects (such as smoke, explosion particles, and so on) and objects to not be reflected in mirror surfaces.</p> <div>NOTE</div> <p>RTT fidelity presets are based on other Video Settings. This means that if you use different Video Settings, using the same RTT fidelity preset may have different results.</p> <div>WARNING</div> <p>Lower values may cause some visual effects (such as smoke, explosion particles, and so on) and objects to not appear on camera displays, such as RWS (Remote Weapon System) displays.</p>

Setting	Description
RTT Periscope Fidelity	<p>Render To Texture (RTT) level of detail for periscopes.</p> <p>Use the drop-down to select from the following preset values:</p> <ul style="list-style-type: none">• Off - Periscopes do not display any objects.• Low - Periscopes display objects at a low level of detail.• Normal - Periscopes display objects at a medium level of detail.• High - Periscopes display objects at a high level of detail.
	NOTE
	<p>RTT fidelity presets are based on other Video Settings. This means that if you use different Video Settings, using the same RTT fidelity preset may have different results.</p>
	WARNING
	<p>Lower values may cause some visual effects (such as smoke, explosion particles, and so on) and objects to not appear on periscope displays, such as land-vehicle periscopes.</p>
Global Settings	Controls the global graphics settings. Click the sub-groups to display information for specific global graphics settings.
Viewport Settings	Controls the viewport graphics settings. Click the sub-groups to display information for specific viewport graphics settings.
Compositor Settings	Controls the compositor graphics settings. Click the sub-groups to display information for specific compositor graphics settings.

The **Graphics Settings** sub-groups are:

- [Global Settings \(below\)](#)
- [Viewport Settings \(on page 175\)](#)
- [Compositor Settings \(on page 194\)](#)

4.2.2.1 Global Settings

Controls the global graphics settings.

Click the sub-groups to display information for specific global graphics settings.

For presets, either use the **preset drop-down** for the overall visual quality, or expand the setting sub-groups and / or set the individual settings in the group.

NOTE

If you change the preset of a sub-group and / or the value of an individual setting within a group, the group preset changes to **Custom**.

Setting	Description
Render Detail	Overall global render detail preset.
Vegetation Detail	Overall global vegetation detail preset.
Particle Detail	Overall global particle detail preset.

The **Global Settings** sub-groups are:

- [Render Detail \(below\)](#)
- [Vegetation Detail \(on the next page\)](#)
- [Particle Detail \(on page 175\)](#)

4.2.2.1.1 Render Detail

Overall global render detail preset.

Setting	Description
Render Detail	Overall global render detail preset. For presets, either use the preset drop-down for the overall visual quality, or expand the setting sub-groups and / or set the individual settings in the group.
NOTE	
If you change the preset of a sub-group and / or the value of an individual setting within a group, the group preset changes to Custom .	
RTT Per Frame	Enter a value, use the up / down arrows in the number field, or the slider to select the number of render targets to update per frame on Render To Texture (RTT) surfaces.
HMD Render Scale	Enter a value, use the up / down arrows in the number field, or the slider to select a supersampling setting for HMDs. Applies on top of any supersampling configured in the HMD vendor settings (for example, Oculus pixel per display).

4.2.2.1.2 Vegetation Detail

Overall global vegetation detail preset.

For presets, either use the **preset drop-down** for the overall visual quality, or expand the setting sub-groups and / or set the individual settings in the group.

NOTE

If you change the preset of a sub-group and / or the value of an individual setting within a group, the group preset changes to **Custom**.

Setting	Description
Vegetation Detail	Overall global vegetation detail preset.
Tree Detail	Overall global tree detail preset.
Bush Detail	Overall global bush detail preset.
Grass Detail	Overall global grass detail preset.

The global **Vegetation Detail** sub-groups are:

- [Tree Detail \(on the next page\)](#)
- [Bush Detail \(on page 174\)](#)
- [Grass Detail \(on page 174\)](#)

4.2.2.1.2 Tree Detail

Overall global tree detail preset.

Setting	Description
Tree Detail	For presets, either use the preset drop-down for the overall visual quality, or expand the setting sub-groups and / or set the individual settings in the group. <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;">i NOTE<p>If you change the preset of a sub-group and / or the value of an individual setting within a group, the group preset changes to Custom.</p></div>
Tree Types Limit	Sets the limit for the amount of biome tree types per surface. Use the drop-down to select the following options: <ul style="list-style-type: none">• 1 (one type per surface)• 2 (two types per surface)• 3 (three types per surface)• 4 (four types per surface)• 5 (five types per surface)• Unlimited <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;">i NOTE<p>When set from Unlimited to 1, for example, there can still be some trees visible, as they are configured as bushes.</p></div>

4.2.2.1.2.2 Bush Detail

Overall global bush detail preset.

Setting	Description
Bush Detail	For presets, either use the preset drop-down for the overall visual quality, or expand the setting sub-groups and / or set the individual settings in the group.
Bush Types Limit	<p>Sets the limit for the amount of biome bush types per surface. Use the drop-down to select the following options:</p> <ul style="list-style-type: none">• 1 (one type per surface)• 2 (two types per surface)• 3 (three types per surface)• 4 (four types per surface)• 5 (five types per surface)• Unlimited

4.2.2.1.2.3 Grass Detail

Overall global grass detail preset.

Setting	Description
Grass Detail	For presets, either use the preset drop-down for the overall visual quality, or expand the setting sub-groups and / or set the individual settings in the group.
Grass Types Limit	<p>Sets the limit for the amount of biome grass types per surface. Use the drop-down to select the following options:</p> <ul style="list-style-type: none">• 1 (one type per surface)• 2 (two types per surface)• 3 (three types per surface)• 4 (four types per surface)• 5 (five types per surface)• Unlimited

4.2.2.1.3 Particle Detail

Overall global particle detail preset.

Setting	Description
Particle Detail	<p>Overall global particle detail preset.</p> <p>For presets, either use the preset drop-down for the overall visual quality, or expand the setting sub-groups and / or set the individual settings in the group.</p> <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><p>NOTE</p><p>If you change the preset of a sub-group and / or the value of an individual setting within a group, the group preset changes to Custom.</p></div>
Particle Count Limit	<p>Enter a value, use the up / down arrows in the number field, or the slider to set the particle count limit.</p> <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><p>NOTE</p><p>The number of simulated particles in the scene is limited by this number.</p></div>

4.2.2.2 Viewport Settings

Controls the viewport graphics settings.

Click the sub-groups to display information for specific viewport graphics settings.

For presets, either use the **preset drop-down** for the overall visual quality, or expand the setting sub-groups and / or set the individual settings in the group.

NOTE	
If you change the preset of a sub-group and / or the value of an individual setting within a group, the group preset changes to Custom .	

Setting	Description
Render Detail	Overall viewport render detail preset.
Shadow Detail	Overall viewport shadow detail preset.
Terrain Detail	Overall viewport terrain detail preset.
Vegetation Detail	Overall viewport vegetation detail preset.
Object Detail	Overall viewport object detail preset.

Setting	Description
Particle Detail	Overall viewport particle detail preset.
Light Detail	Overall viewport light detail preset.
Post-Process Effects	Overall viewport post-process effects quality preset.
Draw Features	Controls the viewport draw-features quality. Click the sub-groups to display information for specific viewport draw-features settings.

The **Viewport Settings** sub-groups are:

- [Render Detail \(below\)](#)
- [Shadow Detail \(on page 179\)](#)
- [Terrain Detail \(on page 180\)](#)
- [Vegetation Detail \(on page 181\)](#)
- [Object Detail \(on page 186\)](#)
- [Particle Detail \(on page 190\)](#)
- [Light Detail \(on page 191\)](#)
- [Post-Process Effects \(on page 192\)](#)
- [Draw Features \(on page 193\)](#)

4.2.2.2.1 Render Detail

Overall viewport render detail preset.

Setting	Description
Render Detail	Overall viewport render detail preset. For presets, either use the preset drop-down for the overall visual quality, or expand the setting sub-groups and / or set the individual settings in the group.

NOTE

If you change the preset of a sub-group and / or the value of an individual setting within a group, the group preset changes to **Custom**.

Setting	Description
DLSS	<p>Deep Learning Super Sampling (DLSS) is an up-scaling method capable of rendering smooth anti-aliased images with significant performance boost.</p> <p>Use the drop-down to select from the following options:</p> <ul style="list-style-type: none">• Disabled - DLSS is disabled.• Ultra-Performance - Ultra performance boost with low visual quality.• Performance - Very high performance boost with medium visual quality.• Balanced - High performance boost with high visual quality.• Quality - Medium performance boost with very high visual quality.• Ultra-Quality - Low performance boost with ultra visual quality.
Render Resolution	<p>Enter a value, use the up / down arrows in the number field, or the slider to select a render resolution for the current view.</p> <p>If set higher than 100%, VBS4 supersamples the image to achieve higher resolution quality, but this may also impact performance.</p> <p>If set lower than 100%, VBS4 downsamples the image which can achieve higher performance, but this may also produce a blurry image.</p>

⚠️ WARNING

There are several available drivers, which are supported and required for DLSS to work. However, be aware that some drivers can be locked from updating and you may require a newer version than the one you have installed. In addition, a GPU is required which supports DLSS technology (currently only NVIDIA RTX GPUs).

For more information, see: <https://www.nvidia.com/en-gb/geforce/technologies/dlss/>

⚠️ WARNING

If VBS4 runs in window mode in a multi-display setup, dragging the VBS4 window to a display that has a different resolution requires a VBS4 restart for the resolution changes to take effect.

Setting	Description
MSAA	<p>Use the drop-down to select the level of Multi-Sample Anti-Aliasing (MSAA) used in the scene. Select a higher value to reduce the jagged edges of the geometry.</p> <p>Use the drop-down to select from the following options:</p> <ul style="list-style-type: none">• Disabled• 2x MSAA• 4x MSAA• 8x MSAA
	<div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><p>NOTE</p><p>Higher values affect performance and video memory.</p></div>
Transparency Render Scale	<p>Enter a value, use the up / down arrows in the number field, or the slider to adjust the resolution of transparent objects in the exterior scene.</p>
	<div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><p>NOTE</p><p>Lower numbers result in more blurred transparent objects, but faster rendering.</p></div>
Transparency Method	<p>Use the drop-down to select the Transparency Method you want to use. The options are:</p> <ul style="list-style-type: none">• Simple - Renders transparent exterior objects in lower resolution.• MultiResolution - Combines low and full resolution rendering.• MultiDistance - Only applies the Transparency Method to transparent objects up to 40m from the camera. Transparent objects farther away from the camera are rendered in full resolution.
Multi-Projection Technology	<p>Use the drop-down to select the Multi-Projection Technology you want to use. The options are:</p> <ul style="list-style-type: none">• None• SPS - Single Pass Stereo.• MVR / SPS - Multi-View Rendering (MVR) with fallback to Single Pass Stereo (SPS).
Anisotropy Quality	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the level of anisotropic filtering used in the scene. This improves the detail of textures, when viewed at sharp angles.</p>

4.2.2.2 Shadow Detail

Overall viewport shadow detail preset.

Setting	Description
Shadow Detail	<p>Overall viewport shadow detail preset.</p> <p>For presets, either use the preset drop-down for the overall visual quality, or expand the setting sub-groups and / or set the individual settings in the group.</p>
	<div style="border: 1px solid #0070C0; padding: 10px; border-radius: 10px;"><p>NOTE</p><p>If you change the preset of a sub-group and / or the value of an individual setting within a group, the group preset changes to Custom.</p></div>
Biome Shadows	Toggle to enable / disabled shadows cast by biome vegetation.
Exterior Shadow Cascades	Enter a value, use the up / down arrows in the number field, or the slider to specify the number of exterior shadow maps covering the view. The more cascades (the higher the number), the higher the shadow quality.
Interior Shadow Cascades	Enter a value, use the up / down arrows in the number field, or the slider to specify the number of interior shadow maps covering the view. The more cascades (the higher the number), the higher the shadow quality.
Shadow Quality	Enter a value, use the up / down arrows in the number field, or the slider to specify the shadow map resolution: <ul style="list-style-type: none">• 0 - Disabled• 1 - Low• 2 - Good• 3 - Ultra
Exterior Shadow Draw Distance	Enter a value, use the up / down arrows in the number field, or the slider to set the distance in meters at which shadows are rendered.

4.2.2.2.3 Terrain Detail

Overall viewport terrain detail preset.

Setting	Description
Terrain Detail	<p>Overall viewport terrain detail preset.</p> <p>For presets, either use the preset drop-down for the overall visual quality, or expand the setting sub-groups and / or set the individual settings in the group.</p>
	<div style="border: 1px solid #0070C0; padding: 10px; border-radius: 10px;"><p>NOTE</p><p>If you change the preset of a sub-group and / or the value of an individual setting within a group, the group preset changes to Custom.</p></div>
Segment Subdivision Depth	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the terrain segment subdivision depth.</p>
	<div style="border: 1px solid #0070C0; padding: 10px; border-radius: 10px;"><p>NOTE</p><p>Settings below 13 contain no road or vegetation data.</p></div>
	<p>Recommended settings: 19 - 23.</p>
Terrain Vertex Count	<p>Use the drop-down to select the terrain segment resolution.</p> <p>The higher the value, the more detailed the terrain is.</p>
	<p>Recommended setting: 65</p>
Terrain Detail	<p>Enter a value, use the up / down arrows in the number field, or the slider to adjust the draw distance (in meters) of the terrain.</p> <p>The value is the distance up to which a segment with one-meter size is split into smaller segments when the camera field of view is 90 degrees.</p> <p>Segments with k-meter size are split up to k-times greater distance.</p>
Water Reflections	<p>Toggles the reflections of objects and terrain on the water.</p>
Preload Distance	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the maximum pre-loading distance around the camera. Set at 0 for FOV < 52.21°.</p>
	<div style="border: 1px solid #0070C0; padding: 10px; border-radius: 10px;"><p>NOTE</p><p>Pre-loading is limited to loading one more detail level than is currently visible.</p></div>

Setting	Description
Preload FOV Multiplier	Enter a value, use the up / down arrows in the number field, or the slider to specify the maximum terrain pre-loading distance around the camera frustum. A value of 1 disables pre-loading.

**NOTE**

Standard scene subdivision still applies, so that setting extreme values does not preload into infinity.

4.2.2.2.4 Vegetation Detail

Overall viewport vegetation detail preset.

For presets, either use the **preset drop-down** for the overall visual quality, or expand the setting sub-groups and / or set the individual settings in the group.

**NOTE**

If you change the preset of a sub-group and / or the value of an individual setting within a group, the group preset changes to **Custom**.

Setting	Description
Vegetation Detail	Overall viewport vegetation detail preset.
3D Trees and Bushes	Toggle to enable / disable 3D trees and bushes.
Tree Detail	Overall viewport tree detail preset.
Bush Detail	Overall viewport bush detail preset.
Grass Detail	Overall viewport grass detail preset.

The viewport **Vegetation Detail** sub-groups are:

- [Tree Detail \(on the next page\)](#)
- [Bush Detail \(on page 184\)](#)
- [Grass Detail \(on page 185\)](#)

4.2.2.2.4.1 Tree Detail

Overall viewport tree detail preset.

Setting	Description
Tree Detail	<p>Overall viewport tree detail preset.</p> <p>For presets, either use the preset drop-down for the overall visual quality, or expand the setting sub-groups and / or set the individual settings in the group.</p>
	<div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><p>NOTE</p><p>If you change the preset of a sub-group and / or the value of an individual setting within a group, the group preset changes to Custom.</p></div>
Tree Texture Resolution Limit	<p>Use the drop-down to limit the best loaded texture resolution for biome trees. The total surface area is considered, which means that a 2048 x 512 texture is equivalent to a 1024 x 1024 texture.</p> <p>The maximum tree texture resolution can be:</p> <ul style="list-style-type: none">• 1/4k (256x256)• 1/2k (512x512)• 1k (1024x1024)• 2k (2048x2048)• Unlimited
	<div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><p>NOTE</p><p>The recommended value is Unlimited for graphics cards with >= 4 GB VRAM, or 2k (2048x2048) in more restricted memory conditions.</p></div>
Streamed Tree Draw Distance	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the maximum draw distance (in meters) of streamed tree objects.</p> <p>These are objects that are embedded in the terrain database.</p> <p>The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees.</p>
Tree Draw Distance	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the draw distance (in meters) of tree objects.</p> <p>These are objects, such as runtime created trees.</p> <p>The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees.</p>

Setting	Description
Tree Detail	<p>Enter a value, use the up / down arrows in the number field, or the slider to adjust the tree detail.</p> <p>The higher the value, the better the LODs of biome and placed trees used, when positioned close to the camera. Increasing the value results in higher-quality objects at further distances.</p>
Biome Tree Fidelity	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the density of biome trees.</p> <p>Lower values mean lower density with distance.</p>
Biome Tree Draw Distance	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the maximum draw distance (in meters) of trees.</p> <p>The value is the distance at which trees disappear when the camera field of view is 90 degrees.</p>

4.2.2.2.4.2 Bush Detail

Overall viewport bush detail preset.

Setting	Description
Bush Detail	<p>Overall viewport bush detail preset.</p> <p>For presets, either use the preset drop-down for the overall visual quality, or expand the setting sub-groups and / or set the individual settings in the group.</p>
	<div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><p>NOTE</p><p>If you change the preset of a sub-group and / or the value of an individual setting within a group, the group preset changes to Custom.</p></div>
Bush Texture Resolution Limit	<p>Use the drop-down to limit the best loaded texture resolution for biome bushes. The total surface area is considered, which means that a 2048 x 512 texture is equivalent to a 1024 x 1024 texture.</p> <p>The maximum bush texture resolution can be:</p> <ul style="list-style-type: none">• 1/4k (256x256)• 1/2k (512x512)• 1k (1024x1024)• 2k (2048x2048)• Unlimited
	<div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><p>NOTE</p><p>The recommended value is Unlimited for graphics cards with >= 4 GB VRAM, or 2k (2048x2048) in more restricted memory conditions.</p></div>
Bush Detail	<p>Enter a value, use the up / down arrows in the number field, or the slider to adjust the bush detail.</p> <p>The higher the value, the better the LODs of biome bushes used, when positioned close to the camera. Increasing the value results in higher-quality objects at further distances.</p>
Biome Bush Fidelity	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the density of biome bushes.</p> <p>Lower values mean lower density with distance.</p>
Biome Bush Draw Distance	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the maximum draw distance (in meters) of bushes.</p> <p>The value is the distance at which bushes disappear when the camera field of view is 90 degrees.</p>

4.2.2.2.4.3 Grass Detail

Overall viewport grass detail preset.

Setting	Description
Grass Detail	<p>Overall viewport grass detail preset.</p> <p>For presets, either use the preset drop-down for the overall visual quality, or expand the setting sub-groups and / or set the individual settings in the group.</p> <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><p>NOTE</p><p>If you change the preset of a sub-group and / or the value of an individual setting within a group, the group preset changes to Custom.</p></div>
Grass Texture Resolution Limit	<p>Use the drop-down to limit the best loaded texture resolution for biome grass. The total surface area is considered, which means that a 2048 x 512 texture is equivalent to a 1024 x 1024 texture.</p> <p>The maximum grass texture resolution can be:</p> <ul style="list-style-type: none">• 1/4k (256x256)• 1/2k (512x512)• 1k (1024x1024)• 2k (2048x2048)• Unlimited <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><p>NOTE</p><p>The recommended value is Unlimited for graphics cards with >= 4 GB VRAM, or 2k (2048x2048) in more restricted memory conditions.</p></div>
Grass Detail	<p>Enter a value, use the up / down arrows in the number field, or the slider to adjust the grass detail.</p> <p>The higher the value, the better the LODs of biome grass used, when positioned close to the camera. Increasing the value results in higher-quality objects at further distances.</p>
Biome Grass Fidelity	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the density of biome grass.</p> <p>Lower values mean lower density with distance.</p>
Biome Grass Draw Distance	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the maximum draw distance (in meters) of grass.</p> <p>The value is the distance at which grass disappears when the camera field of view is 90 degrees.</p>

4.2.2.2.5 Object Detail

Overall viewport object detail preset.

Setting	Description
Object Detail	<p>Overall viewport object detail preset.</p> <p>For presets, either use the preset drop-down for the overall visual quality, or expand the setting sub-groups and / or set the individual settings in the group.</p> <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><p>NOTE</p><p>If you change the preset of a sub-group and / or the value of an individual setting within a group, the group preset changes to Custom.</p></div>
Exterior Object Texture Resolution Limit	<p>Use the drop-down to limit the best loaded texture resolution for exterior objects. The total surface area is considered, which means that a 2048 x 512 texture is equivalent to a 1024 x 1024 texture.</p> <p>The maximum exterior-object texture resolution can be:</p> <ul style="list-style-type: none">• 1/4k (256x256)• 1/2k (512x512)• 1k (1024x1024)• 2k (2048x2048)• Unlimited <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><p>NOTE</p><p>The recommended value is Unlimited for graphics cards with >= 4 GB VRAM, or 2k (2048x2048) in more restricted memory conditions.</p></div>
Interior Object Texture Resolution Limit	<p>Use the drop-down to limit the best loaded texture resolution for interior objects. The total surface area is considered, which means that a 2048 x 512 texture is equivalent to a 1024 x 1024 texture.</p> <p>The maximum interior-object texture resolution can be:</p> <ul style="list-style-type: none">• 1/4k (256x256)• 1/2k (512x512)• 1k (1024x1024)• 2k (2048x2048)• Unlimited <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><p>NOTE</p><p>The recommended value is Unlimited for graphics cards with >= 4 GB VRAM, or 2k (2048x2048) in more restricted memory conditions.</p></div>

Setting	Description
Transparency Detail	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the distance (in meters) at which the VBS4 engine stops handling objects with transparency accurately, and starts using approximation methods.</p> <p>The smaller the value, the better the performance.</p> <p>The value is the distance at which objects with one-meter radius are handled differently by the VBS4 engine, when the camera field of view is 90 degrees.</p>
Streamed Static Draw Distance	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the maximum draw distance (in meters) of streamed static objects.</p> <p>These are objects that are embedded in the terrain database.</p> <p>The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees.</p>
Static Draw Distance	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the maximum draw distance (in meters) of static objects.</p> <p>These are objects such as runtime created buildings.</p> <p>The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees.</p>
Land Draw Distance	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the maximum draw distance (in meters) of land objects.</p> <p>These are objects such as runtime created ground vehicles and lifeforms.</p> <p>The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees.</p>
Water Draw Distance	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the maximum draw distance (in meters) of water objects.</p> <p>These are objects such as runtime created water vehicles.</p> <p>The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees.</p>
Air Draw Distance	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the maximum draw distance (in meters) of air objects.</p> <p>These are objects such as runtime created aircraft.</p> <p>The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees.</p>
Streamed Wind Emitter Draw Distance	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the maximum draw distance (in meters) of streamed wind emitter objects.</p> <p>These are objects such as runtime created force emitters.</p> <p>The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees.</p>

Setting	Description
Wind Emitter Draw Distance	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the maximum draw distance (in meters) of wind emitter objects.</p> <p>These are objects such as runtime created wind emitters.</p> <p>The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees.</p>
Streamed Force Emitter Draw Distance	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the maximum draw distance (in meters) of streamed force emitter objects.</p> <p>These are force emitters that are embedded in the terrain database.</p> <p>The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees.</p>
Force Emitter Draw Distance	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the maximum draw distance (in meters) of force emitter objects.</p> <p>These are objects such as runtime created wind emitters.</p> <p>The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees.</p>
Streamed Damage Area Draw Distance	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the maximum draw distance (in meters) of streamed damage areas objects.</p> <p>These are damage areas that are embedded in the terrain database.</p> <p>The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees.</p>
Damage Area Draw Distance	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the maximum draw distance (in meters) of dedicated damage area objects.</p> <p>These are objects such as runtime created damage areas.</p> <p>The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees.</p>
Streamed Static Fidelity	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the quality of LODs to use for objects that are embedded in the terrain database.</p> <p>The higher the value, the better the LODs used when close to the camera. This results in higher quality objects at further distances.</p>
Static Fidelity	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the quality of LODs to use for objects, such as runtime created buildings.</p> <p>The higher the value, the better the LODs used when close to the camera. This results in higher quality objects at further distances.</p>

Setting	Description
Land Fidelity	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the quality of LODs to use for objects, such as runtime created ground vehicles and lifeforms.</p> <p>The higher the value, the better the LODs used when close to the camera. This results in higher quality objects at further distances.</p>
Water Fidelity	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the quality of LODs to use for objects, such as runtime created water vehicles.</p> <p>The higher the value, the better the LODs used when close to the camera. This results in higher quality objects at further distances.</p>
Air Fidelity	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the quality of LODs to use for objects such as runtime created aircraft.</p> <p>The higher the value, the better the LODs used when close to the camera. This results in higher quality objects at further distances.</p>
Air Dot Size	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the dot size for sub-pixel rendering for air objects (mainly, aircraft, but also applies to tracer ammunition, for example), which allows you to visually enhance air-object visibility at larger distance, when a lower screen resolution is used.</p> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p>NOTE</p> <p>The following considerations apply:</p> <ul style="list-style-type: none"> The color of the dot representing the air object is gray and cannot be modified. The dot transparency changes, based on the air-object distance. The dot visibility depends on Air Draw Distance. </div>
Point Cloud Detail	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the maximum draw distance (in meters) of point cloud data.</p> <p>The value is the distance up to which a segment with one-meter size is split into smaller segments when the camera field of view is 90 degrees.</p> <p>Segments with k-meter size are split up to k-times greater distance.</p>
Cloud Detail	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the maximum draw distance (in meters) of clouds.</p> <p>The value is the distance up to which a segment with one-meter size is split into smaller segments when the camera field of view is 90 degrees.</p> <p>Segments with k-meter size are split up to k-times greater distance.</p>
High Detail Volumetric Clouds	<p>Toggle to enable / disable high-detail volumetric clouds.</p>

Setting	Description
Volumetric Clouds Reprojection Quality	Use the drop-down to specify the reprojection (reflection) quality for volumetric clouds. The options are: <ul style="list-style-type: none"> • Automatic • Normal • High
Building Detail	Enter a value, use the up / down arrows in the number field, or the slider to specify the maximum draw distance (in meters) of the geometry layer (buildings per segment). The value is the distance up to which a segment with one-meter size is split into smaller segments when the camera field of view is 90 degrees. Segments with k-meter size are split up to k-times greater distance.

4.2.2.2.6 Particle Detail

Overall viewport particle detail preset.

Setting	Description
Particle Detail	Overall viewport particle detail preset. For presets, either use the preset drop-down for the overall visual quality, or expand the setting sub-groups and / or set the individual settings in the group.
	<p>NOTE</p> <p>If you change the preset of a sub-group and / or the value of an individual setting within a group, the group preset changes to Custom.</p>
Particle Effect Fidelity	Enter a value, use the up / down arrows in the number field, or the slider to specify the quality of particles in the scene. The lower the value, the better particle LODs are selected, when positioned closer to the camera.
Particle Effect Detail	Enter a value, use the up / down arrows in the number field, or the slider to set the particle count limit.
	<p>NOTE</p> <p>The number of simulated particles in the scene is limited by this number.</p>
Particle Draw Distance	Enter a value, use the up / down arrows in the number field, or the slider to specify the maximum distance at which particles are drawn.

4.2.2.7 Light Detail

Overall viewport light detail preset.

Setting	Description
Light Detail	<p>Overall viewport light detail preset.</p> <p>For presets, either use the preset drop-down for the overall visual quality, or expand the setting sub-groups and / or set the individual settings in the group.</p>
	<div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><p>NOTE</p><p>If you change the preset of a sub-group and / or the value of an individual setting within a group, the group preset changes to Custom.</p></div>
Streamed Light Draw Distance	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the maximum draw distance (in meters) of streamed light objects.</p> <p>These are lights that are embedded in the terrain database and the value can be understood as the lightmap transition distance.</p> <p>The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees.</p>
Light Draw Distance	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the maximum draw distance (in meters) of light objects.</p> <p>These are objects such as runtime created lights.</p> <p>The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees.</p>
Streamed Emissive Plane Draw Distance	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the maximum draw distance (in meters) of streamed emissive planes of light reflectors.</p> <p>The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees.</p>
Emissive Plane Draw Distance	<p>Enter a value, use the up / down arrows in the number field, or the slider to specify the maximum draw distance (in meters) of dynamic emissive planes of light reflectors.</p> <p>The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees.</p>

4.2.2.2.8 Post-Process Effects

Overall viewport post-process effects quality preset.

Setting	Description
Post-Process Effects	<p>Overall viewport post-process effects quality preset. For presets, either use the preset drop-down for the overall visual quality, or expand the setting sub-groups and / or set the individual settings in the group.</p> <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><p>NOTE If you change the preset of a sub-group and / or the value of an individual setting within a group, the group preset changes to Custom.</p></div>
Ambient Occlusion	<p>Activates the ambient occlusion, which improves the visual quality of lighting, and shadows on objects. Can be:</p> <ul style="list-style-type: none">• Disabled• SSAO (Screen Space Ambient Occlusion)• HBAO (Horizon Based Ambient Occlusion)
Motion Blur	Toggles the motion blur in the scene (for example, during fast movement of objects).

4.2.2.2.9 Draw Features

Controls the viewport draw-features quality.

Click the sub-groups to display information for specific viewport draw-features settings.

Setting	Description
Draw Features	Expand the setting group to set the individual settings.
Sky	Toggle to enable / disable the presence of the sky and atmosphere.
Sun	Toggle to enable / disable the presence of the Sun.
Moon	Toggle to enable / disable the presence of the Moon.
Stars	Toggle to enable / disable the presence of the stars.
Ground	Toggle to enable / disable the presence of the ground surface.
Water	Toggle to enable / disable the presence of water surfaces.
Biome Trees	Toggle to enable / disable the presence of biome trees.
Biome Bushes	Toggle to enable / disable the presence of biome bushes.
Biome Grass	Toggle to enable / disable the presence of biome grass.
Geometry	Toggle to enable / disable the presence of procedural geometry (such as in extruded buildings).
Point Clouds	Toggle to enable / disable the presence of point-cloud objects.
Objects	Toggle to enable / disable the presence of streamed and dynamic objects, such as lifeforms and platforms.
Lights	Toggle to enable / disable the presence of lights.
Particles	Toggle to enable / disable the presence of particles (such as from explosions).
Clouds	Toggle to enable / disable the presence of clouds.
Precipitation	Toggle to enable / disable the presence of precipitation effects.

4.2.2.3 Compositor Settings

Controls the compositor graphics settings.

Click the sub-groups to display information for specific compositor graphics settings.

Setting	Description
Post-Process Effects	Controls the compositor post-process effects quality. Click the sub-groups to display information for specific compositor post-process effects settings.

The **Compositor Settings** sub-groups are:

- [Post-Process Effects \(below\)](#)

4.2.2.3.1 Post-Process Effects

Controls the compositor post-process effects quality.

Click the sub-groups to display information for specific compositor post-process effects settings.

Setting	Description
Post-Process Effects	Expand the setting group to set the individual settings.
Bloom Spread Level	Enter a value, use the up / down arrows in the number field, or the slider to specify the size of the bloom effect (halo / flare around strong light sources).
Bloom Strength	Enter a value, use the up / down arrows in the number field, or the slider to specify the bloom effect intensity.
Lens Effects Strength	Enter a value, use the up / down arrows in the number field, or the slider to specify the intensity of dirt and light reflection in lens systems, such as cameras. Affected by Bloom Spread Level .
Sharpening Strength	Enter a value, use the up / down arrows in the number field, or the slider to specify the image sharpening strength applied to the 3D View.

4.2.3 Video Settings Explained

This topic contains a more detailed description of the VBS4 [Video Settings \(on page 165\)](#), focusing on visual differences, performance impact, and recommended values.

Performance is classified using the following attributes:

- **FPS** - Frames Per Second (FPS).
- **System Memory** - Mainly Random Access Memory (RAM), and rarely disk space (in cases when the amount of RAM is insufficient).
- **Video Memory** - Graphics Processing Unit (GPU) memory.
- **Load Time** - VBS4 load time.

NOTE

The [Display Settings \(on the next page\)](#) recommended values are given a specific range, while the [Graphics Settings \(on page 197\)](#) recommended values are based on the Graphics Settings preset being set to **Normal**. Also, this preset is used as the baseline for the illustrations of the other presets.

The Video Settings have the following high-level categories:

- [Display Settings \(on the next page\)](#)
- [Graphics Settings \(on page 197\)](#)
 - [RTT Mirror Fidelity \(on page 198\)](#)
 - [RTT Camera Fidelity \(on page 198\)](#)
 - [RTT Periscope Fidelity \(on page 199\)](#)
 - [Global Settings \(on page 199\)](#)
 - [Viewport Settings \(on page 205\)](#)
 - [Compositor Settings \(on page 234\)](#)

4.2.3.1 Display Settings

The Display Settings control the general display settings.

Performance: high FPS impact.

4.2.3.1.1 VSync

Controls the display vertical synchronization. VSync limits the frame rate to the refresh rate, and may drastically reduce FPS. However, it is recommended to have VSync enabled to prevent screen tearing.

Performance: high FPS impact.

4.2.3.1.2 Brightness

Controls the display brightness.

Performance: no performance impact.

Recommended Value: 0.5 - 1.5.

4.2.3.1.3 Gamma

Controls the exponent of the output image gamma correction. For example, a value of 2.4 corresponds to sRGB gamma correction.

Performance: no performance impact.

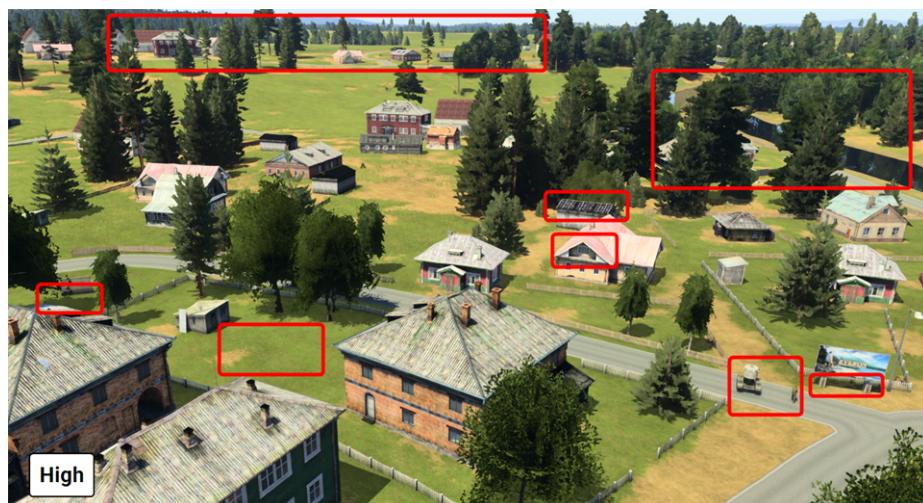
Recommended Value: 1 - 3.5.

4.2.3.2 Graphics Settings

The Graphics Settings control the Render To Texture (RTT) Settings and the Global, Viewport, and Compositor Settings.

Performance: high FPS impact, high Video Memory impact, high System Memory impact, high Load Time impact.

Recommended Value: Normal preset.



The Graphics Settings have the following high-level categories:

- [RTT Mirror Fidelity \(on the next page\)](#)
- [RTT Camera Fidelity \(on the next page\)](#)
- [RTT Periscope Fidelity \(on page 199\)](#)
- [Global Settings \(on page 199\)](#)
- [Viewport Settings \(on page 205\)](#)
- [Compositor Settings \(on page 234\)](#)

4.2.3.2.1 RTT Mirror Fidelity

Controls the visual fidelity of mirror surfaces, such as rear-view / side mirrors in vehicles.

NOTE

RTT fidelity presets are based on other Video Settings. This means that if you use different Video Settings, using the same RTT fidelity preset may have different results.

WARNING

Lower values may cause some visual effects (such as smoke, explosion particles, and so on) and objects to not be reflected in mirror surfaces.

Performance: high FPS impact, high Video Memory impact, high System Memory impact, high Load Time impact.

Recommended Value: Low.

4.2.3.2.2 RTT Camera Fidelity

Controls the visual fidelity of camera views, such as monitors in vehicles like the Interrogator Arm (IA) camera on the Husky T-MDV.

NOTE

RTT fidelity presets are based on other Video Settings. This means that if you use different Video Settings, using the same RTT fidelity preset may have different results.

WARNING

Lower values may cause some visual effects (such as smoke, explosion particles, and so on) and objects to not appear on camera displays, such as RWS (Remote Weapon System) displays.

Performance: high FPS impact, high Video Memory impact, high System Memory impact, high Load Time impact.

Recommended Value: Normal.

4.2.3.2.3 RTT Periscope Fidelity

Controls the visual fidelity periscope views, where periscopes are used (such as in vehicles).

 **NOTE**

RTT fidelity presets are based on other Video Settings. This means that if you use different Video Settings, using the same RTT fidelity preset may have different results.

 **WARNING**

Lower values may cause some visual effects (such as smoke, explosion particles, and so on) and objects to not appear on periscope displays, such as land-vehicle periscopes.

Performance: high FPS impact, high Video Memory impact, high System Memory impact, high Load Time impact.

Recommended Value: Normal.

4.2.3.2.4 Global Settings

The Global Settings control the global graphics settings.

Performance: high FPS impact, high Video Memory impact, medium Load Time impact.

The Global Settings have the following high-level categories:

- [Render Detail \(below\)](#)
- [Vegetation Detail \(on the next page\)](#)
- [Particle Detail \(on page 204\)](#)

4.2.3.2.4.1 Render Detail

Controls the overall global render detail preset.

Performance: high FPS impact, medium Video Memory impact.

Recommended Value: Low preset.

Render Detail has the following settings:

- [RTT Per Frame \(on the next page\)](#)
- [HMD Render Scale \(on the next page\)](#)

RTT Per Frame

Controls how many dynamic Render To Texture (RTT) resources are rendered in one frame.

Performance: high FPS impact.

Recommended Value: 1.

HMD Render Scale

Controls the supersampling for Head-Mounted Displays (HMDs). Applied on top of any supersampling configured in the HMD vendor settings (for example, pixels per display on Oculus HMDs).

Performance: high FPS impact, medium Video Memory impact.

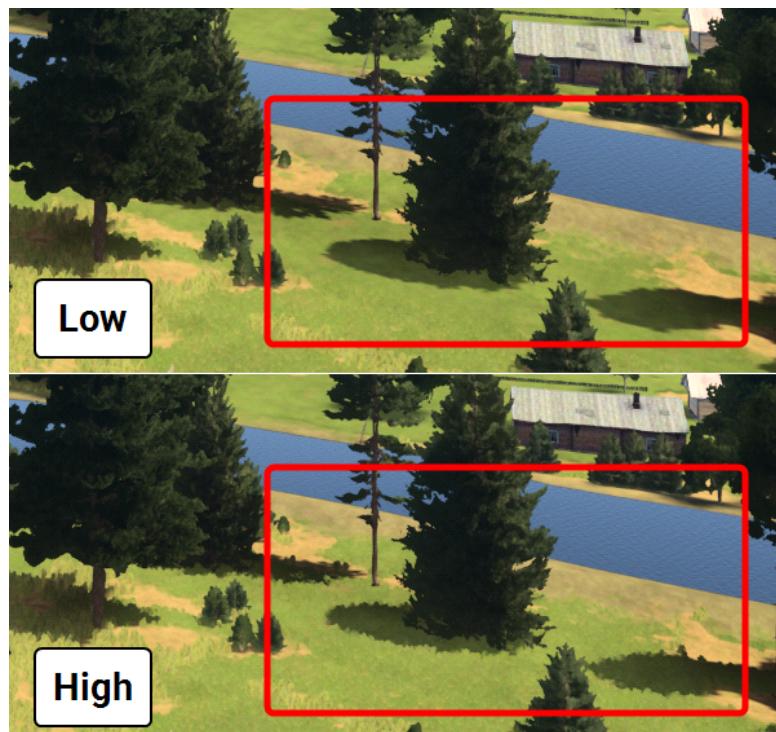
Recommended Value: 100.

4.2.3.2.4.2 Vegetation Detail

Controls the overall global vegetation detail preset.

Performance: medium FPS impact, high Video Memory impact, medium Load Time impact.

Recommended Value: Normal preset.



Vegetation Detail has the following high-level categories:

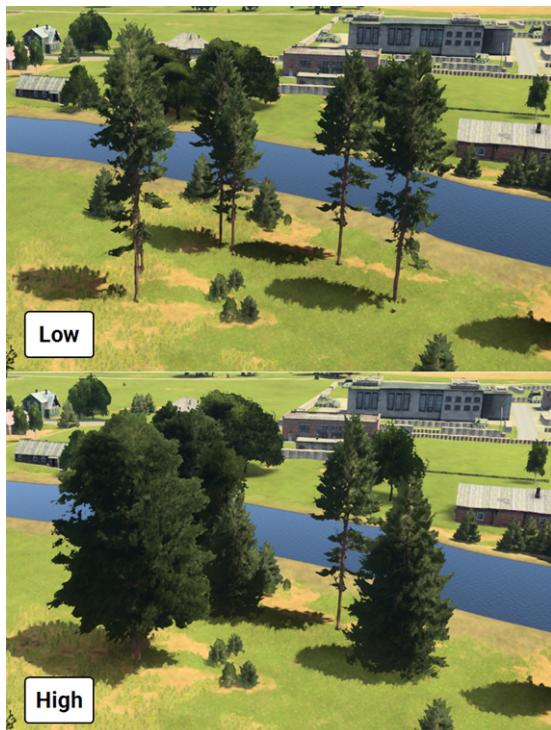
- Tree Detail (on the next page)

4.2.3.2.5 Tree Detail

Controls the overall global vegetation detail preset.

Performance: medium FPS impact, high Video Memory impact, medium Load Time impact.

Recommended Value: Normal preset.



Tree Detail has the following settings:

- [Tree Types Limit \(below\)](#)

Tree Types Limit

Controls how many tree types per surface are going to be in the scene. The fewer the types, the better the performance.

Performance: medium FPS impact, high Video Memory impact, medium Load Time impact.

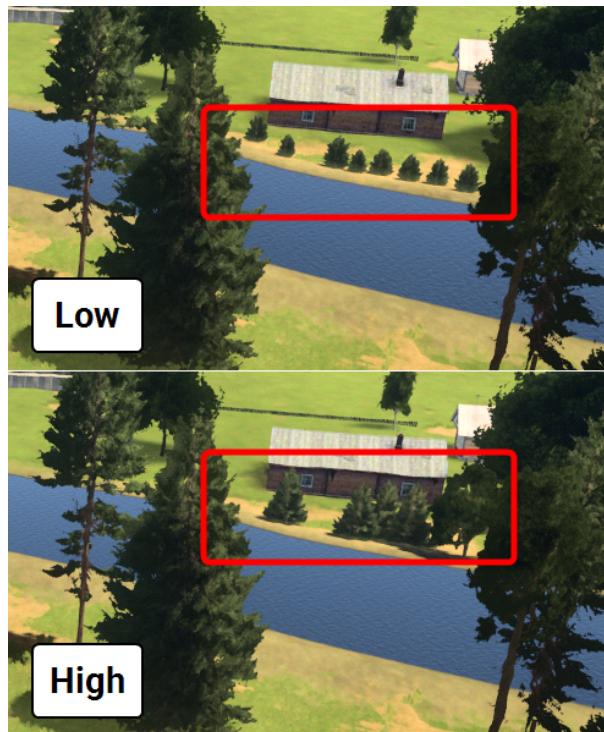
Recommended Value: Unlimited.

4.2.3.2.6 Bush Detail

Controls the overall global bush detail preset.

Performance: medium FPS impact, high Video Memory impact, medium Load Time impact.

Recommended Value: High preset.



Bush Detail has the following settings:

- [Bush Types Limit \(below\)](#)

Bush Types Limit

Controls how many bush types per surface are going to be in the scene. The fewer the types, the better the performance.

Performance: medium FPS impact, high Video Memory impact, medium Load Time impact.

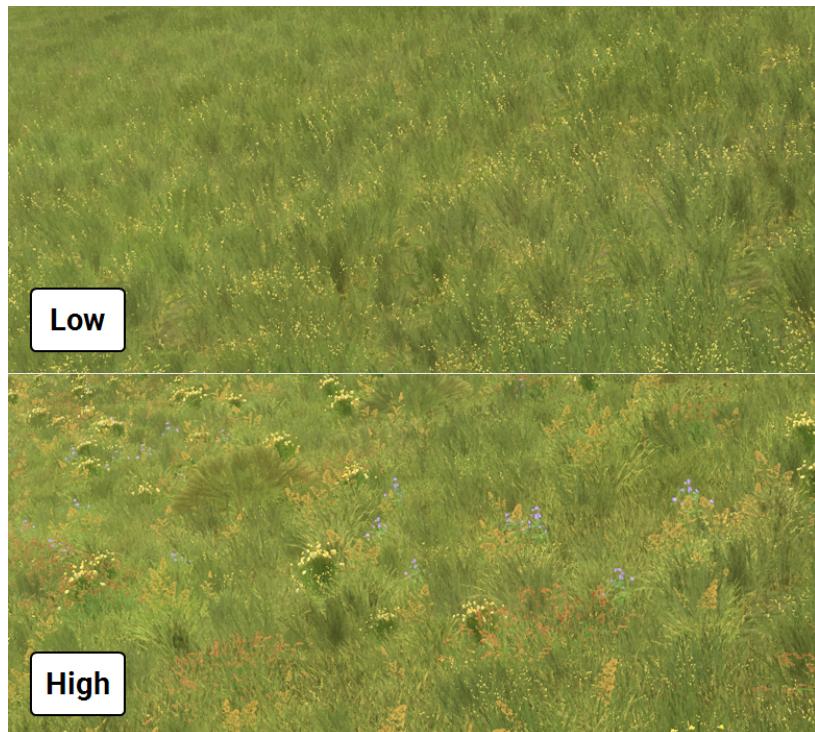
Recommended Value: Unlimited.

4.2.3.2.7 Grass Detail

Controls the overall global grass detail preset.

Performance: medium FPS impact, high Video Memory impact, medium Load Time impact.

Recommended Value: Normal preset.



Grass Detail has the following settings:

- [Grass Types Limit \(below\)](#)

Grass Types Limit

Controls how many grass types per surface are going to be in the scene. The fewer the types, the better the performance.

Performance: medium FPS impact, high Video Memory impact, medium Load Time impact.

Recommended Value: 2 (two types per surface).

4.2.3.2.7.1 Particle Detail

Controls the overall particle detail preset.

Performance: medium FPS impact.

Recommended Value: Normal preset.



Particle Detail has the following settings:

- **Particle Count Limit (below)**

Particle Count Limit

Limits the number of simulated particles in the scene.

Performance: medium FPS impact.

Recommended Value: 5000.

4.2.3.2.8 Viewport Settings

Controls the overall viewport settings.

Performance: high FPS impact, high System Memory impact, high Video Memory impact, high Load Time impact.

Viewport Settings have the following high-level categories:

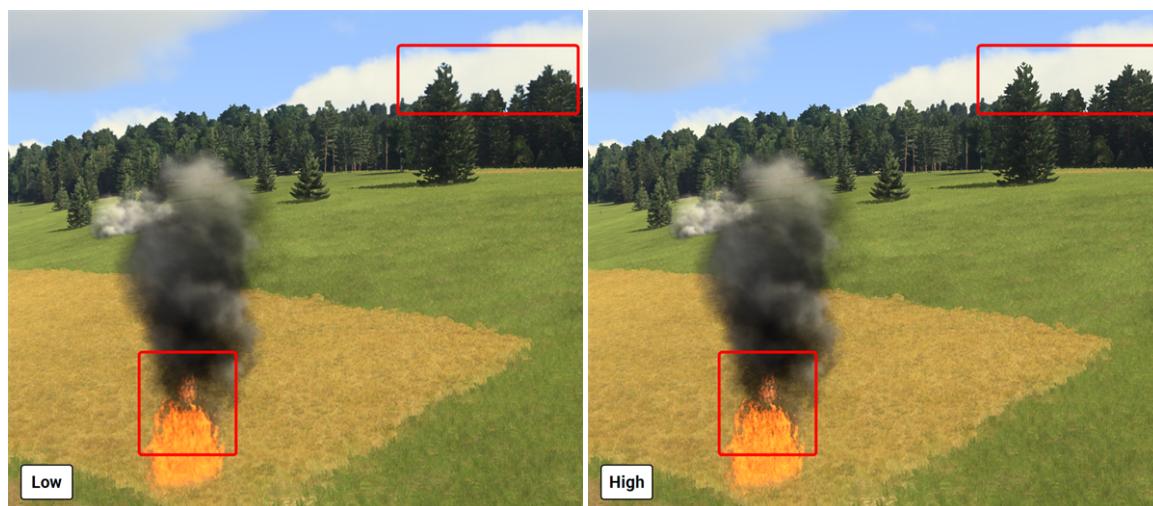
- Render Detail (below)
- Shadow Detail (on page 208)
- Vegetation Detail (on page 212)
- Object Detail (on page 219)
- Particle Detail (on page 225)
- Light Detail (on page 227)
- Post-Process Effects (on page 229)
- Draw Features (on page 230)

4.2.3.2.8.1 Render Detail

Controls the overall viewport render detail preset.

Performance: high FPS impact, medium Video Memory impact.

Recommended Value: Normal preset.



Render Detail has the following settings:

- DLSS (on the next page)
- Render Resolution (on the next page)
- MSAA (on the next page)
- Transparency Render Scale (on the next page)
- Transparency Method (on page 207)
- Multi-Projection Technology (on page 207)
- Anisotropy Quality (on page 207)

DLSS

Controls the Deep Learning Super Sampling (DLSS). Available only on Nvidia GPUs with DLSS support. Enabling this feature disables [Render Resolution \(below\)](#) and [MSAA \(below\)](#) for the given VBS4 window.

Performance: medium FPS impact, medium Video Memory impact.

Recommended Value: Quality.

Render Resolution

Controls the render resolution of viewports. Values higher than 100% perform a supersampling of the viewport. Values lower than 100% result in a blurry, less detailed viewport.

NOTE

This setting is not used when [DLSS \(above\)](#) is enabled.

Performance: high FPS impact, medium Video Memory impact.

Recommended Value: 100.

MSAA

Controls the level of Multi-Sample Anti-Aliasing (MSAA) used in the scene. Reduces the jagged edges of geometry with higher values, at the cost of performance and video memory.

NOTE

This setting is not used when [DLSS \(above\)](#) is enabled.

Performance: medium FPS impact, medium Video Memory impact.

Recommended Value: 4x MSAA.

Transparency Render Scale

Controls the render resolution of transparent objects in the exterior scene. Lower values result in blurrier transparent objects, but faster rendering.

Performance: high FPS impact, medium Video Memory impact.

Recommended Value: 100.

Transparency Method

Controls the method of rendering transparent objects. The Simple method only renders transparent exterior objects in a lower resolution. The MultiResolution method combines low and full resolution rendering. The MultiDistance method only applies to transparent objects up to 40m from the camera (transparent objects farther away from the camera are rendered in full resolution).

Performance: high FPS impact, low Video Memory impact.

Recommended Value: Simple.

Multi-Projection Technology

Toggles the use of Nvidia VRWorks single-pass stereo or multi-view rendering for accelerating HMD and multi-projection rendering. Requires an Nvidia GPU with SPS (Single Pass Stereo) or MVR support.

Performance: high FPS impact.

Recommended Value: MVR / SPS.

Anisotropy Quality

Controls the level of anisotropic filtering used in the scene. Improve the detail of textures, when viewed at sharp angles.

Performance: low FPS impact.

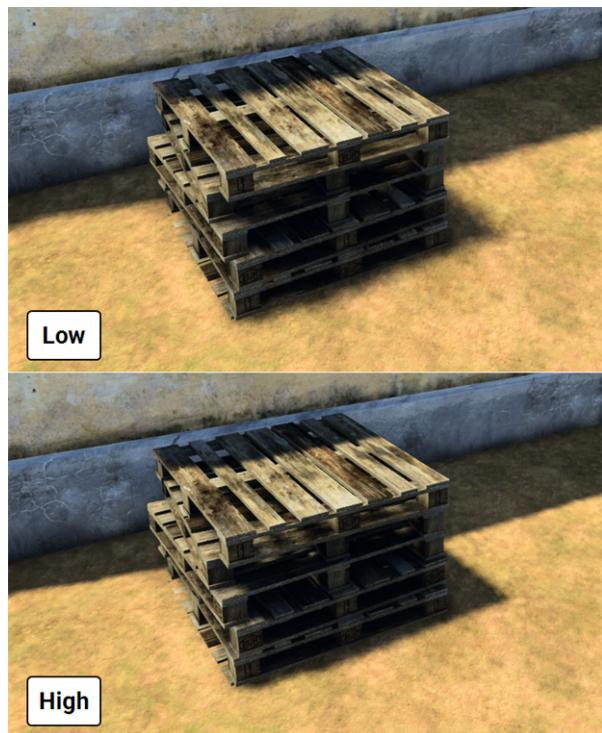
Recommended Value: 16.

4.2.3.2.8.2 Shadow Detail

Controls the overall viewport shadow detail preset.

Performance: high FPS impact, low Video Memory impact.

Recommended Value: Normal preset.



Shadow Detail has the following settings:

- [Biome Shadows \(below\)](#)
- [Exterior Shadow Cascades \(on the next page\)](#)
- [Interior Shadow Cascades \(on the next page\)](#)
- [Exterior Shadow Quality \(on the next page\)](#)
- [Interior Shadow Quality \(on the next page\)](#)
- [Exterior Shadow Draw Distance \(on the next page\)](#)

Biome Shadows

Toggles shadows cast by biome vegetation.

Performance: medium FPS impact.

Recommended Value: On.

Exterior Shadow Cascades

Controls the number of exterior shadow maps covering the view. More maps result in a better shadow quality.

Performance: high FPS impact, low Video Memory impact.

Recommended Value: 3.

Interior Shadow Cascades

Controls the number of interior shadow maps covering the view. More maps result in a better shadow quality.

Performance: medium FPS impact, low Video Memory impact .

Recommended Value: 2.

Exterior Shadow Quality

Controls the exterior shadow map resolution: 0 - exterior shadows disabled, 1 - low, 2 - good, 3 - ultra.

Performance: high FPS impact, low Video Memory impact.

Recommended Value: 2.

Interior Shadow Quality

Controls the interior shadow map resolution: 0 - exterior shadows disabled, 1 - low, 2 - good, 3 - ultra.

Performance: medium FPS impact, low Video Memory impact.

Recommended Value: 2.

Exterior Shadow Draw Distance

Controls the draw distance of exterior shadows, in meters. Larger draw distances results in worse shadow quality and worse performance.

Performance: medium FPS impact.

Recommended Value: 750.

4.2.3.2.8.3 Terrain Detail

Controls the overall viewport terrain detail preset.

Performance: high FPS impact, high Load Time impact, low Video Memory impact, low System Memory impact.

Recommended Value: Normal preset.



Terrain Detail has the following settings:

- Segment Subdivision Depth (on the next page)
- Terrain Vertex Count (on the next page)
- Terrain Detail (on the next page)
- Water Reflections (on the next page)
- Preload Distance (on the next page)
- Preload FOV Multiplier (on page 212)

Segment Subdivision Depth

Limits the maximum terrain segment level in the LOD. A value of 23 is the highest quality LOD for the terrain. The lower the value, the lower the ground detail.

Performance: low FPS impact, high Load Time impact.

Recommended Value: 20.

Terrain Vertex Count

Controls the terrain vertex count. The higher the number, the more detailed the terrain mesh is. This is especially visible on distant hills / mountains.

Performance: high FPS impact, low Video Memory impact.

Recommended Value: 33.

Terrain Detail

Controls the terrain draw distance, in meters. More specifically, the value is the distance, in meters, up to which a segment of one-meter size is split into smaller segments, when the camera field of view is 90 degrees. A segment with a k-meter size is split up to a k-times larger distance.

Performance: high FPS impact, low System Memory impact, low Video Memory impact, high Load Time impact.

Recommended Value: 1.

Water Reflections

Toggles screen space reflections on water.

Performance: high FPS impact.

Recommended Value: Off.

Preload Distance

Controls the terrain pre-loading distance around the camera. Pre-loading is currently limited to load one more detail level than the one currently visible.

Performance: high Load Time impact.

Recommended Value: 0 - 1000000.

Preload FOV Multiplier

Controls the terrain pre-loading around the camera frustum. A value of 1 disables pre-loading the frustum. Standard scene subdivision still applies, so setting very high values does not pre-load the terrain into infinity.

Performance: high Load Time impact.

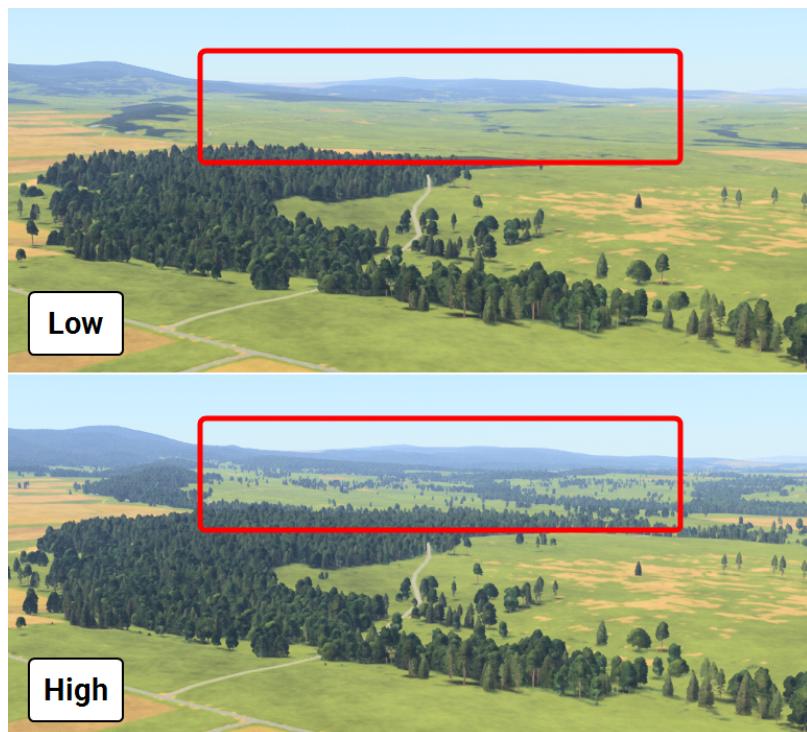
Recommended Value: 1.5.

4.2.3.2.8.4 Vegetation Detail

Controls the overall viewport vegetation detail preset.

Performance: high FPS impact, high Video Memory impact, low System Memory impact, high Load Time impact.

Recommended Value: Normal preset.



Vegetation Detail has the following settings:

- [3D Trees and Bushes \(on the next page\)](#)

3D Trees and Bushes

Toggles 3D trees and bushes.

Performance: high FPS impact, high Video Memory impact, medium Load Time impact.

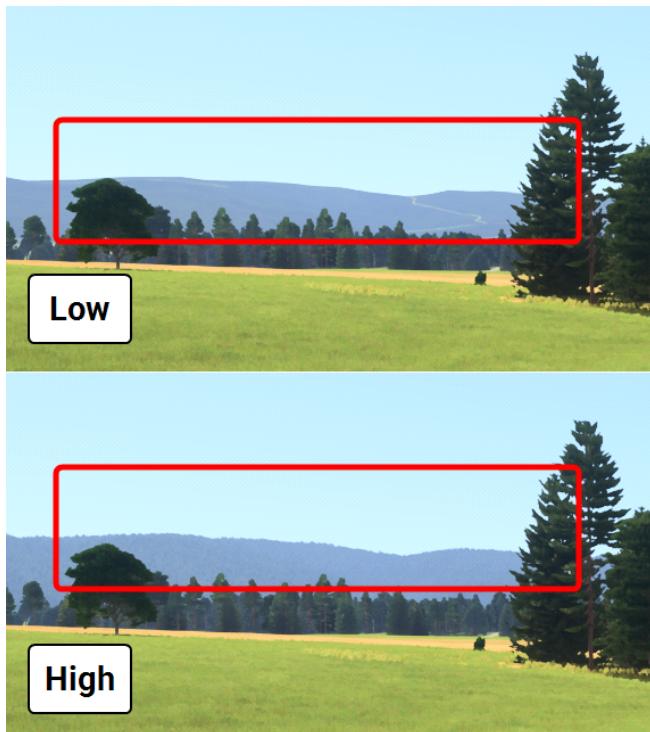
Recommended Value: On.

4.2.3.2.9 Tree Detail

Controls the overall viewport vegetation tree detail preset.

Performance: high FPS impact, high Video Memory impact , low System Memory impact, high Load Time impact.

Recommended Value: Normal preset.



Tree Detail has the following settings:

- [Tree Texture Resolution Limit](#) (on the next page)
- [Streamed Tree Draw Distance](#) (on the next page)
- [Tree Draw Distance](#) (on the next page)
- [Tree Detail](#) (on the next page)
- [Biome Tree Fidelity](#) (on the next page)
- [Biome Tree Draw Distance](#) (on page 215)

Tree Texture Resolution Limit

Limits the best loaded texture resolution for biome trees. The total surface area is considered, which means that a texture of, for example, 2048 x 512 is equivalent to 1024 x 1024. The Unlimited value can be used for graphics cards with 4 GB VRAM or more, or 2048 in more restricted memory conditions.

Performance: high Video Memory impact.

Recommended Value: Unlimited.

Streamed Tree Draw Distance

Controls the draw distance of streamed tree objects, which are objects that are embedded in the terrain database. The value is the distance, in meters, at which an object of 1-meter radius disappears when the camera field of view is 90 degrees.

Performance: medium FPS impact.

Recommended Value: 170.

Tree Draw Distance

Controls the draw distance of runtime created tree objects. The value is the distance, in meters, at which an object of 1-meter radius disappears when the camera field of view is 90 degrees.

Performance: medium FPS impact.

Recommended Value: 170.

Tree Detail

The higher the value, the better the LODs of biome and placed trees, when they are close to the camera. Increasing the value results in higher quality objects at further distances.

Performance: high FPS impact.

Recommended Value: 200.

Biome Tree Fidelity

Controls the fidelity of trees. The value affects the vegetation density, where a lower value means a lower density of trees at longer distances.

Performance: high FPS impact, low System Memory impact, low Video Memory impact, high Load Time impact.

Recommended Value: 0.5.

Biome Tree Draw Distance

Controls the draw distance of trees. The value is the distance, in meters, at which trees disappear when the camera field of view is 90 degrees.

Performance: high FPS impact, low System Memory impact, low Video Memory impact, high Load Time impact.

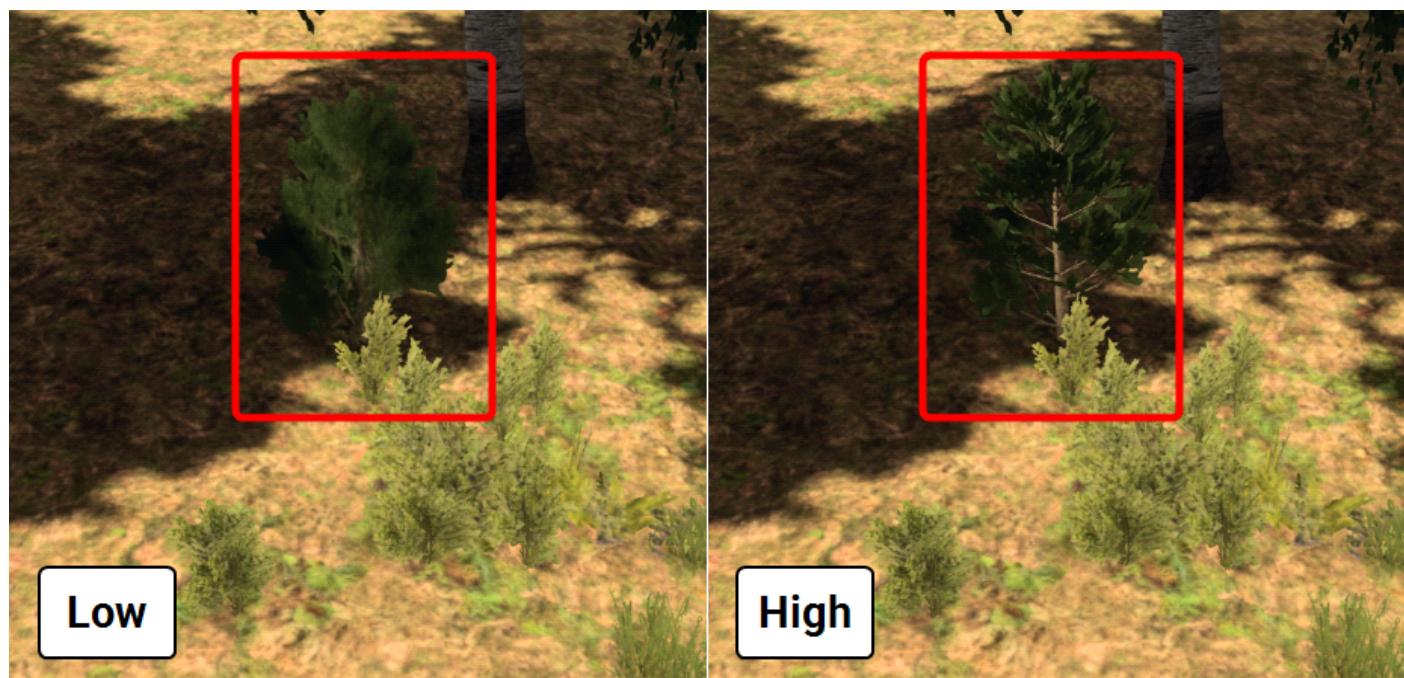
Recommended Value: 4200.

4.2.3.2.10 Bush Detail

Controls the overall viewport vegetation bush detail preset.

Performance: high FPS impact, high Video Memory impact, low System Memory impact, high Load Time impact.

Recommended Value: Normal preset.



Bush Detail has the following settings:

- [Bush Texture Resolution Limit \(on the next page\)](#)
- [Bush Detail \(on the next page\)](#)
- [Biome Bush Fidelity \(on the next page\)](#)
- [Biome Bush Draw Distance \(on the next page\)](#)

Bush Texture Resolution Limit

Limits the best loaded texture resolution for biome bushes. The total surface area is considered, which means that a texture of, for example, 2048 x 512 is equivalent to 1024 x 1024. The Unlimited value can be used for graphics cards with 4 GB VRAM or more, or 2048 in more restricted memory conditions.

Performance: high Video Memory impact.

Recommended Value: 1k (1024 x 1024).

Bush Detail

The higher the value, the better the LODs of biome bushes, when they are close to the camera. Increasing the value results in higher quality objects at further distances.

Performance: high FPS impact.

Recommended Value: 200.

Biome Bush Fidelity

Controls the fidelity of bushes. The value affects the vegetation density, where a lower value means a lower density of bushes at longer distances.

Performance: high FPS impact, low System Memory impact, low Video Memory impact, high Load Time impact.

Recommended Value: 0.5.

Biome Bush Draw Distance

Controls the draw distance of bushes. The value is the distance, in meters, at which bushes disappear when the camera field of view is 90 degrees.

Performance: high FPS impact, low System Memory impact, low Video Memory impact, high Load Time impact.

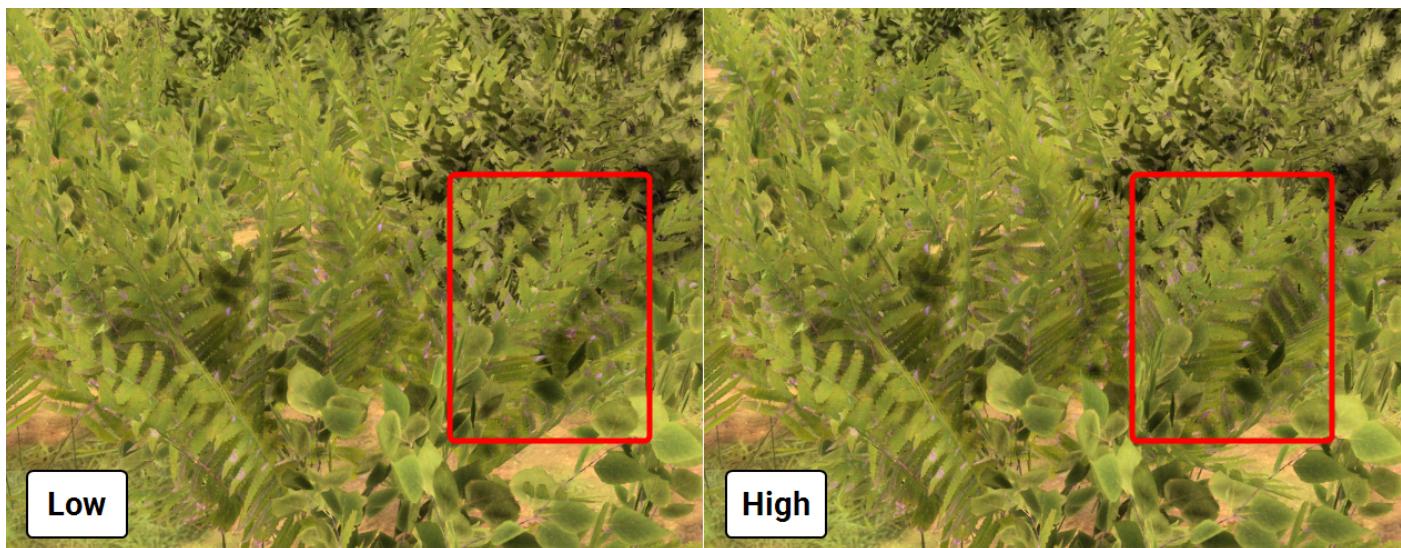
Recommended Value: 1000.

4.2.3.2.11 Grass Detail

Controls the overall viewport vegetation grass detail preset.

Performance: high FPS impact, high Video Memory impact, low System Memory impact, high Load Time impact.

Recommended Value: Normal preset.



Grass Detail has the following settings:

- [Grass Texture Resolution Limit \(below\)](#)
- [Grass Detail \(on the next page\)](#)
- [Biome Grass Fidelity \(on the next page\)](#)
- [Biome Grass Draw Distance \(on the next page\)](#)

Grass Texture Resolution Limit

Limits the best loaded texture resolution for biome grass. The total surface area is considered, which means that a texture of, for example, 2048 x 512 is equivalent to 1024 x 1024. The Unlimited value can be used for graphics cards with 4 GB VRAM or more, or 2048 in more restricted memory conditions.

Performance: high Video Memory impact.

Recommended Value: 1k (1024 x 1024).

Grass Detail

The higher the value, the better the LODs of biome grass, when they are close to the camera. Increasing the value results in higher quality objects at further distances.

Performance: high FPS impact.

Recommended Value: 100.

Biome Grass Fidelity

Controls the fidelity of grass. The value affects the vegetation density, where a lower value means a lower density of grass at longer distances.

Performance: high FPS impact, low System Memory impact, low Video Memory impact, high Load Time impact.

Recommended Value: 0.5.

Biome Grass Draw Distance

Controls the draw distance of grass. The value is the distance, in meters, at which grass disappears when the camera field of view is 90 degrees.

Performance: high FPS impact, low System Memory impact, low Video Memory impact, high Load Time impact.

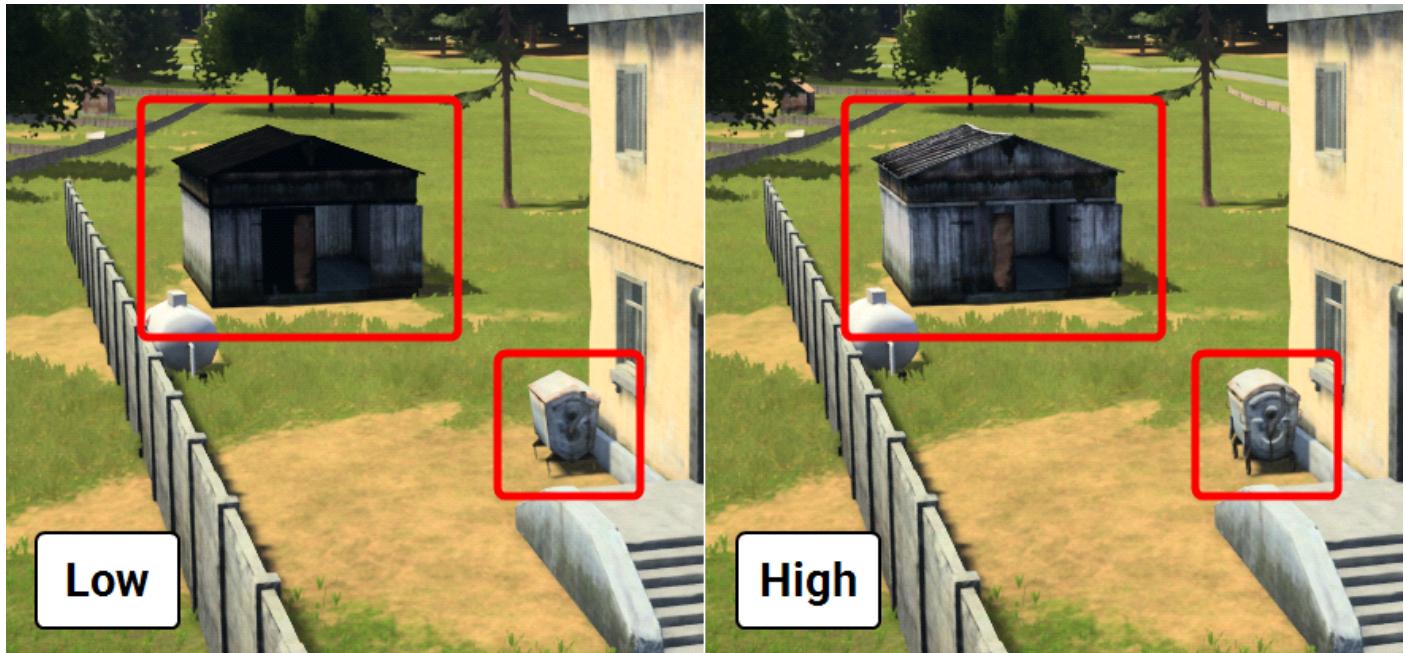
Recommended Value: 210.

4.2.3.2.11.1 Object Detail

Controls the overall viewport object detail preset.

Performance: high FPS impact, high Video Memory impact, high Load Time impact.

Recommended Value: Normal preset.



Object Detail has the following settings:

- Exterior Object Texture Resolution Limit (on the next page)
- Interior Object Texture Resolution Limit (on the next page)
- Transparency Detail (on the next page)
- Streamed Static Draw Distance (on the next page)
- Streamed Wind Emitter Draw Distance (on page 221)
- Wind Emitter Draw Distance (on page 222)
- Streamed Force Emitter Draw Distance (on page 222)
- Force Emitter Draw Distance (on page 222)
- Streamed Damage Area Draw Distance (on page 222)
- Damage Area Draw Distance (on page 223)
- Streamed Static Fidelity (on page 223)
- Volumetric Clouds Reprojection Quality (on page 225)
- High Detail Volumetric Clouds (on page 224)
- Static Draw Distance (on page 221)
- Land Draw Distance (on page 221)
- Water Draw Distance (on page 221)
- Air Draw Distance (on page 221)
- Static Fidelity (on page 223)
- Land Fidelity (on page 223)
- Water Fidelity (on page 223)
- Air Fidelity (on page 224)
- Air Dot Size (on page 224)
- Point Cloud Detail (on page 224)
- Cloud Detail (on page 224)
- Building Detail (on page 225)

Exterior Object Texture Resolution Limit

Limits the best loaded texture resolution for exterior objects. The total surface area is considered, which means that a texture of, for example, 2048 x 512 is equivalent to 1024 x 1024. The Unlimited value can be used for graphics cards with 4 GB VRAM or more, or 2048 in more restricted memory conditions.

Performance: high Video Memory impact.

Recommended Value: Unlimited.

Interior Object Texture Resolution Limit

Limits the best loaded texture resolution for interior objects. The total surface area is considered, which means that a texture of, for example, 2048 x 512 is equivalent to 1024 x 1024. The Unlimited value can be used for graphics cards with 4 GB VRAM or more, or 2048 in more restricted memory conditions.

Performance: high Video Memory impact.

Recommended Value: Unlimited.

Transparency Detail

Controls the distance at which the VBS4 engine stops handling objects with transparency accurately, and starts using approximate methods. The smaller the value, the better the performance. The value is the distance, in meters, at which an object of 1-meter radius switches the way transparency is handled, when the camera field of view is 90 degrees.

Performance: high FPS impact.

Recommended Value: 10.

Streamed Static Draw Distance

Controls the draw distance of streamed static objects, which are objects embedded in the terrain database. The value is the distance, in meters, at which an object of 1-meter radius disappears, when the camera field of view is 90 degrees.

Performance: medium FPS impact.

Recommended Value: 285.

Static Draw Distance

Controls the draw distance of static objects, such as runtime created buildings. The value is the distance, in meters, at which an object of 1-meter radius disappears, when the camera field of view is 90 degrees.

Performance: medium FPS impact.

Recommended Value: 285.

Land Draw Distance

Controls the draw distance of land objects, such as runtime created ground vehicles and lifeforms. The value is the distance, in meters, at which an object of 1-meter radius disappears, when the camera field of view is 90 degrees.

Performance: medium FPS impact.

Recommended Value: 285.

Water Draw Distance

Controls the draw distance of water objects, such as runtime created watercraft. The value is the distance, in meters, at which an object of 1-meter radius disappears, when the camera field of view is 90 degrees.

Performance: medium FPS impact.

Recommended Value: 550.

Air Draw Distance

Controls the draw distance of air objects, such as runtime created aircraft. The value is the distance, in meters, at which an object of 1-meter radius disappears, when the camera field of view is 90 degrees.

Performance: medium FPS impact.

Recommended Value: 550.

Streamed Wind Emitter Draw Distance

Controls the draw distance of streamed wind emitter objects, such as runtime created force emitters. The value is the distance, in meters, at which an object of 1-meter radius disappears, when the camera field of view is 90 degrees.

Performance: low FPS impact.

Recommended Value: 5.

Wind Emitter Draw Distance

Controls the draw distance of wind emitter objects, such as runtime created wind emitters. The value is the distance, in meters, at which an object of 1-meter radius disappears, when the camera field of view is 90 degrees.

Performance: low FPS impact.

Recommended Value: 5.

Streamed Force Emitter Draw Distance

Controls the draw distance of streamed force emitter objects, embedded in the terrain database. The value is the distance, in meters, at which an object of 1-meter radius disappears, when the camera field of view is 90 degrees.

Performance: low FPS impact.

Recommended Value: 40.

Force Emitter Draw Distance

Controls the draw distance of force emitter objects, such as runtime created force emitters. The value is the distance, in meters, at which an object of 1-meter radius disappears, when the camera field of view is 90 degrees.

Performance: low FPS impact.

Recommended Value: 40.

Streamed Damage Area Draw Distance

Controls the draw distance of streamed damage area objects, embedded in the terrain database. The value is the distance, in meters, at which an object of 1-meter radius disappears, when the camera field of view is 90 degrees.

Performance: low FPS impact.

Recommended Value: 500.

Damage Area Draw Distance

Controls the draw distance of dedicated damage area objects, such as runtime created damage areas. The value is the distance, in meters, at which an object of 1-meter radius disappears, when the camera field of view is 90 degrees.

Performance: low FPS impact.

Recommended Value: 500.

Streamed Static Fidelity

The higher the value, the better the LODs of streamed static objects (embedded in the terrain database), when they are close to the camera. Increasing the value results in higher quality objects at further distances.

Performance: medium FPS impact.

Recommended Value: 300.

Static Fidelity

The higher the value, the better the LODs of static objects (such as runtime created buildings), when they are close to the camera. Increasing the value results in higher quality objects at further distances.

Performance: medium FPS impact.

Recommended Value: 300.

Land Fidelity

The higher the value, the better the LODs of land objects (such as runtime created ground vehicles and lifeforms), when they are close to the camera. Increasing the value results in higher quality objects at further distances.

Performance: medium FPS impact.

Recommended Value: 300.

Water Fidelity

The higher the value, the better the LODs of water objects (such as runtime created water vehicles), when they are close to the camera. Increasing the value results in higher quality objects at further distances.

Performance: medium FPS impact.

Recommended Value: 300.

Air Fidelity

The higher the value, the better the LODs of air objects (such as runtime created aircraft), when they are close to the camera. Increasing the value results in higher quality objects at further distances.

Performance: medium FPS impact.

Recommended Value: 300.

Air Dot Size

Controls the pixel size of a dot representing an object that is too small to be visible in the current display resolution.

Performance: no performance impact.

Recommended Value: 1.

Point Cloud Detail

Controls the draw distance of point cloud data. The value is the distance, in meters, up to which a segment of one-meter size is split into smaller segments, when the camera field of view is 90 degrees. A segment with a k-meter size is split up to a k-times larger distance.

Performance: high FPS impact, high Load Time impact.

Recommended Value: 0.3.

Cloud Detail

Controls the draw distance of clouds. The value is the distance, in meters, up to which a segment of one-meter size is split into smaller segments, when the camera field of view is 90 degrees. A segment with a k-meter size is split up to a k-times larger distance.

Performance: low FPS impact.

Recommended Value: 1.

High Detail Volumetric Clouds

Toggles high detail shading of volumetric cloud layers.

Performance: high FPS impact.

Recommended Value: On.

Volumetric Clouds Reprojection Quality

Controls the reprojection (reflection) quality for volumetric clouds.

Performance: high FPS impact.

Recommended Value: Automatic.

Building Detail

Controls the draw distance of the geometry layer (buildings per segment). The value is the distance, in meters, up to which a segment of one-meter size is split into smaller segments, when the camera field of view is 90 degrees. A segment with a k-meter size is split up to a k-times larger distance.

Performance: high FPS impact, high Load Time impact.

Recommended Value: 0.25.

4.2.3.2.11.2 Particle Detail

Controls the overall viewport particle detail preset.

Performance: medium FPS impact.

Recommended Value: Normal preset.



Particle Detail has the following settings:

- [Particle Effect Fidelity \(on the next page\)](#)
- [Particle Effect Detail \(on the next page\)](#)
- [Particle Draw Distance \(on the next page\)](#)

Particle Effect Fidelity

The lower the value, the better are the particle LODs selected closer to the camera.

Performance: medium FPS impact.

Recommended Value: 0.

Particle Effect Detail

The higher the value, the better the lighting quality of particles.

Performance: medium FPS impact.

Recommended Value: 0.5.

Particle Draw Distance

The lower the value, the lower the draw distance and detail of particles. The value is a coefficient that is also affected by the camera field of view.

Performance: medium FPS impact.

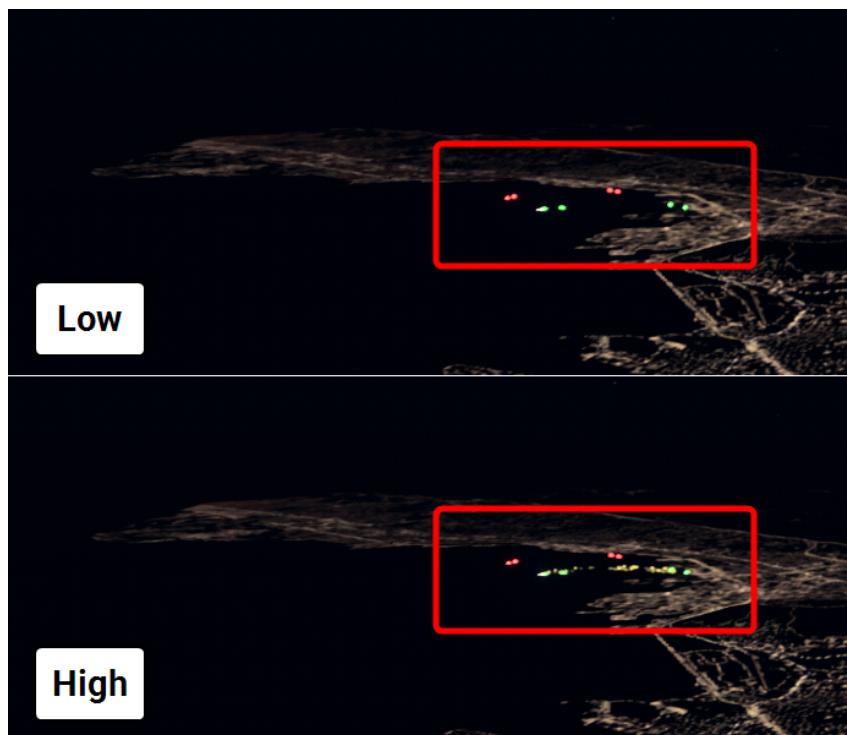
Recommended Value: 10.

4.2.3.2.11.3 Light Detail

Controls the overall viewport light detail preset.

Performance: medium FPS impact.

Recommended Value: Normal preset.



Light Detail has the following settings:

- [Streamed Light Draw Distance \(below\)](#)
- [Light Draw Distance \(on the next page\)](#)
- [Streamed Emissive Plane Draw Distance \(on the next page\)](#)
- [Emissive Plane Draw Distance \(on the next page\)](#)

Streamed Light Draw Distance

Controls the draw distance of streamed light objects (lightmap transition distance), embedded in the terrain database. The value is the distance, in meters, at which an object of 1-meter radius disappears, when the camera field of view is 90 degrees.

Performance: medium FPS impact.

Recommended Value: 20.

Light Draw Distance

Controls the draw distance of light objects (such as runtime created lights). The value is the distance, in meters, at which an object of 1-meter radius disappears, when the camera field of view is 90 degrees.

Performance: medium FPS impact.

Recommended Value: 170.

Streamed Emissive Plane Draw Distance

Controls the draw distance of streamed emissive planes of light reflectors. The value is the distance, in meters, at which an object of 1-meter radius disappears, when the camera field of view is 90 degrees.

Performance: medium FPS impact.

Recommended Value: 170.

Emissive Plane Draw Distance

Controls the draw distance of dynamic emissive planes of light reflectors. The value is the distance, in meters, at which an object of 1-meter radius disappears, when the camera field of view is 90 degrees.

Performance: medium FPS impact.

Recommended Value: 170.

4.2.3.2.11.4 Post-Process Effects

Controls the overall viewport post-process effects preset.

Performance: medium FPS impact, medium Video Memory impact.

Recommended Value: Normal preset.



Post-Process Effects have the following settings:

- [Ambient Occlusion \(on the next page\)](#)
- [Motion Blur \(on the next page\)](#)

Ambient Occlusion

Controls the method for ambient occlusion. This improves the visual quality of lighting, and shadows on objects.

Performance: medium FPS impact, medium Video Memory impact.

Recommended Value: SSAO.

Motion Blur

Toggles motion blur.

Performance: medium FPS impact, low Video Memory impact.

Recommended Value: Off.

4.2.3.2.11.5 Draw Features

Toggles the draw features in the rendered scene.

Performance: high FPS impact, high System Memory impact, high Video Memory impact, high Load Time impact.

Draw Features have the following settings:

- [Sky \(below\)](#)
- [Sun \(on the next page\)](#)
- [Moon \(on the next page\)](#)
- [Stars \(on the next page\)](#)
- [Ground \(on the next page\)](#)
- [Water \(on the next page\)](#)
- [Biome Trees \(on page 232\)](#)
- [Biome Bushes \(on page 232\)](#)
- [Biome Grass \(on page 232\)](#)
- [Geometry \(on page 232\)](#)
- [Point Clouds \(on page 232\)](#)
- [Objects \(on page 233\)](#)
- [Lights \(on page 233\)](#)
- [Particles \(on page 233\)](#)
- [Clouds \(on page 233\)](#)
- [Precipitation \(on page 233\)](#)

Sky

Toggles the skydome and atmosphere in the rendered scene.

Performance: no performance impact.

Recommended Value: On.

Sun

Toggles the Sun in the rendered scene.

Performance: no performance impact.

Recommended Value: On.

Moon

Toggles the Moon in the rendered scene.

Performance: no performance impact.

Recommended Value: On.

Stars

Toggles the starfield in the rendered scene.

Performance: no performance impact.

Recommended Value: On.

Ground

Toggles the ground surface in the rendered scene.

Performance: high FPS impact, high System Memory impact, high Video Memory impact, high Load Time impact.

Recommended Value: On.

Water

Toggles water surfaces in the rendered scene.

Performance: high FPS impact, high System Memory impact, high Video Memory impact, high Load Time impact.

Recommended Value: On.

Biome Trees

Toggles biome trees in the rendered scene.

Performance: high FPS impact, high System Memory impact, high Video Memory impact, high Load Time impact.

Recommended Value: On.

Biome Bushes

Toggles biome bushes in the rendered scene.

Performance: high FPS impact, high System Memory impact, high Video Memory impact, high Load Time impact.

Recommended Value: On.

Biome Grass

Toggles biome grass in the rendered scene.

Performance: high FPS impact, high System Memory impact, high Video Memory impact, high Load Time impact.

Recommended Value: On.

Geometry

Toggles procedural geometry, such as procedural buildings, in the rendered scene.

Performance: high FPS impact, high System Memory impact, high Video Memory impact, high Load Time impact.

Recommended Value: On.

Point Clouds

Toggles point cloud objects in the rendered scene.

Performance: high FPS impact, high System Memory impact, high Video Memory impact, high Load Time impact.

Recommended Value: On.

Objects

Toggles streamed and dynamic objects, such as lifeforms and platforms, in the rendered scene.

Performance: high FPS impact, high System Memory impact, high Video Memory impact, high Load Time impact.

Recommended Value: On.

Lights

Toggles lights in the rendered scene.

Performance: high FPS impact, low System Memory impact, high Load Time impact.

Recommended Value: On.

Particles

Toggles particles in the rendered scene.

Performance: high FPS impact, high System Memory impact, high Video Memory impact.

Recommended Value: On.

Clouds

Toggles clouds in the rendered scene.

Performance: high FPS impact, high System Memory impact, high Video Memory impact, high Load Time impact.

Recommended Value: On.

Precipitation

Toggles precipitation effects in the rendered scene.

Performance: low FPS impact, low Video Memory impact.

Recommended Value: On.

4.2.3.2.12 Compositor Settings

Controls the overall compositor settings.

Performance: low FPS impact, low Video Memory impact.

Compositor Settings have the following high-level categories:

- [Compositor Settings \(above\)](#)

4.2.3.2.12.1 Post-Process Effects

Controls the overall compositor post-process effects settings.

Performance: low FPS impact, low Video Memory impact.

Post-Process Effects have the following settings:

- [Bloom Spread Level \(below\)](#)
- [Bloom Strength \(below\)](#)
- [Lens Effects Strength \(on the next page\)](#)
- [Sharpening Strength \(on the next page\)](#)

Bloom Spread Level

For the post-process bloom flare type, controls the maximum amount of spread of the effect.

Performance: no performance impact.

Recommended Value: 10.

Bloom Strength

Controls the bloom effect strength, when used by the compositor. Required for local tone mapping.

Performance: low FPS impact, low Video Memory impact.

Recommended Value: 1.

Lens Effects Strength

Controls the camera lens effects, such as dirt specks and flare. Affected by the [Bloom Spread Level \(on the previous page\)](#).

Performance: low Video Memory impact.

Recommended Value: 1.

Sharpening Strength

Controls the image sharpening strength applied to the 3D View.

Performance: low FPS impact.

Recommended Value: 0.5.

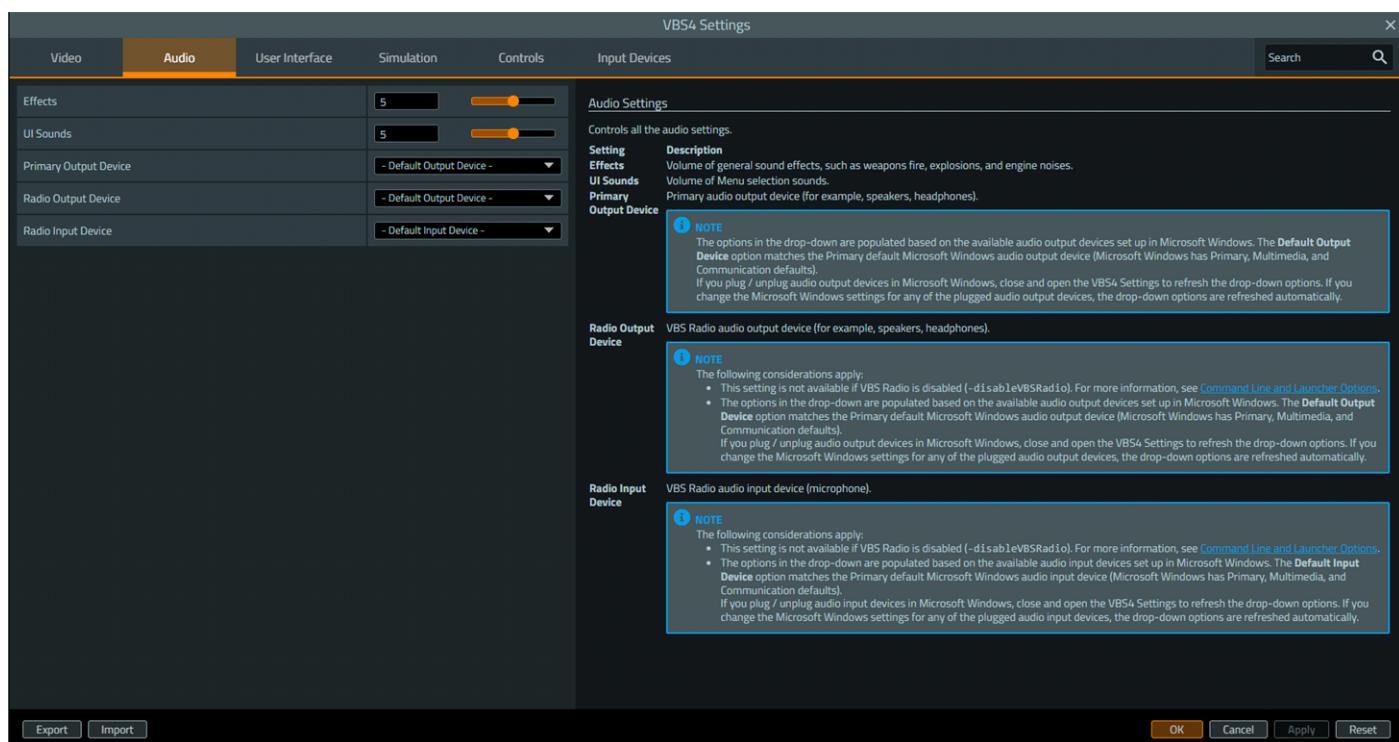
4.3 Audio Settings

All users can manage their Audio Settings from the VBS4 Settings panel.

In the VBS4 Toolbar, click the **Settings Icon**, and select the **Audio Tab**.



The VBS4 Settings Panel displays the Audio Settings.



Follow these steps:

1. Set the [Audio Settings List \(on the next page\)](#) and modify the required settings.
2. Click **Apply**.

The Audio Settings changes are saved.

3. Click **OK**.

VBS4 updates and applies your Audio Settings.

To restore VBS4 to its default settings, click **Reset**.

To export / import the settings, see [Exporting / Importing Settings \(on page 161\)](#).

NOTE

Audio Settings are stored in your VBS4 Profile in the following file:

- Default VBS4 Profile location:

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

- Other VBS4 Profile location:

`\Path\Settings\AudioSettings.xml`

`Path` is specified using the `-profiles=Path` command-line option - for more information, see [Command Line and Launcher Options \(on page 76\)](#).

For more information about the Audio parameters in the Profile configuration, see [VBS4 Profile Options \(on page 386\)](#).

4.3.1 Audio Settings List

Controls all the audio settings.

Setting	Description
Effects	Volume of general sound effects, such as weapons fire, explosions, and engine noises.
UI Sounds	Volume of Menu selection sounds.
Primary Output Device	Primary audio output device (for example, speakers, headphones).

NOTE

The options in the drop-down are populated based on the available audio output devices set up in Microsoft Windows. The **Default Output Device** option matches the Primary default Microsoft Windows audio output device (Microsoft Windows has Primary, Multimedia, and Communication defaults).

If you plug / unplug audio output devices in Microsoft Windows, close and open the VBS4 Settings to refresh the drop-down options. If you change the Microsoft Windows settings for any of the plugged audio output devices, the drop-down options are refreshed automatically.

Setting	Description
Radio Output Device	VBS Radio audio output device (for example, speakers, headphones). NOTE The following considerations apply: <ul style="list-style-type: none">This setting is not available if VBS Radio is disabled (-disableVBSRadio). For more information, see Command Line and Launcher Options (on page 76).The options in the drop-down are populated based on the available audio output devices set up in Microsoft Windows. The Default Output Device option matches the Primary default Microsoft Windows audio output device (Microsoft Windows has Primary, Multimedia, and Communication defaults). If you plug / unplug audio output devices in Microsoft Windows, close and open the VBS4 Settings to refresh the drop-down options. If you change the Microsoft Windows settings for any of the plugged audio output devices, the drop-down options are refreshed automatically.
Radio Input Device	VBS Radio audio input device (microphone). NOTE The following considerations apply: <ul style="list-style-type: none">This setting is not available if VBS Radio is disabled (-disableVBSRadio). For more information, see Command Line and Launcher Options (on page 76).The options in the drop-down are populated based on the available audio input devices set up in Microsoft Windows. The Default Input Device option matches the Primary default Microsoft Windows audio input device (Microsoft Windows has Primary, Multimedia, and Communication defaults). If you plug / unplug audio input devices in Microsoft Windows, close and open the VBS4 Settings to refresh the drop-down options. If you change the Microsoft Windows settings for any of the plugged audio input devices, the drop-down options are refreshed automatically.

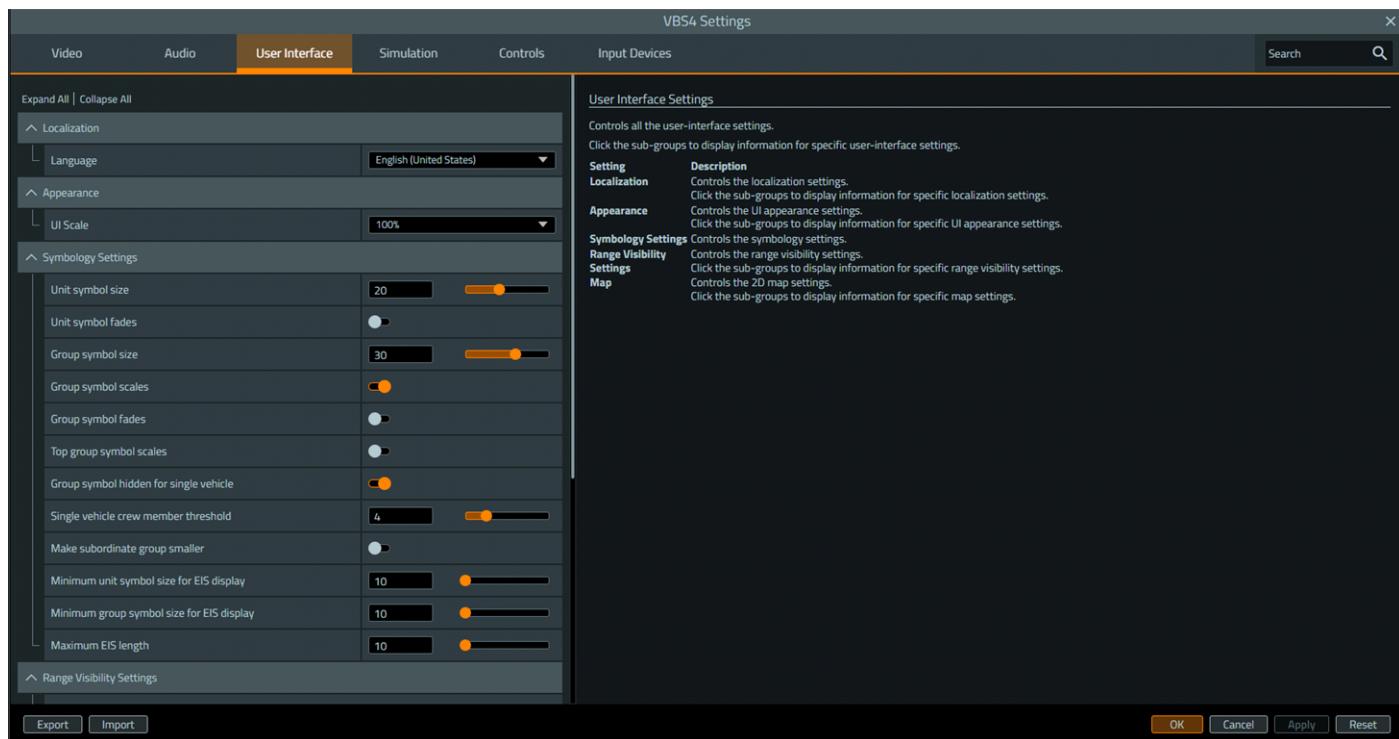
4.4 User Interface Settings

The User Interface Settings allow you to control Localization and various UI appearance settings.

In the VBS4 Toolbar, click the **Settings Icon**, and select the **User Interface Tab**.



The VBS4 Settings Panel displays the User Interface Settings.



Follow these steps:

Expand the User Interface Settings Categories and modify the required settings.

- [Localization \(on the next page\)](#)
- [Appearance \(on page 242\)](#)
- [Symbology Settings \(on page 243\)](#)
- [Range Visibility Settings \(on page 245\)](#)
- [Map \(on page 250\)](#)



TIP

Click **Expand All / Collapse All** to expand / collapse the settings hierarchy.

To restore VBS4 to its default settings, click **Reset**.

To export / import the settings, see [Exporting / Importing Settings \(on page 161\)](#).

NOTE

The Map, Localization, and Symbology Settings are stored in your VBS4 Profile in the following file:

- Default VBS4 Profile location:

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

- Other VBS4 Profile location:

`\Path\Settings\UISettings.xml`

`Path` is specified using the `-profiles=Path` command-line option - for more information, see [Command Line and Launcher Options \(on page 76\)](#).

For more information about the Localization parameters in the Profile configuration, see [VBS4 Profile Options \(on page 386\)](#).

4.4.1 Localization

Controls the localization settings.

Click the sub-groups to display information for specific localization settings.

Setting	Description
Language	Select the UI display language. VBS4 includes UI translations for the following languages: <ul style="list-style-type: none">• French (VBS4 24.1.0)• Korean (VBS4 21.1.2)• Polish (VBS3 22.1.0)

**WARNING**

Some languages use translations for VBS3. Most of this text is reused in VBS4, but it does not include new UI created specifically for VBS4.

VBS4 requires a restart to apply a **Language** change.

Additional languages may also be added to VBS4 based on customer-provided translations.

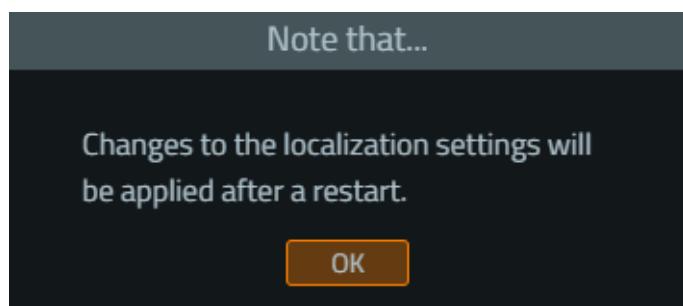
**FEATURE NOTICE**

UI translations are typically provided at customer request for specific versions of VBS4 and may be partial. Later versions of VBS4 introduce new UI text that is not translated into all languages. Untranslated strings display in English. Contact sales@bisimulations.com to inquire about a new language or an update to an existing one.

Click one of the following:

- **Apply** to save the settings, but leave the VBS4 Settings dialog open, so that you can adjust settings in other tabs.

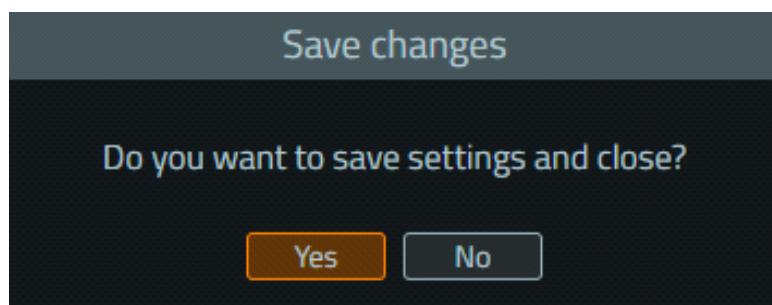
The following dialog opens.



Click **OK**.

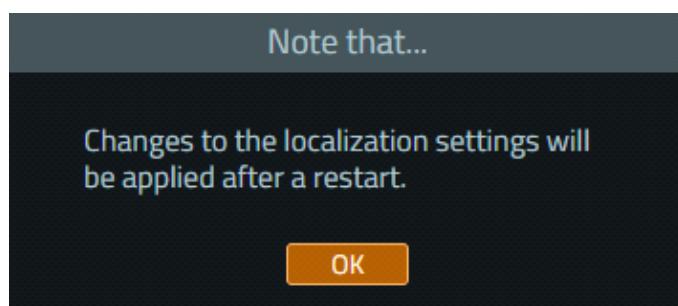
- **OK** to save the settings and close the VBS4 Settings dialog.

The following dialog opens.



Click **Yes**.

The VBS4 Settings dialog closes, and the following dialog opens.



Click **OK**.

Restart VBS4 to apply localization changes.

VBS4 opens in the language you selected in the Localization tab.

4.4.2 Appearance

Controls the UI appearance settings.

Click the sub-groups to display information for specific UI appearance settings.

Setting	Description
UI Scale	VBS4 UI-scaling percentage. See Resolution Compatibility (below) to determine which percentages are available for which display types. <div style="border: 2px solid red; padding: 10px; margin-top: 10px;"><p>⚠️ WARNING The scaling depends on the used display. Bohemia Interactive Simulations does not recommend using higher values, since the result may be unpredictable.</p><p>ℹ️ NOTE Using the <code>-window</code> command-line option (see Command Line and Launcher Options (on page 76)) lowers the effective resolution (due to the window title bar and Microsoft Windows Taskbar).</p></div>

Resolution Compatibility

The following UI-scaling percentages are available for the following display types:

Display Type / Resolution	100%	125%	150%	175%	200%	225%	250%	300%
Full HD / 1920 x 1080 / 1080p	1920 x 1080	1536 x 864	1280 x 720	N/A	N/A	N/A	N/A	N/A
2K / 2560 x 1440 / 1440p	2560 x 1440	2048 x 1152	1707 x 960	1462 x 823	1280 x 720	N/A	N/A	N/A
2.5K Ultrawide / 3440 x 1440 / 1440p	3440 x 1440	2752 x 1152	2293 x 960	1965 x 823	1720 x 720	N/A	N/A	N/A
4K / 3840 x 2160 / 2160p	3840 x 2160	3072 x 1728	2560 x 1440	2194 x 1234	1920 x 1080	1707 x 960	1536 x 864	1280 x 720

Click **Apply**.

The UI Display Scale Settings changes are saved.

Click **OK**.

VBS4 applies your UI Display Scale Settings changes.

4.4.3 Symbology Settings

Controls the symbology settings.

Setting	Description
Unit Symbol Size	Enter a value, use the up / down arrows in the number field, or the slider to set the symbol size of single entities (in pixels).
Unit Symbol Fades	If enabled, single entity symbols become partially transparent.
Group Symbol Size	Enter a value, use the up / down arrows in the number field, or the slider to set the symbol size of groups (in pixels).
Group Symbol Scales	If enabled, group symbols scale with the map zoom. <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"> i NOTE <p>Only applies to groups that are assigned to higher echelons. Groups that are not part of a higher-echelon hierarchy are considered top-level groups.</p> </div>
Group Symbol Fades	If enabled, group symbols become partially transparent.
Top Group Symbol Scales	If enabled, top-level group symbols scale with the map zoom. <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"> i NOTE <p>Top-level group scaling only works if Group Symbol Scales is enabled.</p> </div>
Group Symbol Hidden for Single Vehicle	If enabled, group symbols are not displayed when there is only one vehicle in a group. However, the vehicle must satisfy the crew member threshold.
Single Vehicle Crew Member Threshold	Enter a value, use the up / down arrows in the number field, or the slider to set the crew member threshold for single vehicles. If the number of crew members for a single vehicle is lower than the threshold number, the group symbol can be hidden for that vehicle. <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"> i NOTE <p>The group symbol becomes visible when the mouse cursor hovers over the vehicle, but fades after approximately 1.5 seconds, once your cursor moves away from the vehicle symbol.</p> </div>
Make Subordinate Group Smaller	If enabled, group symbols become smaller and smaller on each hierarchy level, until the minimum size is reached.

Setting	Description
Minimum Unit Symbol Size for EIS Display	<p>Enter a value, use the up / down arrows in the number field, or the slider to set the minimum symbol size for single entities.</p>
<p>NOTE</p> <p>If a single entity symbol is smaller than the threshold, the textual display information is not shown for that symbol.</p>	
Minimum Group Symbol Size for EIS Display	<p>Enter a value, use the up / down arrows in the number field, or the slider to set the minimum symbol size for groups.</p>
<p>NOTE</p> <p>If a group symbol is smaller than the threshold, the textual display information is not shown for that symbol.</p>	
Maximum EIS Length	<p>Enter a value, use the up / down arrows in the number field, or the slider to set the maximum number of characters allowed in the Entity Information System (EIS) text display boxes.</p>
<p>NOTE</p> <p>Also affects status information shown directly above symbology, such as: "Forming Line", "Suppressing", when using VBS Plan Tactical Objects, for example.</p>	

Click **Apply.**

The Symbology Settings changes are saved.

Click **OK.**

VBS4 applies your Symbology Settings changes.

For more information about symbology, see Customizable Symbology in the VBS4 Editor Manual.

4.4.4 Range Visibility Settings

Controls the range visibility settings.

Click the sub-groups to display information for specific range visibility settings.

Setting	Description
Gateway Geo Filter	Controls the range visibility settings for the VBS Gateway Geo Filter, see Configure Gateway Geofiltering in the VBS Gateway Manual. Click the sub-group to display the VBS Gateway Geo Filter settings.
Electronic Warfare	Controls the range visibility settings for Electronic Warfare (EW), see Electronic Warfare in the VBS4 Editor Manual. Click the sub-group to display the EW settings.
Hazardous Area	Controls the range visibility settings for Hazardous Areas, see Hazardous Area in the VBS4 Editor Manual. Click the sub-group to display the hazardous-area settings.
Radio	Controls the range visibility settings for radio devices, see Retractable Radio Mas and Radio Jamming Device in the VBS Radio Manual. Click the sub-group to display the radio-device settings.
CREW	Controls the range visibility settings for the CREW Link jamming device, see Enabling CREW in the VBS4 Editor Manual.
Waypoints	Controls the range visibility settings for Suppress Waypoints, see Suppress Order in the VBS Control AI Manual.
Active Protection System	Controls the range visibility settings for the Active Protection System (APS), see Active Protection System in the VBS4 Editor Manual. Click the sub-group to display the APS settings.
Boomerang	Controls the range visibility settings for the Boomerang shooter detection system, see Boomerang in the VBS4 Editor Manual.
Pattern Of Life	Controls the range visibility settings for Pattern Of Life, see Population Editor Object in the VBS Control AI Manual.

4.4.4.1 Core Range Visibility Settings

The core range visibility settings are:

Setting	Description
2D Visibility	Range visualization circle on the 2D Map.
2D Fill	Fill color for the circle on the 2D Map.
2D Line to Origin	Line to Origin in the circle on the 2D Map.
2D Text	Text above the circle on the 2D Map.
3D Visibility	Range visualization hemisphere / cylinder in 3D Camera View.
3D Fill from Inside	Fill color for the hemisphere / cylinder in 3D Camera View.
3D Line to Origin	Line to Origin in the hemisphere / cylinder in 3D Camera View.
3D Text	Text above the hemisphere / cylinder in 3D Camera View.

4.4.4.2 Gateway Geo Filter

Controls the range visibility settings for the VBS Gateway Geo Filter, see Configure Gateway Geofiltering in the VBS Gateway Manual.

Click the sub-group to display the VBS Gateway Geo Filter settings.

Setting	Description
Life Form	Controls the range visibility for any lifeform (any human or animal entity) transmitted over VBS Gateway. Click the sub-group to display information for specific range visibility settings.
Ground	Controls the range visibility for any ground vehicle transmitted over VBS Gateway. Click the sub-group to display information for specific range visibility settings.
Marine	Controls the range visibility for any watercraft transmitted over VBS Gateway. Click the sub-group to display information for specific range visibility settings.
Air	Controls the range visibility for any aircraft transmitted over VBS Gateway. Click the sub-group to display information for specific range visibility settings.
Munitions	Controls the range visibility for certain types of munition transmitted over VBS Gateway. Click the sub-group to display information for specific range visibility settings.
Other	Controls the range visibility for any other entity transmitted over VBS Gateway. Click the sub-group to display information for specific range visibility settings.

For the range visibility settings for each of the VBS Gateway Geo Filter settings, see [Core Range Visibility Settings \(on the previous page\)](#).

4.4.4.3 Electronic Warfare

Controls the range visibility settings for Electronic Warfare (EW), see [Electronic Warfare](#) in the VBS4 Editor Manual.

Click the sub-group to display the EW settings.

Setting	Description
Radar	Controls the range visibility for EW radars (see Radar in the VBS4 Editor Manual). Click the sub-group to display information for specific range visibility settings.
CBS	Controls the range visibility for the EW CBS (Counter-Battery Sensor) (see CBS (Counter-Battery Sensor) in the VBS4 Editor Manual). Click the sub-group to display information for specific range visibility settings.

For the range visibility settings for each EW type, see [Core Range Visibility Settings \(on the previous page\)](#).

4.4.4.4 Hazardous Area

Controls the range visibility settings for Hazardous Areas, see [Hazardous Area](#) in the VBS4 Editor Manual.

Click the sub-group to display the hazardous-area settings.

Setting	Description
Mustard	Controls the range visibility for mustard-gas hazardous areas. Click the sub-group to display information for specific range visibility settings.
Chlorine	Controls the range visibility for chlorine-gas hazardous areas. Click the sub-group to display information for specific range visibility settings.
Liquid Nerve Agent	Controls the range visibility for Liquid Nerve Agent (LNA) hazardous areas. Click the sub-group to display information for specific range visibility settings.
Sarin Gas	Controls the range visibility for sarin-gas hazardous areas. Click the sub-group to display information for specific range visibility settings.
Radioactive	Controls the range visibility for radioactive hazardous areas. Click the sub-group to display information for specific range visibility settings.

For the range visibility settings for each of the hazardous-area settings, see [Core Range Visibility Settings \(on the previous page\)](#).

4.4.4.5 Radio

Controls the range visibility settings for radio devices, see Retractable Radio Mast and Radio Jamming Device in the VBS Radio Manual.

Click the sub-group to display the radio-device settings.

Setting	Description
Antenna	Controls the range visibility for radio antennas (see Retractable Radio Mast in the VBS Radio Manual). Click the sub-group to display information for specific range visibility settings.
Jammer	Controls the range visibility for radio jammers (see Radio Jamming Device in the VBS Radio Manual). Click the sub-group to display information for specific range visibility settings.

For the range visibility settings for each of the radio-device settings, see [Core Range Visibility Settings \(on page 246\)](#).

4.4.4.6 CREW

Controls the range visibility settings for the CREW Link jamming device, see Enabling CREW in the VBS4 Editor Manual.

For the range visibility settings for the CREW radius setting, see [Core Range Visibility Settings \(on page 246\)](#).

4.4.4.7 Waypoints

Controls the range visibility settings for Suppress Waypoints, see Suppress Order in the VBS Control AI Manual.

For the range visibility settings for the Suppress Waypoint radius setting, see [Core Range Visibility Settings \(on page 246\)](#).

4.4.4.8 Active Protection System

Controls the range visibility settings for the Active Protection System (APS), see Active Protection System in the VBS4 Editor Manual.

Click the sub-group to display the APS settings.

Setting	Description
APS Min Range	Controls the Min Defeat Distance range visibility for the APS (see Active Protection System in the VBS4 Editor Manual). Click the sub-group to display information for specific range visibility settings.

Setting	Description
APS Max Range	Controls the Engagement Distance range visibility for the APS (see Active Protection System in the VBS4 Editor Manual). Click the sub-group to display information for specific range visibility settings.

For the range visibility settings for each of the APS settings, see [Core Range Visibility Settings \(on page 246\)](#).

4.4.4.9 Boomerang

Controls the range visibility settings for the Boomerang shooter detection system, see Boomerang in the VBS4 Editor Manual.

For the range visibility settings for the Boomerang Operational Radius setting, see [Core Range Visibility Settings \(on page 246\)](#).

4.4.4.10 Pattern Of Life

Controls the range visibility settings for Pattern Of Life, see Population Editor Object in the VBS Control AI Manual.

For the range visibility settings for the Population Editor Object radius setting, see [Core Range Visibility Settings \(on page 246\)](#).

4.4.5 Map

Controls the 2D map settings.

Click the sub-groups to display information for specific map settings.

Setting	Description
Map Style	<p>Map style to use. Select any of the available map-styles JSON files.</p> <ul style="list-style-type: none">• <code>\Documents\VBS4\Map\Styles\</code> (default patches location)• <code>\Path\User\Map\Styles\</code> (if the <code>-profiles=Path</code> command-line option is used - see Command Line and Launcher Options (on page 76)). <p>NOTE The map-styles JSON files at these locations work as modifications (patches) for the default <code>styles.json</code>. For more information on the file structure, see Custom Map Style Elements (on page 335).</p> <p>The default JSON file used by VBS4 is called <code>styles.json</code>, stored at: <code>\VBS_Installation\Components\WebMapController\styles.json</code></p> <p>WARNING This file should not be modified directly, as any changes get overwritten by default values. Therefore, it is not available for selection in the Map Style drop-down.</p>

Click **Apply**.

The Map Settings changes are saved.

Click **OK**.

VBS4 applies your Map Settings changes.

For more information on the file structure, see [Custom Map Style Elements \(on page 335\)](#).

For more information on map layers and how to use them, see [Custom Map Layers in the VBS4 Editor Manual](#).

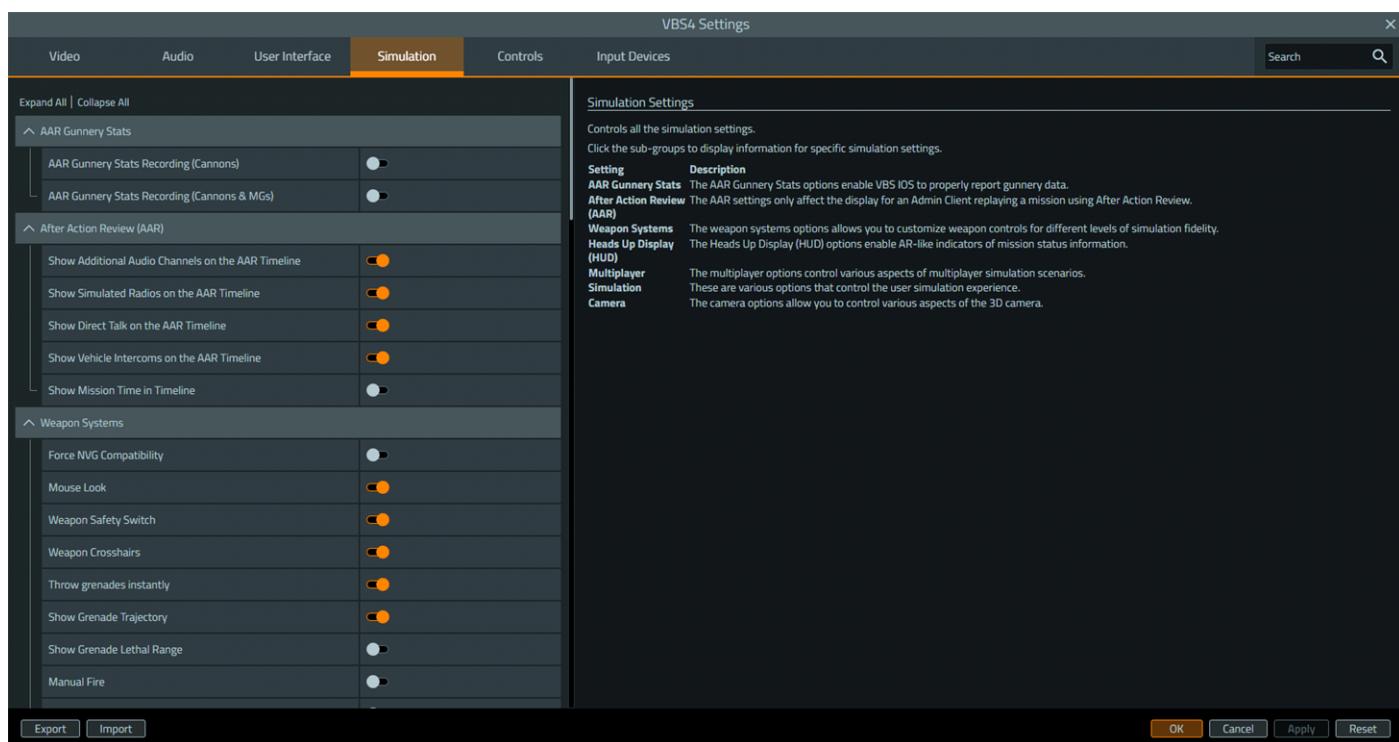
4.5 Simulation Settings

Administrators can manage the Simulation Settings from the VBS4 Settings panel.

In the VBS4 Toolbar, click the **Settings Icon**, and select the **Simulation Tab**.



The VBS4 Settings Panel displays the Simulation Settings.



Follow these steps:

1. Use the Individual Settings in the [Simulation Settings Categories \(on the next page\)](#).
2. Click **Apply**.

The Simulation Settings changes are saved.

3. Click **OK**.

VBS4 updates and applies your Simulation Settings.

NOTE

Most of the Simulation Settings do not take effect while the simulation is running. To make sure that all the updated Simulation Settings are used, restart the simulation.

To restore VBS4 to its default settings, click **Reset**.

To export / import the settings, see [Exporting / Importing Settings \(on page 161\)](#).

NOTE

Simulation Settings are mainly stored in your VBS4 Profile in the following file:

- Default VBS4 Profile location:

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

- Other VBS4 Profile location:

`\Path\Settings\SimulationSettings.xml`

`Path` is specified using the `-profiles=Path` command-line option - for more information, see [Command Line and Launcher Options \(on page 76\)](#).

For more information about the Video parameters in the Profile configuration, see [VBS4 Profile Options \(on page 386\)](#).

4.5.1 Simulation Settings Categories

For more information on the Simulation Settings categories, see:

- [AAR Gunnery Stats Options \(below\)](#)
- [After Action Review \(AAR\) \(on the next page\)](#)
- [Weapon Systems \(on page 254\)](#)
- [Heads Up Display \(HUD\) \(on page 256\)](#)
- [Multiplayer \(on page 259\)](#)
- [Simulation \(on page 260\)](#)
- [Camera \(on page 264\)](#)

4.5.2 AAR Gunnery Stats Options

The AAR Gunnery Stats options enable VBS IOS to properly report gunnery data.

Gunnery Stats Option	Description
AAR Gunnery Stats Recording (Cannons)	If enabled, gunnery data is recorded when the main cannon of a vehicle is fired.
AAR Gunnery Stats Recording (Cannons & MGs)	If enabled, gunnery data is recorded when both the main cannon and machine gun of a vehicle are fired.

4.5.3 After Action Review (AAR)

The AAR settings only affect the display for an Admin Client replaying a mission using After Action Review.

AAR Option	Description
Show Additional Audio Channels on the AAR Timeline	If enabled, AAR displays additional radio channel (pitch voice) icons in the AAR timeline, to indicate when additional radio channels were used. For more information, see VBS Radio Playback in AAR in the VBS Radio Manual.
Show Simulated Radios on the AAR Timeline	If enabled, AAR displays simulated-radio icons in the AAR timeline, to indicate when simulated-radio transmission was used. For more information, see VBS Radio Playback in AAR in the VBS Radio Manual.
Show Direct Talk on the AAR Timeline	If enabled, AAR displays Direct Talk icons in the AAR timeline, to indicate when Direct Talk transmission was used. For more information, see VBS Radio Playback in AAR in the VBS Radio Manual.
Show Vehicle Intercoms on the AAR Timeline	If enabled, AAR displays intercom icons in the AAR timeline, to indicate when vehicle intercom transmission was used. For more information, see VBS Radio Playback in AAR in the VBS Radio Manual.
Show Mission Time in Timeline	If enabled, the time display in AAR displays the time of day at that point in the mission instead of the elapsed time.

4.5.4 Weapon Systems

Weapons Systems Option	Description
Force NVG Compatibility	If enabled, allows the player to use Night Vision (NVG), while looking and aiming through the sight / scope of a weapon (disabled by default).
Mouse Look	If enabled (default), allows the camera to rotate much more quickly as the restrictions of unit movement are removed.
Weapon Safety Switch	If enabled (default), activates weapon safety mode.
Weapon Crosshair	If enabled, the crosshair is visible without looking through the sight. Its purpose is to give an approximation of where the weapon barrel is pointing.
Throw Grenades Instantly	If enabled (default), the grenade-throwing animation is skipped, and grenades are thrown instantly.
Show Grenade Trajectory	If enabled, shows the approximate trajectory line when throwing grenades and for 40 mm grenade launchers.
Show Grenade Lethal Range	If enabled, shows the approximate lethal range, using a bubble visualization, for thrown and launched grenades.
Manual Fire	Enables a manual fire Quick Menu item (see Quick Menu Actions in the VBS4 Trainee Manual).

NOTE

By default, the trajectory can only be disabled (hidden) for grenade launchers, while hand-grenade trajectories are always shown, regardless of the setting. However, you can use the `-oldGameplay` command-line option (see [Command Line and Launcher Options \(on page 76\)](#)) to re-enable the old hand-grenade functionality, which allows enabling / disabling the trajectory.

NOTE

Only works with [Show Grenade Trajectory \(above\)](#) enabled.

NOTE

Only applies to tanks.

Weapons Systems Option	Description
Constant Turret Slew Rate	If enabled, turrets have the same turn rate irrespective of whether they are zoomed or not.
XInput Aim-Assist	If enabled, assists aiming on XInput controllers by slowly moving the weapon crosshair on the target.
<p>NOTE</p> <p>XInput Aim-Assist has the following aspects:</p> <ul style="list-style-type: none">Only supported for XInput controllers (for example, if XInput Aim-Assist is on, but the mouse is used, XInput Aim-Assist has no effect).Does not lock on the target, but automatically moves the crosshair to the target. You can aim at a different target, if required.Not supported for grenades, grenade launchers, and vehicle weapons.Range limitations and magnification levels apply, depending on the used weapon.	<p>Advanced Gunnery Features</p> <p>If enabled:</p> <ul style="list-style-type: none">Main armament starts unloaded.Changing the nature of the selected round does not unload the current loaded round, it only affects the next loaded round.This setting only applies to updated vehicles - The fin / sabot round is loaded automatically, if the gunner is AI.With difficulty disabled - All tanks start with the fin / sabot round loaded automatically. <p>NOTE</p> <p>These features only apply to certain vehicles. For more information, see Manual Loading in the VBS4 Trainee Manual.</p>

4.5.5 Heads Up Display (HUD)

HUD Option	Description
Gun Position Indicator	If enabled, shows the commander and primary-turret orientation on tank-type vehicles and UGVs. <ul style="list-style-type: none">• Orange Line - Shows the primary turret orientation. Only present if the vehicle has a turret.• White Line - Shows the commander orientation. Only present if the vehicle has a commander position.
<div style="border: 1px solid #ccc; padding: 10px; margin-bottom: 10px;"><p>NOTE</p><p>The following considerations apply:</p><ul style="list-style-type: none">• The mils indicator only applies to the Orange Line.• The Gun Position Indicator is hull-up, with the compass rotating around it.• Overrides the Vehicle Awareness Indicator (on the next page), if it is enabled. If it is disabled, Gun Position Indicator still displays.• Needs to be set together with the <code>unitInfoType</code> vehicle configuration parameter set to "<code>UnitInfoTank</code>". For more information, see General Vehicle Parameters in the VBS Developer Reference. If <code>unitInfoType</code> is not set, the Vehicle Awareness Indicator (on the next page) is displayed instead.</div>	
For more information, see Heads Up Display (HUD) in the VBS4 Trainee Manual.	
Hide Vehicles on Radar	If enabled, hides Vehicles / Empty Vehicles on the Situational Awareness Indicator. If disabled, vehicles are shown as small colored diamonds (lilac for Vehicles, green for Empty Vehicles). For more information, see Heads Up Display (HUD) in the VBS4 Trainee Manual.
Advanced Mini-Map	Changes the Mini-Map to Advanced View mode, see Mini-Map Navigation in the VBS4 Trainee Manual.
Infantry Heading Indicator	If enabled, the heading indicator (compass strip) for infantry is shown.
Hide Steerable Parachute HUD	If enabled, hides special HUD controls that are usually shown when a player is using a steerable parachute.
Infantry Awareness Indicator	If enabled, the Situational Awareness Radar with FOV indicators is shown.

HUD Option	Description
Vehicle Awareness Indicator	If enabled, the Situational Awareness Radar with Turret orientation and FOV indicators is shown. <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;">i NOTE<p>Vehicle Awareness Indicator is overridden by Gun Position Indicator (on the previous page), if the latter is enabled.</p></div>
Use Game Map	If enabled, VBS4 uses the old-style "Armed Assault" Game Map instead of the C2 Interface.
Peripheral Vision	If enabled, adds visual signals for characters slightly out of direct view.
Nearby Shot Awareness	If enabled, nearby shots are visualized.
HUD Labels	If disabled, turns off HUD labels for everything except player controlled avatars.
HUD Waypoints Info Always On	The next waypoint is continually shown, rather than fading in and out.
HUD Waypoints Info	Waypoints are shown "floating" above their location with an icon and distance indicator. <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;">i NOTE<p>For this setting to work, Extended HUD Info must be enabled.</p></div>
HUD Show Group	If enabled, arrows at the edge of the screen indicate the direction team members are moving in.
Hide UI	Removes unit information resources from the screen, such as: Health Bar, Fuel Bar, Weapon Type, Radar, Weapon Cursor, 3D World Actions (see the VBS4 Trainee Manual). The server forces these settings on all clients in MP.
Friendly TAG	If enabled, shows the health and name of the target avatar as your cross-hairs point at it. The information disappears after the cross-hairs leave the target. <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;">i NOTE<p>For this setting to work, HUD Labels must be enabled.</p></div>
Extended Map Info	If disabled (default), known friendly / hostile units are not seen by players using the Game Map or Mini-Map (see Mini-Map Navigation in the VBS4 Trainee Manual).

HUD Option	Description
Extended HUD Info Always On	Shows extended HUD information continually, rather than fading in and out.
Extended HUD Info	If enabled, provides information about the location of enemy forces, in the form of an indicator arrow and an estimated distance-to-target. This information is available from all friendly sources and appears automatically on your screen.
Enemy TAG	If enabled, shows the health and name of the target avatar as your crosshairs point at it. The information disappears once the cross-hairs leave the target.
	<div style="border: 1px solid #0070C0; padding: 5px; margin-top: 10px;"><p>NOTE</p><p>For this setting to work, HUD Labels must be enabled.</p></div>
Friendly Kill Messages	If disabled, players do not receive friendly fire messages such as: "Player 1 killed Player 2 (friendly fire)" (enabled by default).
	<div style="border: 1px solid #0070C0; padding: 5px; margin-top: 10px;"><p>NOTE</p><p>Only applies to players, not AI.</p></div>
Clock Indicator	If enabled, this indicator provides a clock method of target indication. It only appears when an enemy is located, and the player is part of a group. Disabling this setting removes this feature, and no target indication is given by the AI (enabled by default).
	<div style="border: 1px solid #0070C0; padding: 5px; margin-top: 10px;"><p>NOTE</p><p>The Clock Indicator appears at the top-right corner of the player HUD.</p></div>
	For more information, see Heads Up Display (HUD) in the VBS4 Trainee Manual.
3D Soldier Names	If disabled, removes the health bar and name field from above the soldiers on your team.
	<div style="border: 1px solid #0070C0; padding: 5px; margin-top: 10px;"><p>NOTE</p><p>Only applies to players, not AI.</p></div>

4.5.6 Multiplayer

Multiplayer Option	Description										
Skip Briefing in Multiplayer	If enabled, always skips the Mission Briefing (see Mission Briefings in the VBS4 Editor Manual) at the start of a multiplayer session. Affects the default Skip Briefing setting in the Network Lobby.										
Start AAR in Multiplayer	If enabled, AAR recording starts automatically during multiplayer sessions. Affects the default Record AAR setting in the Network Lobby.										
VON ID	If enabled, the VOIP ID is shown.										
Seagull Respawn	If enabled, toggles between a dead player re-spawning as a seagull above the battlefield, or receiving the "You Are Dead" message on a black background.										
Can Host Multiplayer Session	<p>If enabled, allows hosting of multiplayer sessions.</p> <p>The following applies when the option is enabled / disabled:</p> <table border="1"> <thead> <tr> <th>Trainee / Administrator</th> <th>Enabled</th> <th>Disabled</th> </tr> </thead> <tbody> <tr> <td>Trainee</td> <td>The Multiplayer Servers dialog shows the Host Locally option.</td> <td>The Multiplayer Servers dialog does not show the Host Locally option.</td> </tr> <tr> <td>Administrator</td> <td>The Multiplayer Servers dialog shows the Host Locally option. The Host button in Battlespace Functions Panel is enabled.</td> <td>The Multiplayer Servers dialog does not show the Host Locally option. The Host button in Battlespace Functions Panel is disabled.</td> </tr> </tbody> </table>		Trainee / Administrator	Enabled	Disabled	Trainee	The Multiplayer Servers dialog shows the Host Locally option.	The Multiplayer Servers dialog does not show the Host Locally option.	Administrator	The Multiplayer Servers dialog shows the Host Locally option. The Host button in Battlespace Functions Panel is enabled.	The Multiplayer Servers dialog does not show the Host Locally option. The Host button in Battlespace Functions Panel is disabled.
Trainee / Administrator	Enabled	Disabled									
Trainee	The Multiplayer Servers dialog shows the Host Locally option.	The Multiplayer Servers dialog does not show the Host Locally option.									
Administrator	The Multiplayer Servers dialog shows the Host Locally option. The Host button in Battlespace Functions Panel is enabled.	The Multiplayer Servers dialog does not show the Host Locally option. The Host button in Battlespace Functions Panel is disabled.									
<p>For more information, see Scenario Execution in the Introduction to VBS4 Guide.</p>											

4.5.7 Simulation

Simulation Option	Description
Advanced Ballistics	<p>If enabled, the following atmospheric parameters affect munition ballistics:</p> <ul style="list-style-type: none">• Wind Speed and Direction.• Air Friction, determined by Air Temperature and Pressure settings.• For specific vehicles, the Fire Control System (FCS) may enable compensation for the atmospheric parameters. <p>To set atmospheric parameters, see Atmospheric Parameters in the VBS4 Editor Manual.</p> <p>To display atmospheric parameters in VBS4, see Atmospheric Parameters in the VBS4 Trainee Manual and Mission Briefings in the VBS4 Editor Manual.</p> <p>If enabled, VBS4 simulates the Coriolis Effect (https://en.wikipedia.org/wiki/Coriolis_force), which affects the impact point of rounds based on the rotation of the Earth. For example, shots fired in the Northern Hemisphere drift to the right.</p> <p>If enabled, the Magnus Effect (https://en.wikipedia.org/wiki/Magnus_effect) for ballistics is activated, which affects how projectiles travel through the air. This effect causes projectiles to deflect sideways due to their spin. How the Magnus Effect is configured for VBS is discussed in Ammunition Parameters in the VBS Developer Reference.</p>
Flight Model Affected by Wind	<p>If enabled, wind affects rotary wing aircraft behavior.</p> <p>This setting can also be enabled / disabled, using SQF command: setWind (https://sqf.bisimulations.com/display/SQF/setWind).</p> <p>The Wind Speed / Direction and Gust Speed / Direction settings in Weather Settings, described in the VBS4 Editor Manual, are used to define the specific wind characteristics.</p>
Vehicle and Weapon Qualifications	<p>If enabled, allows using SQF scripts that limit available vehicle roles and weapon usage, based on unit qualifications (all the qualifications are enabled by default).</p> <p>For a list of qualifications, see addCapability (https://sqf.bisimulations.com/display/SQF/addCapability).</p>
3D Wakes	<p>If enabled, watercraft wakes are shown in 3D.</p>
CAS Dispersion	<p>If enabled, allows the simulation of aircraft munitions dispersion in VBS Close Air Support.</p> <p>For general information, see VBS Close Air Support in the Introduction to VBS4 Guide.</p> <p>For information on how to configure specific dispersion, see the Dispersion JSON parameter in the VBS Plan Manual.</p>

Simulation Option	Description
Unlimited Fuel	If disabled, the vehicle adopts normal fuel usage rates and eventually requires refueling from an external source. If enabled, allocates limitless fuel to the vehicle.
Inversed Ship Steering Control	Reverses the ship steering controls. <div style="border: 1px solid #0070C0; padding: 5px; margin-top: 10px;">i NOTE<p>Used in adjustment of specific ship controllers whose steering central position is set to 0.5, and not 0, which reverses the axis logic.</p></div>
Automatic Door Animations	When enabled (enabled by default), plays vehicle-door opening / closing animations during the performance of the Get In / Get Out actions. <div style="border: 1px solid #0070C0; padding: 5px; margin-top: 10px;">i NOTE<p>The following considerations apply:</p><ul style="list-style-type: none">• The option only works for specifically configured content models. For more information, contact support@bisimulations.com.• Bohemia Interactive Simulations recommends to use the option with Realistic Vehicle Entry (below) enabled.</div>
Unlimited Saves	If enabled, saves single player missions unlimited times.
Simple Helicopter Model	If enabled, the flight model of the helicopter becomes less reliant on the flying skills of the user. The helicopter is extremely easy to fly and does not crash to the ground. Speed and elevation are controlled by single key presses on the keyboard (it is not necessary to hold them down).
Realistic Vehicle Entry	If enabled, forces units to use proper access points (which a vehicle model may have - for example, M1128 Stryker MGS) to board the various vehicle positions.
Realistic Repairs	If enabled, players can perform manual repairs. For more information, see Repairing Vehicles in the VBS4 Trainee Manual.
Realistic Fatigue	If enabled, the Fatigue Indicator shows as soon as the fatigue value is bigger than 0. Stress applied to the body through factors such as running, carried weight, wounds, length of time in battle, directly affects the fatigue level of units (disabled by default).
Lifeform Snow Compression	If enabled (default), lifeform entities (people and animals) leave snow trails. If disabled, the lifeform entities clip through the snow visually, but do not leave trails.

Simulation Option	Description
Wheel Snow Compression	If enabled (default), wheeled vehicle entities leave tire marks on snow. If disabled, the wheeled vehicle entities still leave tire marks visually, but remain on the snow surface.
	<div style="border: 1px solid #0070C0; padding: 5px; margin-top: 10px;"><p> NOTE Can only be modified in Prepare mode.</p></div>
One Incapacitated Screen	If enabled, displays the text "You are Incapacitated" on screen for dead or unconsciousness units.
Helicopter Follow Contour	If enabled, forces the helicopter to follow the contours of the ground, adopting a "tactical flying" behavior. The helicopter gains / decreases altitude according to the landscape.
	<div style="border: 2px solid red; padding: 10px; margin-top: 10px;"><p> WARNING Only works, if Simple Helicopter Model (on the previous page) is enabled.</p></div>
Hit Body Effect	If enabled (default), units aim up when hit.
Injured Hands Trembling	If enabled, damage to the arms of a unit causes them to tremble, making aiming more difficult. The more damage, the worse the trembling. Disabled by default.
	<div style="border: 1px solid #0070C0; padding: 5px; margin-top: 10px;"><p> NOTE If enabled, damage to other body parts can also cause the hands to tremble, even if the hands themselves are not injured.</p></div>
Health Degradation	If enabled, the health degradation (bleeding out) simulation is applied. Health begins to deteriorate when the setting is less than 75%, and stops at 10%.
Extended Armor	If enabled, simulates the addition of extra armor plates to armored vehicles. This allows the vehicle to sustain more damage before total destruction.
Combat User Suppression	If enabled, the player is effectively suppressed by incoming fire. The player notices a "white out" flashing of the screen, momentarily losing focus on their current FOV.
Cadet Mode and Training Hints	If enabled, allows the cadetMode (https://sqf.bisimulations.com/display/SQF/cadetMode) and hintCadet (https://sqf.bisimulations.com/display/SQF/hintCadet) commands to function.

Simulation Option	Description
Bleeding	If enabled, bleeding causes a drop in blood level (amount of blood a unit has) leading to death from bleeding out. If disabled, bleeding can still be set or inflicted (in combination with the Advanced Wounding Editor object / Object Properties settings), but the blood level remains stable, the unit cannot bleed out.
Backblast Damage	If disabled, prevents damage / injury from backblasts.
	<p>NOTE</p> <p>Only player units operating backblast-producing weapons may cause backblast damage to other units (player or AI). AI units operating such weapons do not cause backblast damage, even if Backblast Damage is enabled.</p>
Enable Distant Footprint	If enabled, allows non-vehicle entities (people and animals) to leave distant footprints (outside of the player vicinity). The number of footprints per entity is limited to 600 (the number may change in future releases). When that limit is reached, the oldest footprints begin to disappear, if there are new ones to replace them.
Advanced Wounding and Amputations	If enabled, simulates injuries to specific limbs, including amputations and bleeding out.
	<p>NOTE</p> <p>By default, advanced wounding and amputation only applies to military units. These units use the <code>hasAmputation</code> and <code>amputationDamage</code> parameters in their configuration.</p> <p>For more information, see Person Parameters in the VBS Developer Reference and the <code>\docs\</code> folder of your VBS Developer Suite installation.</p>
Advanced Head Injury	If enabled, units that receive head injuries experience dizziness and blurred vision, which affects their accuracy when using weapons, for example.

4.5.8 Camera

Camera Option	Description
Show Avatar in First-Person View	If enabled, shows avatar proxies in first-person view when in vehicles.
3D Editor Camera Retains Absolute Height	If enabled, allows the 3D Editor Camera in the VBS Editor to follow an absolute height, instead of relative height (following the terrain curvature).
Automatic Driver Camera Turn	If enabled, when controlling a vehicle, the view direction is affected by the direction the vehicle is headed. If disabled, the camera is independent of vehicle steering.
Third-Person View	Enables / disables the ability to adopt a third-person view port, while using the avatar in the game.

4.6 Controls Settings

All users can manage their Controls Settings from the VBS4 Settings panel.

In the VBS4 Toolbar, click the **Settings Icon**, and select the **Controls Tab**.



The VBS4 Settings Panel displays the Controls Settings.

	Primary	Secondary
Mouse Sensitivity (X-Axis)	1 %	
Mouse Sensitivity (Y-Axis)	1 %	
Invert Mouse		Switch
Infantry Controls		
Swim Up	⚠️ Q	
Swim Down	⚠️ Z	
Move Forward	⚠️ W	⚠️ UP
Move Back	⚠️ S	⚠️ DOWN
Strafe Left	⚠️ A	⚠️ LEFT
Strafe Right	⚠️ D	⚠️ RIGHT
Turbo		
Fast Forward	Right Ctrl+W	
Slow Forward		
Up	⚠️ Page Up	
Go Prone	⚠️ Page Down	

Follow these steps:

1. Select one of the following controller type sub-tabs:

- **Keyboard and Mouse** - Standard keyboard and mouse controls.
- **XInput Controllers** - XInput-type controllers (such as the Microsoft Xbox controller - see Microsoft Xbox Controls in the VBS4 Trainee Manual).

NOTE

XInput controllers all use the same **XInput Controllers** sub-tab.

To enable XBox controller / joystick functionality when the player is not focused on VBS4 (for example, when the VBS4 window is open in the background), use `-bgControllerInput` in **Extra Parameters** in VBS Launcher.

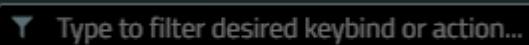
- **TrackIR Controllers** - TrackIR-type controllers.
- **Logitech 3D Extreme** - Logitech 3D Extreme Pro controllers.
- **ASVSIM Controllers** - ASVSIM-type controllers.

NOTE

Connecting DirectInput controllers to your computer causes sub-tabs to appear for each controller.

2. To find the control that you need to set (see [VBS4 Controls Reference \(on page 275\)](#) for the full list of controls in VBS4), do one of the following:

- Type the control name in the **Search** bar.



- Select one of the available control category filters, and then the control itself:

- | | | |
|-----------------------------|------------------------------------|-------------------------------|
| ◦ Other Controls | ◦ Vehicle Advanced Controls | ◦ System Controls |
| ◦ Infantry Controls | ◦ Helicopter Controls | ◦ User Input Emulation |
| ◦ Skydiving Controls | ◦ Aircraft Controls | ◦ SPIKE LR Specific |
| ◦ Optics Controls | ◦ Buldozer Controls | ◦ Electronic Warfare |
| ◦ Vehicle Controls | ◦ Editor Controls | |

NOTE

The following considerations apply:

- By default, VBS4 displays the full list of controls for all the categories for the selected controller type. You can also use the **Mouse Scroll Wheel** to locate the control.
- The **Other Controls** are specific to the controller type, and have a different setup method from the remaining controls. For more information, see [Other Controls \(on the next page\)](#).

3. To set / bind the control, click in the **Primary / Secondary** column (these columns are used to create primary and secondary control bindings), and press a key / click a button / move a stick on your controller device to bind the control to it.

To cancel the control binding, press **Esc**.

If another control uses the same binding, the **Binding Duplication Icon** appears next to it.



To track binding duplication issues, see [Binding Duplication \(on page 269\)](#).

4. To clear a control binding that is already set, right-click in the **Primary / Secondary** column.

5. Click **Apply**.

The Controls Settings changes are applied.

6. Click **OK**.

VBS4 updates and applies your Controls Settings.

To restore VBS4 to its default settings, click **Reset**.

To export / import the settings, see [Exporting / Importing Settings \(on page 161\)](#).

NOTE

Controls Settings are stored in your VBS4 Profile in the following file:

- Default VBS4 Profile location:

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

- Other VBS4 Profile location:

`\Path\Settings\ControlsSettings.xml`

`Path` is specified using the `-profiles=Path` command-line option - for more information, see [Command Line and Launcher Options \(on page 76\)](#).

For more information about the Controls parameters in the Profile configuration, see [VBS4 Profile Options \(on page 386\)](#).

4.6.1 Other Controls

The **Other Controls** are specific to the following controller types:

- [Keyboard and Mouse \(below\)](#)
- [XInput Controllers \(on the next page\)](#)

4.6.1.1 Keyboard and Mouse

Other controls for keyboard and mouse include:

Control	Description
Mouse Sensitivity (X-Axis)	Controls the mouse sensitivity along the X-axis. Enter a value, use the up / down arrows in the number field, or the slider to set the sensitivity. The full range is 1 - 500%, with the default set to 100%.
Mouse Sensitivity (Y-Axis)	Controls the mouse sensitivity along the Y-axis. Enter a value, use the up / down arrows in the number field, or the slider to set the sensitivity. The full range is 1 - 500%, with the default set to 100%.
Invert Mouse	Toggle to enable / disable mouse movement inversion along the Y-axis.

NOTE

Bohemia Interactive Simulations recommend using the default settings.

4.6.1.2 XInput Controllers

Other controls for XInput controllers include:

Control	Description
XInput Deadzone	<p>Use the XInput Deadzone option to set the controller-sensitivity threshold for XInput controllers (such as a Microsoft Xbox controller) between 1 - 99%, where 1% is the lowest threshold for the control usage to take effect in VBS4, and 99% the highest threshold.</p> <p>For example, if XInput Deadzone is set to 1%, then it is enough to use 1% of the X- and Y-axis spans of the Microsoft Xbox controller Left Stick / Right Stick to perform a certain action. Increasing the threshold helps to prevent unwanted cursor drift.</p> <p>The XInput Deadzone full range is 1 - 99%.</p>

4.6.2 Binding Duplication

In cases of control binding duplication, the **Primary** and / or **Secondary** columns indicate the issue with the **Binding Duplication Icon** that appears next to it.



Strafe Right



D



RIGHT

The **Duplicated Keybindings** panel allows you to see the conflicting bindings for the **Primary** and / or **Secondary** control bindings.

Duplicated keybindings

D is already bound to:

- Side Slip Right
- Parachute Bank Right
- Car Right
- Command Right
- Bank Right
- Bank Right
- Move Editor Camera Right
- Change missile flight path trajectory

RIGHT is already bound to:

- Car Right
- Command Right
- Bank Right
- Bank Right
- Shift missile lock - Right

4.6.3 Logitech G27 / G29 Racing Wheels

VBS4 supports the Logitech G27 and G29 Racing Wheels, Pedals, and Shifters.

Image-26: Logitech G27 Racing Wheel, Pedals, and Shifter



The following setups are available:

- [Logitech G27 Setup \(below\)](#)
- [Logitech G29 Setup \(on page 272\)](#)

Logitech G27 Setup

Follow these steps:

1. Set up the G27 Steering Wheel according to the G27 Racing Wheel Getting Started Guide.

Obtain the guide at <http://www.logitech.com/assets/47059/g27-racing-wheel-quickstart-guide.pdf>

2. Install the Logitech Gaming Software.

Visit <http://support.logitech.com/product/g27-racing-wheel> to download the software.

NOTE

Ensure that you select the appropriate OS and 64-bit type for your computer.

3. Run the Logitech Gaming Software with your G27 Racing Wheel plugged in, and calibrate the device.

4. Open the Logitech Profiler from the Windows Toolbar, and select **Options > Global Device Settings**:
 - Set **Degrees of Rotation** to 900°.
 - Click **OK**.
5. Start VBS4, open the **Controls** settings, and select the **G27 Racing Wheel** device you want to configure.
To configure a control, see [Controls Settings \(on page 265\)](#).
6. To select the Gearbox Mode, open the **Input Devices** tab (see [Input Devices Settings \(on page 304\)](#)):
 - **Off**: All vehicles are fully automatic.
 - **Basic**: Select forward or reverse with automatic forward gear changes.
 - **Real**: VBS4 uses the gearbox configured for the vehicle.

 **NOTE**

For more information, see Gearboxes in the VBS4 Trainee Manual.

7. Configure controls for the G27 Steering Wheel:
 - Enable **True Steering Mode** in the **Input Devices** tab (see [Input Devices Settings \(on page 304\)](#)).
 - VBS4 is pre-configured to use the steering axis for **Car Linear Left** and **Car Linear Right**.
 - To use the steering paddles with Basic Gearbox Mode, configure **Car Gear Down** and **Car Gear Up**.
8. Configure controls for the G27 Pedals:
 - Configure **Car Accelerate** and **Car Brake**.
9. Configure controls for the G27 Shifter:
 - To use the shifter with Basic Gearbox Mode, configure **Car Gear Down** and **Car Gear Up**.
 - To use the shifter with Real Gearbox Mode, configure **Car Shift Fwd 1-6** and **Car Shift Rvs 1**.
10. **Optional:** Map any of the other buttons on the G27 Steering Wheel and Shifter to useful driver controls in VBS4. For example, vehicle light controls.

 **NOTE**

VBS4 does not use the clutch, even for the real gearbox mode.

11. Review all control mappings to ensure that the G27 controls are not mapped to any controls you do not want to use.
12. Click **OK** to confirm all your settings and return to the main menu.

Logitech G29 Setup

Follow these steps:

1. Set up the G29 Steering Wheel according to the G29 Racing Wheel Getting Started Guide.

Obtain the guide at <http://www.logitech.com/support/g29>

2. Install the Logitech G HUB.

Visit <https://support.logi.com/hc/en-us/articles/360024850133-Downloads-G29-Driving-Force-Racing-Wheel> to download the software.

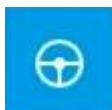
 **NOTE**

Ensure that you select the appropriate OS and 64-bit type for your computer.

3. Run the Logitech G HUB with your G29 Racing Wheel plugged in, and calibrate the device.

4. In the Logitech G HUB:

- a. Go to **Settings**.
- b. Select the G29 Racing Wheel.
- c. Click the **Steering Wheel** icon.



- d. Set the **Operating Range** to 900°.

5. Start VBS4, open the **Controls** settings, and select the **G27 Racing Wheel** device you want to configure.

To configure a control, see [Controls Settings \(on page 265\)](#).

6. To select the Gearbox Mode, open the **Input Devices** tab (see [Input Devices Settings \(on page 304\)](#)):

- **Off:** All vehicles are fully automatic.
- **Basic:** Select forward or reverse with automatic forward gear changes.
- **Real:** VBS3 uses the gearbox configured for the vehicle.

 **NOTE**

For more information, see Gearboxes in the VBS4 Trainee Manual.

7. Configure controls for the G29 Steering Wheel:

- Enable **True Steering Mode** in the **Input Devices** tab (see [Input Devices Settings \(on page 304\)](#)).
- VBS4 is pre-configured to use the steering axis for **Car Linear Left** and **Car Linear Right**.
- To use the steering paddles with Basic Gearbox Mode, configure **Car Gear Down** and **Car Gear Up**.

8. Configure controls for the G29 Pedals:

- Configure **Car Accelerate** and **Car Brake**.

 **NOTE**

VBS4 does not use the clutch, even for the real gearbox mode.

9. Configure controls for the G29 Shifter:

- To use the shifter with Basic Gearbox Mode, configure **Car Gear Down** and **Car Gear Up**.
- To use the shifter with Real Gearbox Mode, configure **Car Shift Fwd 1-6** and **Car Shift Rvs 1**.

10. **Optional:** Map any of the other buttons on the G29 Steering Wheel and Shifter to useful driver controls in VBS4. For example, vehicle light controls.

11. Review all control mappings to ensure that the G29 controls are not mapped to any controls you do not want to use.

12. Click **OK** to confirm all your settings and return to the main menu.

4.6.4 TrackIR Setup

You can configure TrackIR to work with VBS4.

For the Virtual Reality (VR) equipment that can be used with TrackIR, see [Virtual Reality Headsets \(on page 306\)](#).

Follow these steps:

1. Download the **TrackIR** application from <https://www.naturalpoint.com/trackir/> and install it.
2. Connect your **TrackIR** device to your PC.
3. Start the **TrackIR** application.
4. In the **TrackIR** application, select the **Tracking Target**, based on your TrackIR hardware type.
5. In the **TrackIR** application, press **F12** to reset your TrackIR position / rotation to the current real-life one.
6. Start VBS4.
7. In the VBS4 Toolbar (see the Introduction to VBS4 Guide), click the **Settings** icon.



8. Select the **Controls** tab.

The VBS4 Settings Panel displays the Controls settings.

9. Select the **TrackIR Controllers** sub-tab.

Set up the control bindings, as needed.

NOTE

You can disable continuous zoom for TrackIR by unbinding the **Zoom In (Continuous)** and **Zoom Out (Continuous)** controls.

4.6.5 VBS4 Controls Reference

VBS4 uses the following controls, which can be bound to different key or control mappings as described in [Controls Settings \(on page 265\)](#).

NOTE

Default Controls in the table uses the following conventions:

- LMB, MMB, RMB - Left (Primary), Middle, Right (Secondary) Mouse Button.
- LShift, LCtrl, RAlt - Left and Right Shift, Ctrl, Alt, and so on.
- 2 x Key - Tap the key twice or tap and hold the key.
- Key + Key - Hold both keys.
- Num N - The key on the Numpad (right-side) of a standard keyboard.
- XBox Control - The applicable control on an XBox controller.
- Stick Control - The applicable control on a Joystick.
- TrackIR Control - The applicable control for TrackIR.
- POV N deg - The applicable POV HAT Joystick control.

Control Name	Description	Default Controls
Accelerate Editor Camera	Increase the movement speed of the Editor Camera.]
Aim Down	Aim personal weapon down.	Mouse Down XBox Right Thumb Y Down
Aim Left	Aim personal weapon left.	Mouse Left XBox Right Thumb X Left
Aim Right	Aim personal weapon right.	Mouse Right XBox Right Thumb X Right
Aim Up	Aim personal weapon up.	Mouse Up XBox Right Thumb Y Up
Align Vehicle	Align the aircraft to the current RMS target. Only works with specific vehicles.	Not Set

Control Name	Description	Default Controls
Arrow Down	Gamepad control to move the arrow down (used in lists and menus).	XBox Down
Arrow Left	Gamepad control to move the arrow left (used in lists and menus).	XBox Left
Arrow Right	Gamepad control to move the arrow right (used in lists and menus).	XBox Right
Arrow Up	Gamepad control to move the arrow up (used in lists and menus).	XBox Up
Atmospheric Parameters On / Off	Toggle the atmospheric parameters display.	K
Auto-Hover Off	Turn off the aircraft auto-hover mode.	2 x W 2 x A 2 x D
Auto-Hover On	Turn on the aircraft auto-hover mode.	2 x S
Back	Navigate to a previous interaction menu screen.	Backspace
Backspace	Gamepad control that emulates pressing Backspace in user interfaces.	XBox Right Trigger
Bank Left	Hold to bank the aircraft to the left.	A Left Arrow Stick X- Axis XBox Right Thumb X Left
Bank Right	Hold to bank the aircraft to the right.	D Right Arrow Stick X+ Axis XBox Right Thumb X Right
Binoculars	Equip binoculars.	B Hold XBox Right
Browser Back	Gamepad control to back in the browser.	XBox Black
Browser Forward	Gamepad control to forward in the browser.	XBox White
Browser Refresh	Gamepad control to refresh the browser.	XBox Back

Control Name	Description	Default Controls
Camera and Object Rotations	Hold while moving the cursor to look around in Editor. Hold with the Shift key to rotate selected objects in Editor.	RMB
Camera Crosshair On / Off	Toggle the camera crosshair.	L
Cancel Action	Unused.	Not Set
Car Accelerate	Hold to move the vehicle forwards.	Not Set
<p>NOTE</p> <p>This control is intended for use with a gearbox controller and Gearbox Mode must be set to Real. For more information, see Gearbox Modes in the VBS4 Trainee Manual.</p>		
Car Aim Down	Aim vehicle weapon down.	Mouse Down XBox Right Thumb Y Down
Car Aim Left	Aim vehicle weapon left.	Mouse Left XBox Right Thumb X Left
Car Aim Right	Aim vehicle weapon right.	Mouse Right XBox Right Thumb X Right
Car Aim Up	Aim vehicle weapon up.	Mouse Up XBox Right Thumb Y Up
Car Back	Hold to brake or move the vehicle backwards if it is stopped.	S Down Arrow Stick Z- Rotate XBox Left Thumb Y Down

Control Name	Description	Default Controls
Car Brake	Hold to brake or move the vehicle backwards if it is stopped.	XBox B
	<p>NOTE</p> <p>This control is intended for use with a gearbox controller and Gearbox Mode must be set to Real. For more information, see Gearbox Modes in the VBS4 Trainee Manual.</p>	
Car Fast Forward	Hold to reach the maximum vehicle speed.	E Stick Y- Axis
Car Forward	Hold to move the vehicle forwards.	W Up Arrow XBox Left Thumb Y Up
Car Gear Down	Shift the vehicle gear down.	Not Set
	<p>NOTE</p> <p>This control is intended for use with a gearbox controller and Gearbox Mode must be set to Real. For more information, see Gearbox Modes in the VBS4 Trainee Manual.</p>	
Car Gear Up	Shift the vehicle gear up.	Not Set
	<p>NOTE</p> <p>This control is intended for use with a gearbox controller and Gearbox Mode must be set to Real. For more information, see Gearbox Modes in the VBS4 Trainee Manual.</p>	
Car Left	Hold to turn the vehicle left.	A Left Arrow
Car Linear Left	Turn the vehicle left.	Stick X- Axis XBox Right Thumb X Left
	<p>NOTE</p> <p>This control is intended for analog controls such as joysticks, gamepad sticks, or steering wheels.</p>	

Control Name	Description	Default Controls
Car Linear Right	Turn the vehicle right.	Stick X+ Axis XBox Right Thumb X Right
	<p>NOTE</p> <p>This control is intended for analog controls such as joysticks, gamepad sticks, or steering wheels.</p>	
Car More Left	Hold to sharply turn the vehicle left.	Mouse Left
Car More Right	Hold to sharply turn the vehicle right.	Mouse Right
Car Parking Brake	Toggle the vehicle parking brake on and off.	Not Set
Car Right	Hold to turn the vehicle right.	D Right Arrow
Car Shift Fwd 1-8	Shift directly to the specified gear.	Not Set
	<p>NOTE</p> <p>This control is intended for use with a gearbox controller and Gearbox Mode must be set to Real. For more information, see Gearbox Modes in the VBS4 Trainee Manual.</p>	
Car Shift Rvs 1-2	Shift directly to the specified reverse gear.	Not Set
	<p>NOTE</p> <p>This control is intended for use with a gearbox controller and Gearbox Mode must be set to Real. For more information, see Gearbox Modes in the VBS4 Trainee Manual.</p>	
Car Slow Forward	Hold to slowly move the vehicle forwards.	Q
Car Soft Brake	Hold to softly brake the vehicle.	Not Set
	<p>NOTE</p> <p>This control is intended for use with a gearbox controller and Gearbox Mode must be set to Real. For more information, see Gearbox Modes in the VBS4 Trainee Manual.</p>	

Control Name	Description	Default Controls
Car Transfer Range Down	Shift the current gear down by one.	Not Set
	<p>NOTE</p> <p>This control is intended for use with a gearbox controller and Gearbox Mode must be set to Real. For more information, see Gearbox Modes in the VBS4 Trainee Manual.</p>	
Car Transfer Range Up	Shift the current gear up by one.	Not Set
	<p>NOTE</p> <p>This control is intended for use with a gearbox controller and Gearbox Mode must be set to Real. For more information, see Gearbox Modes in the VBS4 Trainee Manual.</p>	
Center Look	<p>Center the view back to the default weapon position when Free Look is used while on foot.</p> <p>Reset the camera position when using UAV camera views.</p> <p>Return vehicle weapons, including RWS or CROWS, to their default center position when in control of one, or when taking control as the commander.</p>	Num 5
Change Missile Flight Path Trajectory	Use to toggle between a HIGH / LOW trajectory on the Spike LR (Long-Range) portable missile system.	D
Chat	<p>Use to open text chat.</p> <p>For more information, see Text Chat in the VBS4 Trainee Manual.</p>	/
	<p>NOTE</p> <p>Text Chat uses legacy VBS VON / chat technology. The supported channels for Text Chat are not part of VBS Radio. For information about VBS Radio chat, see Communications Panel in the VBS Radio Manual.</p>	

Control Name	Description	Default Controls
Command Back	Order an AI-driven vehicle to move backwards.	S Down Arrow
	<p>NOTE</p> <p>This control is only available in the Commander position of the vehicle.</p>	
Command Fast	Order an AI-driven vehicle to move faster.	E
	<p>NOTE</p> <p>This control is only available in the Commander position of the vehicle.</p>	
Command Fire	Order an AI-controlled vehicle weapon to fire.	2 x LCtrl
	<p>NOTE</p> <p>This control is only available in the Commander position of the vehicle.</p>	
Command Forward	Order an AI-driven vehicle to move forwards.	W Up Arrow
	<p>NOTE</p> <p>This control is only available in the Commander position of the vehicle.</p>	
Command Left	Order an AI-driven vehicle to turn left.	A Left Arrow
	<p>NOTE</p> <p>This control is only available in the Commander position of the vehicle.</p>	
Command Right	Order an AI-driven vehicle to turn right.	D Right Arrow
	<p>NOTE</p> <p>This control is only available in the Commander position of the vehicle.</p>	

Control Name	Description	Default Controls
Command Slow	Order an AI-driven vehicle to move slower.	Q
	<p>NOTE</p> <p>This control is only available in the Commander position of the vehicle.</p>	
Command Watch	Order an AI-controlled vehicle gunner to aim at a target.	RMB
	<p>NOTE</p> <p>This control is only available in the Commander position of the vehicle.</p>	
Command Watch Stop	Order an AI-controlled vehicle gunner to stop aiming at a target.	Tab
	<p>NOTE</p> <p>This control is only available in the Commander position of the vehicle.</p>	
Commander Override	Take direct control of the primary vehicle weapon and optics. You must Turn In to use Commander Override.	Scroll Lock
	<p>NOTE</p> <p>This control is only available in the Commander position of the vehicle.</p>	
Commanding Mode	Hold to display a list of AI command actions. For more information, see Vehicle Command Controls in the VBS4 Trainee Manual.	Left Windows
	<p>NOTE</p> <p>This control is only available in the Commander position of the vehicle.</p>	
Compass	Hold to display the compass.	G
Compass (Toggle)	Toggle the compass display on and off.	2 x G
Convoy Light	Toggle vehicle convoy lights on and off.	K

Control Name	Description	Default Controls
Crouch	Change to the crouch posture, or return to the standing posture when crouching.	X XBox B
Crouch	Hold to crouch.	Not Set
Cycle Direct Talk Volume Level	Cycle through the VBS Radio Direct Talk volume levels (whispering, talking, shouting).	2 x Tab
	<p>NOTE</p> <p>To define the cut-off distances (in meters) for whispering, talking, and shouting, see the <code>DirectTalk_WhisperingDistance</code>, <code>DirectTalk_TalkingDistance</code>, and <code>DirectTalk_ShoutingDistance</code> parameters in the VBSRadioSettings Configuration File in the VBS Radio Manual.</p>	
Cycle Laser (All Modes)	Cycle between the available lasers attached to a weapon and / or vehicle lasers, and laser modes for each personal-weapon / vehicle laser.	Not Set
Cycle Lights (All Modes)	Cycle between the available flashlights attached to a weapon and / or vehicle lights, and light modes for each flashlight / vehicle light.	Not Set
	<p>NOTE</p> <p>Lights are only visible at night.</p>	
Cycle Magnification	Cycle between high and low magnification when using optics.	Not Set
Cycle Optics	Cycle through all available optics, but not their individual modes (normal, NV, TI).	Not Set
Cycle Optics (All Modes)	Cycle through all available optics and optic modes within the range of one optic (normal, NV, TI) and their sub-modes (TI white hot, TI black hot, and so on).	N
Cycle Optics (Vision Modes)	Cycle through the available optic modes within the range of one optic.	Not Set
Cycle Optics Polarity	Cycle through the available polarities for a given optics mode (for example, thermal sub-modes).	Not Set
DAGR	Press and hold the DAGR key to show the DAGR.	Not Set

Control Name	Description	Default Controls
DAGR (Toggle)	Press the DAGR (toggle) key to display the DAGR, press the DAGR (toggle) key again to hide the DAGR.	Not Set
De-Arch	Hold to assume the de-arch position while skydiving.	Q
Decelerate Editor Camera	Reduce the movement speed of the Editor Camera.	[
Decrease GMTI Symbol Size	Scale down the Ground Moving Target Indicator (GMTI) symbology. Each key press scales the GMTI symbol size down by 5-pixel decrements.	Not Set
Decrease Thrust	Hold to reduce altitude in rotary wing aircraft.	Z XBox Left Thumb Y Down Stick Slider 1+
Decrement Fuse Distance	Decrease the fuse distance. Fuses enable air-bursts which are only available for certain weapons and vehicles ammunition. For more information, see Munition Fusing in the VBS4 Trainee Manual.	Not Set
Digital Zoom In	Zoom in the Launcher Electro-Optical View / Missile Seeker View (Digital Zoom) on the Spike LR (Long-Range) portable missile system.	Num +
Digital Zoom Out	Zoom out in the Launcher Electro-Optical View / Missile Seeker View (Digital Zoom) on the Spike LR (Long-Range) portable missile system.	Num -
Editor Camera Bank Left	Bank left while using the Editor Camera.	T
Editor Camera Bank Right	Bank right while using the Editor Camera.	Y
Editor Camera Lock Target	Lock the Editor Camera to the currently aimed at object.	Spacebar Num /
Editor Camera Rotation Reset	Reset the Editor Camera rotation.	Num 5
Editor Camera Slower	Hold to slow down the Editor Camera movement.	LCtrl

Control Name	Description	Default Controls
Editor Camera Toggle Maintain Speed	Toggle the current Editor Camera speed.	Insert
Editor Camera Toggle Movement Inertia	Toggle inertia on and off when moving the Editor Camera.	Delete
Editor Camera Turbo	Hold to accelerate the Editor Camera movement.	LShift
Editor Camera Zoom In	Zoom in while using the Editor Camera.	Num + Mouse Wheel Up
Editor Camera Zoom Out	Zoom out while using the Editor Camera.	Num - Mouse Wheel Down
Editor Redo	Redo the previous action in VBS Editor.	LCtrl + Y
Editor Undo	Undo the previous action in VBS Editor.	LCtrl + Z
Eject	Eject from vehicles.	LShift + 2 x H
Enter	Gamepad control to emulate pressing Enter in user interfaces.	XBox Left Thumb
EO Decrease Brightness	Decrease the image brightness of electro-optical system optics.	LAlt + 1
EO Decrease Contrast	Decrease the image contrast of electro-optical system optics.	LAlt + 3
EO Increase Brightness	Increase the image brightness of electro-optical system optics.	LAlt + 2
EO Increase Contrast	Increase the image contrast of electro-optical system optics.	LAlt + 4
EO Toggle Automatic	Toggle the auto-contrast of electro-optical system on and off.	LAlt + ~
Escape	Gamepad control to emulate pressing Esc in user interfaces.	XBox B

Control Name	Description	Default Controls
Evasive Forward	<p>Tap and hold while walking forward to move faster.</p> <p>Double-tap to quickly get up from the prone or crouch position, briefly move forward and go back to the original position.</p> <p>Double-tap and hold while moving forward in the prone position to continuously move faster, and when released, return to the original position.</p> <p>Sets your running speed to maintain fatigue levels between 65-70%.</p> <p>For more information, see Character Fatigue in the VBS4 Trainee Manual.</p>	2 x W
Evasive Left	Roll left when in the prone position.	2 x Q 2 x XBox Black
Evasive Right	Roll right when in the prone position.	2 x E 2 x XBox White
Fast Forward	Hold to reach the aircraft maximum speed.	E
Fast Forward	Hold while moving forward to run at maximum speed.	RCtrl + W
Fire	Tap to fire or hold to continuously fire the weapon.	LMB Stick Btn. #1 XBox Right Trigger
Flaps Down	Set aircraft flaps down.	F 2 x XBox Down
Flaps Up	Set aircraft flaps up.	R 2 x XBox Up
Focal Plane Far	Increase the camera / optic focal distance.	Not Set
Focal Plane Near	Decrease the camera / optic focal distance.	Not Set
Focus Analog	Change the camera / optic focal distance.	Not Set
<p>NOTE</p> <p>This control is intended for analog controls such as joysticks, gamepad sticks, or steering wheels.</p>		
Force Rotation of Camera	Force Editor rotation controls to apply to the camera instead of the selected object.	LCtrl

Control Name	Description	Default Controls
Forward Track	Hold to assume the forward track position while skydiving.	W XBox Left Thumb Y Up
FPS Display	Toggle the FPS display on and off.	Not Set
Free Look	Hold to free look (look around without moving the weapon aiming direction).	LAlt XBox Right Thumb
Free Look Toggle	Toggle free look mode.	Num * 2 x LAlt
Gear Down	Landing gear down on an aircraft.	G 2 x XBox Right
Gear Up	Landing gear up on an aircraft.	G 2 x XBox Left
Get Out	Exit the vehicle through the nearest available exit. For aircraft, you must be on the ground.	2 x H
Get Up	Get out of the seat and walk around in the cargo area while in a vehicle or aircraft.	Not Set
Go Prone	Change to the prone posture. When already prone, use to get up.	Page Down
GPS	Hold to display the GPS.	Not Set
GPS (Toggle)	Toggle the mini-map display on and off. For more information, see Mini-Map Navigation in the VBS4 Trainee Manual.	RCtrl + M XBox Start
Hard-Arch	Hold to assume the hard-arch position while skydiving.	Z
Hazard Lights	Toggle the vehicle hazard lights on and off.	Home
Head Down Delta	Hold to assume the head down delta position while skydiving.	2 x W
Helicopter Dump Collective	Hold to dump collective while on a helicopter.	Not Set
Helicopter Wheel Brake	Hold to use the wheel brake on helicopter.	Not Set
Helicopter Wheel Brakes On / Off	Toggle the helicopter wheel brakes on and off.	Not Set

Control Name	Description	Default Controls
Hide Map	Closes the map (RTE / C2).	M Hold XBox Start
	<p>NOTE</p> <p>Select Use Game Map in Simulation Settings to enable this control.</p>	
High Lift Track	Hold to assume the high lift track position while skydiving.	LShift + W
HMD Re-Center	Re-center the tracking position of head-mounted displays (HMD).	LAlt + LShift
Hold Breath	Hold to steady aim for a limited time while looking through weapon scopes.	RMB
Increase GMTI Symbol Size	Scale up the Ground Moving Target Indicator (GMTI) symbology. Each key press scales the GMTI symbol size up by 5-pixel increments.	Not Set
Increase Thrust	Hold to increase altitude in a rotary wing aircraft.	Q XBox Left Thumb Y Up Stick Slider 1-
Increment Fuse Distance	Increase the fuse distance. Fuses enable air-bursts which are only available for certain weapons and vehicles ammunition. For more information, see Munition Fusing in the VBS4 Trainee Manual.	Not Set
Indicate Left	Toggle the vehicle left indicator on and off.	Insert
Indicate Right	Toggle the vehicle right indicator on and off.	Page Up
Interact with Vehicle	Open the Interact with Vehicle (IWV) interface. For more information, see Interact with Vehicles Interface (IWV) in the VBS4 Trainee Manual.	U
Inventory	Open the inventory.	I XBox Back

Control Name	Description	Default Controls
Jump	<p>The following options are available:</p> <ul style="list-style-type: none"> • Jump - If nothing is blocking forward movement. You can jump while standing still, but travel further if you are moving before you jump. • Step Over - Objects up to waist height. <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"> <p>NOTE</p> <p>The Step Over action is also available in the Quick Menu Actions in the VBS4 Trainee Manual.</p> </div> <ul style="list-style-type: none"> • Step Onto - Objects up to waist height that you can walk on. 	F XBox Left Thumb
Lase Target	Obtain the range to target and adjust the main gun.	F Hold XBox Y
Laser On / Off	Toggles the laser attached to a weapon and / or vehicle laser on / off.	2 x XBox Right
Last Help	Display the last help message.	Not Set
Lead Lock	Toggle aided lay on and off.	Not Set
Lean Forward	Hold to lean your head position forward in a vehicle seat.	R
Lean Forward (Toggle)	Toggle the head position forward and back in a vehicle seat.	2 x R
Lean Left	Hold to lean left.	Q TrackIR Left
Lean Left Toggle	Toggle lean left.	Not Set
Lean Right	Hold to lean right.	E TrackIR Right
Lean Right Toggle	Toggle lean right.	Not Set
Left Pedal	Hold to rudder left while piloting an aircraft or controlling a UAV.	X Insert XBox Left Thumb X Left Stick Z- Rotate
Left Turn	Hold to turn left in an aircraft.	Mouse Left

Control Name	Description	Default Controls
Left Win	Gamepad control to emulate pressing the Left Windows Key in user interfaces.	XBox Start
Lights On / Off	Toggles flashlights attached to a weapon and / or vehicle lights on / off.	L XBox Left
	<p>NOTE</p> <p>Lights are only visible at night.</p>	
List of Participants	Toggle the display of all the players in the mission. Only works in multiplayer.	P
Load Gun	Order an AI-controlled weapon to reload when in a vehicle as the commander.	Not Set
	<p>NOTE</p> <p>This control is only available in the Commander position of the vehicle.</p>	
Lock or Zoom	Hold to lock or zoom in the camera.	RMB
Look Down	Look down when in vehicles.	Num 2 XBox Right Thumb Y Down
Look Down	Look down when in vehicles (secondary).	Mouse Down POV 180 deg
Look Down (Analog)	Look down when using a TrackIR device.	TrackIR Rot Down
Look Left	Look left.	Num 4 POV 270 deg
Look Left	Look left (secondary).	Mouse Left XBox Right Thumb X Left
Look Left (Analog)	Look left when using a TrackIR device.	TrackIR Rot Down
Look Left Down	Look left and down.	Num 1 POV 225 deg

Control Name	Description	Default Controls
Look Left Up	Look left and up.	Num 7 POV 315 deg
Look Right	Look right.	Num 6 POV 90 deg
Look Right	Look right (secondary).	Mouse Right XBox Right Thumb X Right
Look Right (Analog)	Look right when using a TrackIR device.	TrackIR Rot Right
Look Right Down	Look right and down.	Num 3 POV 125 deg
Look Right Up	Look right and up.	Num 9 POV 45 deg
Look Through Optics / Sights	Hold to look through optics / sights.	XBox Left Trigger
Look Up	Look up when in vehicles.	Num 8 XBox Right Thumb Y Up
Look Up	Look up when in vehicles (secondary).	Mouse Up POV 0 deg
Look Up (Analog)	Look up when using a TrackIR device.	TrackIR Rot Up
Lower Editor Camera	Hold to lower the Editor Camera position.	Z
Main Ramp Lower	Lower the main ramp of a vehicle. This can only be done by specific crew members depending on the vehicle, and it requires a vehicle that has a ramp functionality.	Not Set
Main Ramp Raise	Raise the main ramp of a vehicle. This can only be done by specific crew members depending on the vehicle, and it requires a vehicle that has a ramp functionality.	Not Set
Maintain Height Off	Turn Maintain Height Off while in an aircraft. (Only available if Auto-Hover is on).	Not Set

Control Name	Description	Default Controls
Maintain Height On	Turn Maintain Height On while in an aircraft. (Only available if Auto-Hover is on).	Not Set
Manual Mode	Enter MANUAL mode on the Spike LR (Long-Range) portable missile system.	Spacebar
Map	Display the map.	M Hold XBox Start
Marker Lights On / Off	Toggle aircraft marker lights on and off (only available when the aircraft is in the air).	J
Missile Seeker / Launcher View Switch	Enter the Missile Seeker View (CCD (gray-scale) and Infra-Red (IR) only) on the Spike LR (Long-Range) portable missile system.	A
Mouse Down	Gamepad control to emulate moving the mouse cursor down.	Hold XBox Left Thumb Y Down
Mouse Left	Gamepad control to emulate moving the mouse cursor left.	Hold XBox Left Thumb X Left
Mouse Left Click	Gamepad control to emulate clicking the LMB .	XBox A
Mouse Right	Gamepad control to emulate moving the mouse cursor right.	Hold XBox Left Thumb X Right
Mouse Right Click	Gamepad control to emulate clicking the RMB .	XBox X
Mouse Scroll Down	Gamepad control to emulate scrolling the mouse wheel down.	Hold XBox Right Thumb Y Down
Mouse Scroll Up	Gamepad control to emulate scrolling the mouse wheel up.	Hold XBox Left Thumb Y Up
Mouse Up	Gamepad control to emulate moving the mouse cursor up.	XBox Left Thumb Y Up
Move Back	Hold to walk backwards.	S Down Arrow XBox Left Thumb Y Down
Move Editor Camera Back	Hold to move the Editor Camera position backwards.	S
Move Editor Camera Forward	Hold to move the Editor Camera position forwards.	W

Control Name	Description	Default Controls
Move Editor Camera Left	Hold to move the Editor Camera position left.	A
Move Editor Camera Right	Hold to move the Editor Camera position right.	D
Move Forward	Hold to walk forwards.	W Up Arrow XBox Left Thumb Y Up
Next Action	Scroll to the next Quick Menu or 3D World Action option.] Mouse Wheel Down XBox Down Stick Btn. #5
Next Radio	Cycle through the available Radio Types and Communication Channels.	.
Next Radio Channel	Cycle through the available Communication Channels, depending on the selected mode or Radio Type.	RCtrl + .
Next Target	Cycle the weapon lock to the next valid target.	Tab XBox X Stick Btn. #2
Night Vision	Toggle night vision on and cycle through the available night vision modes.	N XBox Right
Nose Down	Hold to pitch the aircraft forward.	W Up Arrow Mouse Down Stick Y- Axis XBox Right Thumb Y Up
Nose Up	Hold to pitch the aircraft back.	S Down Arrow Mouse Up Stick Y+ Axis XBox Right Thumb Y Down

Control Name	Description	Default Controls
Nudge Object Back	Slightly move the object back in the Editor.	LAlt + S LAlt + Down Arrow LAlt + Num 2
Nudge Object Clockwise	Slightly rotate the object clockwise in the Editor.	LAlt + C LAlt + Num 3
Nudge Object Counter Clockwise	Slightly rotate the object counter-clockwise in the Editor.	LAlt + X LAlt + Num 1
Nudge Object Down	Slightly move the object down in the Editor.	LAlt + Z LAlt + Page Down
Nudge Object Forward	Slightly move the object forward in the Editor.	LAlt + W LAlt + Up Arrow LAlt + Num 8
Nudge Object Left	Slightly move the object left in the Editor.	LAlt + A LAlt + Left Arrow LAlt + Numpad 4
Nudge Object Right	Slightly move the object right in the Editor.	LAlt + D LAlt + Right Arrow LAlt + Numpad 6
Nudge Object Up	Slightly move the object up in the Editor.	LAlt + Q LAlt + Page Up
Open Radio Settings	Open the Communications Panel.	Not Set
Optical Zoom In	Zoom in the Launcher Electro-Optical View (Optical Zoom) on the Spike LR (Long-Range) portable missile system.	W
Optical Zoom Out	Zoom out in the Launcher Electro-Optical View (Optical Zoom) on the Spike LR (Long-Range) portable missile system.	S
Parachute Accelerate	Hold to move faster while using a parachute.	W XBox Left Thumb Y Up
Parachute Bank Left	Hold to bank left while using a parachute.	A XBox Left Thumb X Left

Control Name	Description	Default Controls
Parachute Bank Right	Hold to bank right while using a parachute.	D XBox Left Thumb X Right
Parachute Brake	Hold to slow down while using a parachute.	S XBox Left Thumb Y Down
Parachute Flare	Hold to perform flare maneuver while using a parachute.	LShift + S
Pause	Access the VBS4 Toolbar, and also pause the simulation if it is running offline.	Esc
Perform Action	Confirm a Quick Menu or 3D World Action option.	Enter MMB XBox A Stick Btn. #6
Player Path Recording	Start and stop recording the movements of a unit. Enable Record Path Hot Key in the Editor Tools menu before use. For more information, see Unit Path Recording (UPR) in the VBS4 Editor Manual.	P
Previous Action	Scroll to the previous Quick Menu or 3D World Action option.	[Mouse Wheel Up XBox Up Stick Btn. #7
Previous Radio	Cycle through the available Radio Types and Communication Channels in reverse order.	,
Previous Radio Channel	Cycle through the available Communication Channels in reverse order, depending on the selected mode or Radio Type.	RShift + ,
Prone	Change to the prone position.	Z Hold XBox B
Push to Talk	Hold to talk on the currently selected Radio Channel.	Caps Lock XBox Black
Quick Enter	Quickly enter a vehicle.	2 x U
Quick Menu	Hold to display the Quick Menu (see Quick Menu Actions in the VBS4 Trainee Manual).	Left Windows XBox White

Control Name	Description	Default Controls
Raise Editor Camera	Hold to raise the Editor Camera position.	Q
Raise Weapon	Raise the weapon you are holding.	Not Set
Reload	Reload your current weapon.	R Home XBox X
Reveal Target	Identify the current target in your crosshairs to the rest of the group.	RMB Hold XBox X
Reverse Track	Hold to assume the reverse track position while skydiving.	S XBox Left Thumb Y Down
Right Pedal	Hold to rudder right while piloting an aircraft or controlling a UAV.	C Page Up XBox Left Thumb X Right Stick Z+ Rotate
Right Turn	Hold to turn right in an aircraft.	Mouse Right
Rotate Editor Camera Down	Hold to rotate the Editor Camera down.	Mouse Down
Rotate Editor Camera Left	Hold to rotate the Editor Camera left.	Mouse Left
Rotate Editor Camera Right	Hold to rotate the Editor Camera right.	Mouse Right
Rotate Editor Camera Up	Hold to rotate the Editor Camera up.	Mouse Up
Rotate Left	Hold to rotate to the left while skydiving.	X
Rotate Right	Hold to rotate to the right while skydiving.	C
Safety Switch	Enable and disable the weapon safety switch.	LCtrl + LShift 2 x XBox X
Salute	Perform the salute gesture.	\
Scenario Preview	Start the scenario in preview mode.	H

Control Name	Description	Default Controls
Scenario Statistics	Hold to display scenario statistics while a mission is running. It displays information about kills and deaths during the mission for each player.	RCtrl + I
Screenshot with UI	Take a screenshot, including the HUD or the Editor UI.	PrtScn
Screenshot without UI	Take a screenshot, excluding the HUD or the Editor UI.	RShift + PrtScn
Seagull Back	Hold to control the seagull. Set Seagull Respawn in Simulation Settings to respawn as a seagull after death during a mission.	S Down Arrow
Seagull Down		Z Page Down Mouse Up Stick Y- Axis
Seagull Fast Forward		E
Seagull Forward		W Up Arrow
Seagull Up		Q Page Up Mouse Down Stick Y+ Axis
Select	Select the current menu item.	Not Set
Select All Units	Select all subordinate units.	~
Shift Missile Lock - Down	Move the Lock Indicator down, when locked on to a target. on the Spike LR (Long-Range) portable missile system.	Down Arrow
Shift Missile Lock - Left	Move the Lock Indicator left, when locked on to a target. on the Spike LR (Long-Range) portable missile system.	Left Arrow
Shift Missile Lock - Right	Move the Lock Indicator right, when locked on to a target. on the Spike LR (Long-Range) portable missile system.	Right Arrow
Shift Missile Lock - Up	Move the Lock Indicator right, when locked on to a target. on the Spike LR (Long-Range) portable missile system.	Up Arrow
Ship Left Engine Bucket	Left-engine ship maneuver thrust.	Not Set

Control Name	Description	Default Controls
Ship Left Engine Thrust Backward	Left engine backward thrust.	Not Set
Ship Left Engine Thrust Forward	Left engine forward thrust.	Not Set
Ship Left Engine Turn Left	Left engine turn left.	Not Set
Ship Left Engine Turn Right	Left engine turn right.	Not Set
Ship Maneuver Thrust	Hold when turning to add a component of Maneuver Thrust equal to Forward Thrust. The effect increases the turn rate of the boat. If you apply Maneuver Thrust for more than a few seconds, the boat turns in position with no forward movement.	X
Ship Reversing Bucket	Control the amount of maneuver thrust (must be mapped to an analog control).	Not Set
Ship Right Engine Bucket	Right-engine ship maneuver thrust.	Not Set
Ship Right Engine Thrust Backward	Right engine backward thrust.	Not Set
Ship Right Engine Thrust Forward	Right engine forward thrust.	Not Set
Ship Right Engine Turn Left	Right engine turn left.	Not Set
Ship Right Engine Turn Right	Right engine turn right.	Not Set
Show 3D Move Arrows	Hold to display the 3D move arrows of selected objects while in VBS Editor.	LAlt
Show 3D Rotation Circles	Hold to display the 3D rotation circles of selected objects while in VBS Editor.	Spacebar
Show 3D Scale Arrows	Hold to display the 3D scale arrows of selected objects while in VBS Editor.	Not Set
Side Light	Toggle vehicle side lights on and off.	J

Control Name	Description	Default Controls
Side Slip Left	Hold to assume the side slip left position while skydiving.	A XBox Left Thumb X Left
Side Slip Right	Hold to assume the side slip right position while skydiving.	D XBox Left Thumb X Right
Sit Down	Sit down in an available position. Only works from a standing position.	Not Set
Slow Forward	Hold to slowly move forwards.	Not Set
Space	Gamepad control to emulate pressing the Spacebar in user interfaces.	XBox Left Trigger
Stand Up	Stand up from the prone or crouch position.	C
Stop Input Recording	Stop recordings of input macros made using the <code>recordUserInput</code> SQF command.	LCtrl + Esc
Strafe Left	Hold to strafe left.	A Left Arrow XBox Left Thumb X Left
Strafe Right	Hold to strafe right.	D Right Arrow XBox Left Thumb X Right
Swap Gunner	Change to the gunner position.	Not Set
<p>NOTE</p> <p>This control is only available in the Commander position of the vehicle.</p>		
Swim Down	Hold to swim down.	Z
Swim Up	Hold to swim up.	Q
Switch Gun / Handgun	Cycle between your equipped primary and pistol weapons.	; Hold XBox Y
Switch to Handgun	Switch to pistol weapon.	2

Control Name	Description	Default Controls
Switch to Launcher	Switch to grenade / rocket launcher.	3 Hold XBox Left
Switch to Primary Weapon	Switch to your equipped primary weapon.	1 2 x XBox Y
Switch to Throw / Put	Switch to a throw / put weapon (for example, grenades).	4 XBox Left
Switch Weapon	Cycle between your equipped primary and secondary weapons.	'
Systems Menu	Access the vehicle Systems Menu (only available in some vehicles). For more information, see Systems Menu in the VBS4 Trainee Manual.	Y
Tactical View	Toggle a wider 3rd-person perspective giving you a better view of your group, and the tactical menu options.	Num .
Talk on Direct Channel	Hold to talk to people nearby in the scenario.	LShift + Caps Lock
Talk on Global Channel	Hold to talk on the Global Channel.	Not Set
Talk on Group Channel	Hold to talk on the Group channel.	Not Set
Talk on Side Channel	Hold to talk on the Side Channel.	Not Set
Talk on Vehicle Channel	Hold to talk on the Vehicle Channel.	Not Set
Team Switch	Open the Team Switch menu.	RCtrl + T
Team Switch to Next	Change unit to the next team.	Not Set
Team Switch to Previous	Change unit to the previous team.	Not Set

Control Name	Description	Default Controls
Time Acceleration	Increase the mission time speed.	=
	<p>NOTE</p> <p>Only applies to:</p> <ul style="list-style-type: none"> Scenarios running in single-player Preview Mode. Scenarios running in VBS4 Client Hosted (but not Dedicated Server) Execute Mode with a single player. 	
Time Deceleration	Decrease the mission time speed.	-
	<p>NOTE</p> <p>Only applies to:</p> <ul style="list-style-type: none"> Scenarios running in single-player Preview Mode. Scenarios running in VBS4 Client Hosted (but not Dedicated Server) Execute Mode with a single player. 	
Toggle Camera Lock	Toggles the VBS Editor camera to lock on the currently selected Editor Object.	L
Toggle GMTI	Toggles the visibility of Ground Moving Target Indicator (GMTI) symbology on / off.	Not Set
Toggle Light System 1-10	Toggle the applicable light system (only applicable to specific vehicles).	RCtrl + Num 1-0
Toggle Manual Fire	<p>Toggle manual fire on and off in an aircraft.</p> <p>Manual Fire must be enabled in Simulation Settings.</p>	Not Set
Toggle Optics	Toggle look through optics.	V Num 0
Toggle Personal Items	Switch between personal equipment and vehicle-mounted weapons.	2 x Spacebar
Toggle Raise Weapon	Raise and lower the current weapon.	2 x LCtrl Hold XBox X
Toggle Turret Lights	Toggle turret lights on and off.	LShift + L

Control Name	Description	Default Controls
Toggle View	Toggle between 1st-person and 3rd-person perspectives.	Num Enter
Toggle Weapons	Cycle through your available weapons.	Spacebar XBox Y Stick Btn. #3
Toggle Weapons Dialog	Open the Weapon Selection dialog (only available in specific vehicles).	RCtrl + RAlt
Toggle Weapons Modes	Cycle through available weapons modes.	RShift + Spacebar
Toggle Weapons Reversed	Cycle through weapons in reverse order.	RCtrl + Spacebar
Turbo	Hold while moving forwards to sprint.	Not Set
Turn In	Turn in while in a vehicle.	Z
Turn Left	Hold to turn left.	Not Set
Turn Out	Turn out of a vehicle.	Z
Turn Right	Hold to turn right.	Not Set
Turret Lead	Apply lead compensation to the turret fire control system. Toggle - Tap key to enable turret lead, tap again to disable it. Hold - Press and hold key to apply turret lead.	Not Set
Turret Safety Override (Toggle)	Override the turret turn limit on certain Stryker vehicles.	Not Set
Up	Get up when in the crouch or prone position. Go to the crouch position if already standing up.	Page Up
User Defined 1-20	Controls reserved for custom use cases and controller profiles.	
Vehicle Turbo	Hold to use vehicle turbo (only available for vehicles that have turbo).	LShift XBox Left Thumb
Voice Over Net	Legacy control for deprecated communications functionality.	Not Set
Walk or Run Temporary	Hold to run faster.	LShift
Walk or Run Toggle	Toggle between walk and run.	Not Set
Watch	Hold to display the watch.	T

Control Name	Description	Default Controls
Watch (Toggle)	Toggle the watch display on and off.	2 x T
Weapon Sight - Decrease Elevation	Decrease the trajectory of grenade launchers. Decrease the aiming point when using leaf sights optics.	Mouse Wheel Down XBox Down
Weapon Sight - Increase Elevation	Increase the trajectory of grenade launchers. Increase the aiming point when using leaf sights optics.	Mouse Wheel Up XBox Up
Zoom In	Hold to zoom in. Only works when using variable zoom optics.	Num + Stick Btn #4
Zoom In (Continuous)	Zoom in when using a TrackIR device.	TrackIR -tZ
Zoom Out	Hold to zoom out. Only works when using variable zoom optics.	Num -
Zoom Out (Continuous)	Zoom out when using a TrackIR device.	TrackIR +tY
Zoom Out (Toggle)	Toggle zoom in and out.	2 x Num -

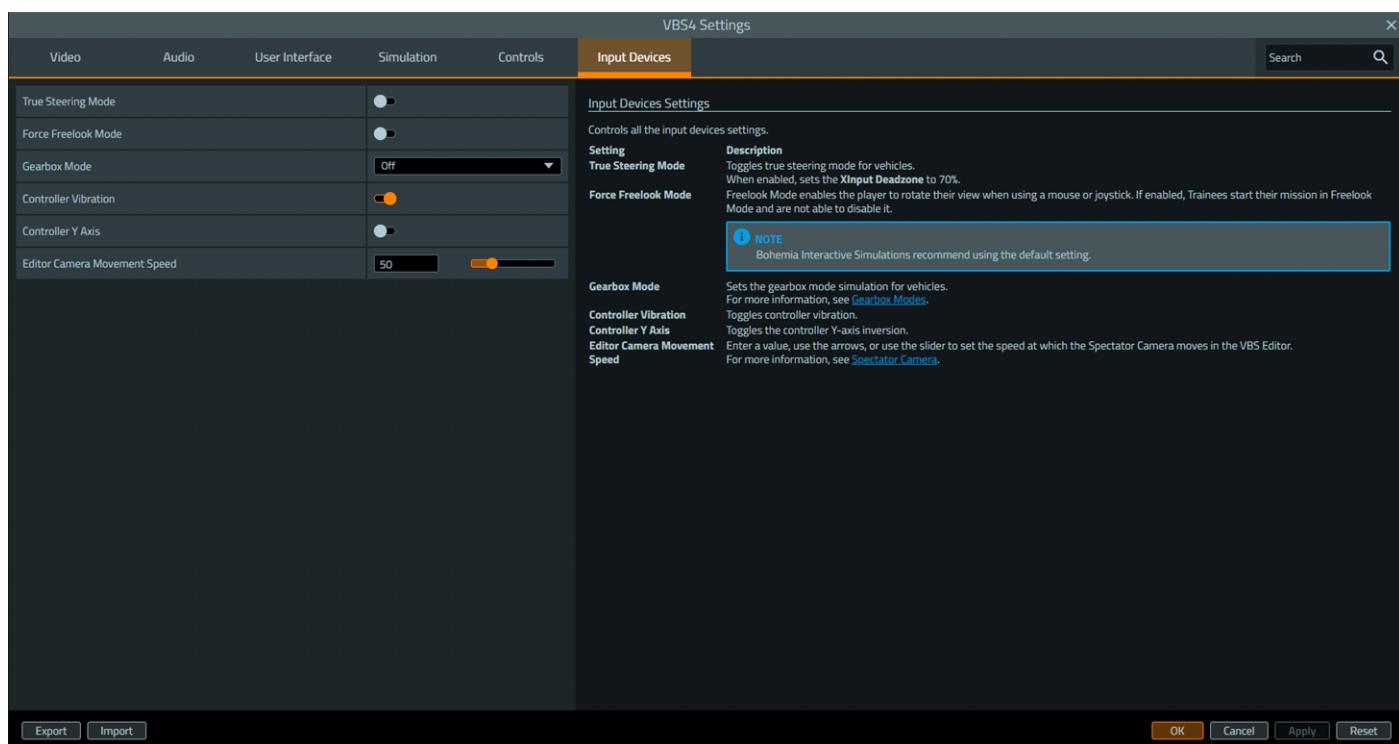
4.7 Input Devices Settings

All users can manage their Input Devices Settings from the VBS4 Settings panel.

In the VBS4 Toolbar, click the **Settings Icon**, and select the **Input Devices Tab**.



The VBS4 Settings Panel displays the Input Devices Settings.



Follow these steps:

1. Set the [Input Devices Settings List](#) (on the next page) and modify the required settings.

i NOTE

In this release, **Reset** does not apply to Input Devices Settings.

2. Click **Apply**.

The Input Devices Settings changes are saved.

3. Click **OK**.

VBS4 updates and applies your Input Devices Settings.

NOTE

Input Devices Settings are stored in your VBS4 Profile in the following file:

- Default VBS4 Profile location:

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

- Other VBS4 Profile location:

`\Path\Settings\InputSettings.xml`

`Path` is specified using the `-profiles=Path` command-line option - for more information, see [Command Line and Launcher Options \(on page 76\)](#).

For more information about the Input Devices parameters in the Profile configuration, see [VBS4 Profile Options \(on page 386\)](#).

4.7.1 Input Devices Settings List

Controls all the input devices settings.

Setting	Description
True Steering Mode	Toggles true steering mode for vehicles. When enabled, sets the XInput Deadzone to 70%.
Force Freelook Mode	Freelook Mode enables the player to rotate their view when using a mouse or joystick. If enabled, Trainees start their mission in Freelook Mode and are not able to disable it.
NOTE	Bohemia Interactive Simulations recommend using the default setting.
Gearbox Mode	Sets the gearbox mode simulation for vehicles. For more information, see Gearbox Modes in the VBS4 Trainee Manual.
Controller Vibration	Toggles controller vibration.
Controller Y Axis	Toggles the controller Y-axis inversion.
Editor Camera Movement Speed	Enter a value, use the arrows, or use the slider to set the speed at which the Spectator Camera moves in the VBS Editor. For more information, see Spectator Camera in the VBS4 Instructor Manual.

5. Virtual Reality Headsets

VBS4 supports a range of Virtual Reality (VR) headsets (HMDs) with VBS4.

Use the following HMDs to provide stereo video rendering, head tracking, and positional tracking:

Vendor	Required Software	Model
HTC	Viveport System Software and SteamVR Vive Streaming Software for supported Wireless Tether Headsets	<ul style="list-style-type: none"> • Vive • Vive Pro • Vive Pro 2 • Vive Pro Eye • Vive Focus 3 with Vive Business Streaming • Vive XR Elite with Vive Business Streaming
JVC	JVC HMD System Software and SteamVR	HMD-VS1W Augmented Reality
Magic Leap	Magic Leap Hub	Magic Leap 2
Microsoft Mixed Reality	SteamVR and Microsoft Mixed Reality for SteamVR	<ul style="list-style-type: none"> • HP Reverb / Reverb G2 • Samsung Odyssey / Odyssey+
Meta (Oculus)	SteamVR with Oculus PC System Software	<ul style="list-style-type: none"> • Rift CV1 / DK2 / S • Quest / Quest 2 / Quest 3 / Quest Pro
Valve	SteamVR	Index HMD
Varjo	Varjo Base 3.9 or Newer	<ul style="list-style-type: none"> • Aero • VR-3 / XR-3 (foveated rendering and mixed reality pass through)
VRGineers	VRTool Online 3.2.0.135 / Standalone 3.2.0.69 or newer	XTAL 3 / XTAL 3 MR (Mixed Reality Passthrough)

NOTE

For hand-held motion controllers, use the `-hmdVendor` command line option (see [Command Line and Launcher Options \(on page 76\)](#)), which accepts the following vendor-based values:

- `-hmdVendor=HP`
- `-hmdVendor=Oculus`
- `-hmdVendor=Valve`
- `-hmdVendor=Vive`

For additional head-tracking equipment supported by VBS4 that can be used in VR setups, see [TrackIR Setup \(on page 274\)](#).

NOTE

Using an HMD requires high resolution stereo rendering so the hardware requirements are higher than running VBS4 on a standard monitor at 60 / 75 / 90 FPS.

- Use the Optimal [System Requirements \(on page 27\)](#) as minimum requirements.
- The higher performance requirements of HTC Vive requires VBS4 to render frames in less than 7ms. If this cannot happen, reprojection is used (half FPS, slight jitter, slower response to movement). Use the best CPU available, with a focus on single core performance.

To configure VBS4 to work with your HMD, see [Setup VBS4 for VR \(on the next page\)](#).

Setup instructions depending on your HMD can be found in [VR Headset Configuration \(on page 311\)](#).

NOTE

HMD support is still in development. Performance, controls, and overall integration with many features is not complete. For more information, see [VR Troubleshooting \(on page 315\)](#).

5.1 Setup VBS4 for VR

Configure the HMD using the VBS4 options.

WARNING

An internet connection is required during HMD setup.

You must have SteamVR installed and running.

NOTE

Check that your HMD is properly setup and connected (see [VR Headset Configuration \(on page 311\)](#)).

Start VBS4 with the `-hmd` command line option, and `-hmdVendor=vendor` if you are using hand-held motion controllers (see [Command Line and Launcher Options \(on page 76\)](#)). For a list of available vendors, see [Virtual Reality Headsets \(on page 306\)](#).

For the `-hmd` command line option, use the following display modes (depending on your HMD) in the format `-hmd=display_mode`:

NOTE

The display modes can be specified with or without quotation marks (for example, `-`

`hmd=openvr` or `-hmd="openvr"`), unless the display mode name contains a space.

Quotation marks are reserved for future display mode names that may have spaces.

Display modes available in the `-hmd` option of the VBS Launcher UI:

Display Mode	Description
<code>openvr</code>	The default display mode, intended for all the HMDs, unless otherwise better natively supported, and must support the OpenVR / SteamVR API.
<code>openxr</code>	Display mode for supported XR headsets.
<code>varjo</code>	Launches VBS4 in Varjo Native runtime to enable advanced features like foveated rendering and Mixed Reality.
<code>xtal</code>	Launches VBS4 in XTAL Native runtime to enable advanced features, such as foveated rendering and Mixed Reality.
<code>debug</code>	Stereo image rendering debug view. Does not require a connected HMD. Starts VBS4 in a display mode that simulates HMD output on a standard monitor.

NOTE

For other display modes that are not part of the VBS Launcher UI, specify the `-hmd` option in the **Extra Parameters** section of the VBS Launcher. For more information, see [Command Line and Launcher Options \(on page 76\)](#).

Display Mode	Description
<code>viveproeye</code>	Used for the HTC Vive Pro Eye.
<code>debugfoveated</code>	Quad image rendering debug view. Does not require a connected HMD. Starts VBS4 in a display mode that simulates HMD output on a standard monitor.

The following additional display sub-modes can be used, appended by underscores (_), in any order:

Display Sub-Mode	Description
<code>keycolor</code>	Enables custom chroma keying color for Varjo XR-3 Mixed Reality. The color is specified by Varjo Base Runtime.
<code>keyblue</code>	Enables chroma keying using built in Blue Chroma Profile for Varjo XR-3.
<code>keygreen</code>	Enables chroma keying using built in Green Chroma Profile for Varjo XR-3.
<code>depth</code>	Enables depth estimation for Varjo XR-3 hand occlusion.
<code>eye</code>	Enables eye tracking VBS Simulation SDK usage for Varjo XR-3.
<code>markeron</code>	Initialize with active Marker Tracking (uses more CPU) for Varjo XR-3, while also enabling any provided Varjo Marker Mixed Reality meshes to automatically render when using the mask (below) display sub-mode.
<code>markeroff</code>	Initialize with deactivated Marker Tracking (using less CPU) for Varjo XR-3, while also enabling any provided Varjo Marker Mixed Reality meshes to automatically render when using the mask (below) display sub-mode.
<code>mask</code>	Enables Mixed Reality-based mask rendering for usage with Varjo XR-3 when using varjo (on the previous page) runtime, as well as the JVC HMD-VS1W when using the openvr (on the previous page) runtime.
<code>standing</code>	Specifies to use the standing mode tracking space, if the HMDs do not automatically launch into standing mode.
<code>hidecontroller</code>	Some HMDs support two-handed controllers. VBS4 automatically renders these for convenience unless you specify hiding the controller.

Display Sub-Mode	Description
<code>allviews</code>	Allows rendering of all the HMD incorporated Views into the main VBS4 window, if not otherwise already doing so. This sub-parameter is generally more useful for developers than for typical HMD users.
<code>blendcontrol</code>	Allows for reverse Mixed Reality Masking to simultaneously composite on top of chroma key areas, forcing areas to be virtual within masking areas, regardless of being within the specified chroma color.
<code>manualtools</code>	Specifies the use of manual masking volume tools for use with Varjo XR HMD masking-compositing modes.
<code>apprecenter</code>	Specifies the use of application recenter-based calibrations.
<code>meshcorrelation</code>	Uses a visual mesh to correlate where the HMD user is placed, relative to the tracking space.
<code>tomarker#</code>	Visual marker-based calibration for Varjo XR-3, to be used in conjunction with calibrating in <code>mask_meshcorrelation</code> mode. Results in a custom HMD recenter that restores the mask and user location to the specified calibrated Varjo Marker ID# (number).
<code>nocamerainit</code>	Only Mixed Reality (MR) HMDs that support this do not initialize and turn on their MR camera hardware, and require you to do it manually in the runtime software.

VBS4 starts with the HMD as the display output. Depending on the default head position calibration from the HMD setup you may need to press the **HMD Re-Center** key to see the main menu. The default key binding for **HMD Re-Center** is **LAlt + LShift**.

To avoid *judder* on the HMD you need a minimum of 90 FPS at all times (60 on DK1, 75 on DK2). On most machines this requires reducing video settings to near minimum. Open [Video Settings \(on page 165\)](#) from within a mission to see the current FPS displayed at the top-left of the settings screen.

5.2 VR Headset Configuration

This section describes the following HMD configurations:

- HTC (below)
- JVC (on the next page)
- Magic Leap (on the next page)
- Meta (Oculus) (on the next page)
- Valve (on page 313)
- Varjo (on page 313)
- VRGineers (on page 313)
- Windows Mixed Reality (WMR) HMDs (on page 313)

NOTE

For advanced VR configuration, Administrators can use `VR.xml`, located in:

- Default VBS4 Profile location: `%LOCALAPPDATA%\VBS4\Settings\`
- Other VBS4 Profile location: `Path\Settings\`

`Path` is specified using the `-profiles=Path` command-line option - for more information, see [Command Line and Launcher Options \(on page 76\)](#).



WARNING

Do not modify `VR.xml` directly, without consulting Customer Support at support@bisimulations.com first. Enabling too many log outputs and reducing log filters can have a negative impact on performance, memory, and storage space.

5.2.1 HTC

You can configure HTC Vive / Vive Pro / Vive Pro 2 / Vive Pro Eye to work with VBS4.

Follow these steps:

1. Download the Vive Setup Tool from: <http://www.vive.com/us/setup/>
2. Connect the HTC Vive (use USB 3 sockets for best results).
3. Run the Setup Tool, `ViveSetup.exe`.

NOTE

Requires an internet connection during HMD setup.

4. Follow the Setup Tool instructions.

5.2.2 JVC

You can configure JVC HMD-VS1W Augmented Reality to work with VBS4.

Follow these steps:

1. Download the **Steam VR Runtime** from the [Steam Store](https://store.steampowered.com/app/250820/SteamVR/) (<https://store.steampowered.com/app/250820/SteamVR/>).
2. Run the Setup Tool, [SteamSetup.exe](#).
3. Follow the Setup Tool instructions.

5.2.3 Magic Leap

You can configure the Magic Leap 2 HMD to work with VBS4:

Follow these steps:

1. Connect the Magic Leap 2 to the PC with a USB-C cable for initial setup.
2. Download and install Magic Leap Hub and setup the device bridge.

For more information, see the [Device Bridge](https://developer-docs.magicleap.cloud/docs/guides/developer-tools/ml-hub/ml-hub-device-bridge/) (<https://developer-docs.magicleap.cloud/docs/guides/developer-tools/ml-hub/ml-hub-device-bridge/>) documentation.

Setup the bridge for either Wired or Wi-fi connection.

3. Follow the documentation for [Remote Render](https://developer-docs.magicleap.cloud/docs/guides/remote-rendering/remote-rendering/#installing-remote-render) (<https://developer-docs.magicleap.cloud/docs/guides/remote-rendering/remote-rendering/#installing-remote-render>) setup.

5.2.4 Meta (Oculus)

You can configure Oculus Rift CV1 / DK2 / S / Quest / Quest 2 / Quest 3 / Quest Pro with Link Cable or Wi-Fi to work with VBS4.

Follow these steps:

1. Download the Setup Tool from <https://www.meta.com/quest/setup/>.
2. Connect the Oculus and Tracking Sensor (use USB 3 sockets for best results).
3. Run the Setup Tool, [OculusSetup.exe](#).

 **NOTE**

Requires an internet connection and Oculus account during HMD setup.

4. Follow the Setup Tool instructions.

5.2.5 Valve

You can configure Valve Index HMD to work with VBS4.

Follow these steps:

1. Download the **Steam VR Runtime** from the [Steam Store](https://store.steampowered.com/app/250820/SteamVR/) (<https://store.steampowered.com/app/250820/SteamVR/>).
2. Run the Setup Tool, [SteamSetup.exe](#).
3. Follow the Setup Tool instructions.

5.2.6 Varjo

You can configure any of the following Varjo HMDs to work with VBS4:

- Aero
- VR-3 / XR-3 (foveated rendering and Mixed Reality Passthrough)

Follow these steps:

1. Go to [Varjo Downloads](https://varjo.com/downloads/) (<https://varjo.com/downloads/>).
2. Install Varjo 3.9 Base Runtime.
3. Follow the Setup Tool instructions.

5.2.7 VRGineers

You can configure the VRGineers XTAL 5k or 8k to work with VBS4:

Follow these steps:

1. Go to [VRGineers](https://portal.vrgineers.com/) (<https://portal.vrgineers.com/>), and install VRTool 3.2.0.69+.
2. Follow the Setup Tool instructions.

5.2.8 Windows Mixed Reality (WMR) HMDs

You can configure any supported WMR HMD to work with VBS4. This applies to the following supported WMR HMDs:

- HP Reverb / Reverb G2
- Samsung Odyssey / Samsung Odyssey+

Follow these steps:

1. Download the **Steam VR Runtime** from the [Steam Store](https://store.steampowered.com/app/250820/SteamVR/) (<https://store.steampowered.com/app/250820/SteamVR/>).

2. Run the Setup Tool, [SteamSetup.exe](#).
3. Follow the Setup Tool instructions.

 **WARNING**

The Windows Mixed Reality Portal is required if you want to use WMR HMDs. It can be obtained [here](https://docs.microsoft.com/en-us/windows/mixed-reality/enthusiast-guide/install-windows-mixed-reality) (<https://docs.microsoft.com/en-us/windows/mixed-reality/enthusiast-guide/install-windows-mixed-reality>).

5.3 VR Troubleshooting

If you experience problems with your HMD setup and configuration in VBS4, the following section provides solutions to possible problems.

VBS4 starts up but I only see a gray image on the Oculus Rift.

During initial loading the OR displays a gray image. If the main menu does not appear after some time, then headtracking is likely not centered correctly. Press the **HMD Re-Center** key bound from the controls (default: **LAlt + LShift**). The default tracking position is set from the Demo scene in the Oculus runtime configuration utility.

Nothing is displayed on the Oculus Rift or the image is upside down.

Check the OR display orientation from Windows display settings. It should be set to appear as a landscape display in the preview window.

Headtracking "stutters" and is not smooth.

Verify that you are reaching the required frame rate at all times. This typically requires reducing video details to almost minimum. Open [Video Settings \(on page 165\)](#) from within a mission to see the current FPS displayed in the top-left of the settings screen.

In some cases DK2 headtracking can stutter if the device does not get enough power through the USB port. Use the included external power source in these cases.

Check that the VR display is set to the correct refresh rate in Windows Display Properties. Note that using display mirroring or cloning with the Oculus Rift does not work correctly if the display to which it is mirrored to is not using the same refresh rate (75Hz for the DK2), and can result in stuttering.

For Oculus Rift CV1 or HTC Vive, use USB 3 sockets to ensure best results.

For HTC Vive, ensure that the lighthouse sensors are properly setup.

I get an error about not finding the Oculus Rift or a similar initialization problem.

Check that the OR is setup properly and that it works in the Runtime demo. Check the VBS RPT output for more information about the error.

The 'head position' becomes offset over time and often leaves a headless body behind.

Press the **HMD Re-center** key. This problem occurs frequently with HTC Vive.

The response to head movement with HTC Vive is poor, especially with reprojection.

There is some movement prediction but it makes things even worse (when compared to Oculus Rift). The user can get used to it, but it is quite unpleasant when the user takes off the HMD.

Setup the room properly, with both lighthouses clearly visible to the HMD.

FPS lags with HTC Vive cause significant stuttering.

Use the lowest video settings possible to improve performance.

When low FPS occurs with HTC Vive, typically when loading or starting a mission, the SteamVR dashboard appears.

Do not use the HMD until the mission has started.

When there is a change in the room setup for HTC Vive, a blue SteamVR mesh appears.

Press the **HMD Re-Center** key.

Mouse cursor in VR mode, where the bottom-right corner is unreachable.

Running VBS4 in HMD mode requires windowed mode to be on, so that the screen dimensions work properly in the menu. This is likely an issue with any HMD device.

Performance decrease.

By default, the HP Reverb G2 might have resolution super sampling / upscale in Windows mixed reality or / and SteamVR enabled. This can cause performance decreases. It is therefore advisable to disable super sampling or set the upscale to 100%.

When HP Reverb G2 is in the SteamVR Dashboard, pressing the Dashboard button does not close it.

You have to manually press the **Go back To Game** button.

When you press the Dashboard button in HP Reverb G2, it opens the WMR Dashboard and not SteamVR.

You have to manually go to SteamVR dashboard.

Text in dialogs is blurry in VR

Disable Deep Learning Super Sampling (DLSS). For more information, see [Video Settings \(on page 165\)](#).

6. Mixed Reality: Overview

The mixed reality functionality allows trainees using VBS4 to interact with real equipment inside a synthetic scenario.



When configured, the scenario enables each player to do the following:

- While using the Varjo HMD headset:
 - See the virtual environment.
 - See avatars of other crew members positioned in their roles.
If the member of the crew mounts / dismounts a vehicle, the avatars appear or disappear, accordingly.
- Interact with real equipment that appears through a mixed reality cutout.

To setup and use Mixed Reality in VBS4, follow this process:

1. [Starting VBS4 with Mixed Reality \(on the next page\)](#)
2. [Creating Mixed Reality Masks \(on page 319\)](#)
3. [SDK API Modifications \(on page 323\)](#)

6.1 Starting VBS4 with Mixed Reality

Using the Mixed Reality functionality requires VBS4 to start with specific parameters.

Follow these steps:

1. Start VBS Launcher and open the **Client** tab.
2. In the **Preset** drop-down menu, select **Admin**.
3. In the **Parameters** field, input the following:

`-hmd=varjo_mask_manualtools_apprecenter`

This parameter enables the following functionality:

- `-hmd=varjo` - Uses the Varjo Software for tracking.
- `_mask` - Allows Varjo masking functionality.
- `_manualtools` - Allows for creation of mask with controller and the CAD tools used for editing the masks.
- `_apprecenter` - Overwrites the default recenter technology with one designed for cockpits and multiple created masks.

Launching with this parameter enable the user to create, manipulate, and save mixed reality mask configurations while in the virtual environment.

NOTE

If VBS4 is running in the background, using `-window` is recommended.

For more information, see [Launching with Parameters \(on page 62\)](#).

4. Click **Launch Modules** to start the VBS4 Admin Client.

For more information, see [Starting VBS4 \(on page 55\)](#).

6.1.1 Optimizing Settings

Performance and compatibility can be optimized using these recommended settings.

Follow these steps:

1. Open the **Settings** menu in VBS4 and select the **Video** tab.
2. Expand the **Graphics Settings > Viewport Settings > Render Detail** section:
 - Select **Multi-Projection Technology > MVR / SPS**.
 - Select **DLSS > Disabled**.
3. Click **OK** to save the settings and close the window.

6.2 Creating Mixed Reality Masks

Define rectangular panels within the VBS4 scene where real-world equipment and monitors are located in relation to the 3D virtual environment.

You can set the XYZ dimensions of these panels, and their location and orientation in the 3D virtual environment. You can also configure rectangular 3D shapes and the size of panels in VBS4.

Select from the following topics to configure a mask:

- [Accessing the MR Mask Editor \(below\)](#)
- [Adding / Removing A Mask \(on the next page\)](#)
- [Selecting A Mask \(on page 321\)](#)
- [Scaling Masks \(on page 321\)](#)
- [Moving / Rotating Masks \(on page 322\)](#)

6.2.1 Accessing the MR Mask Editor

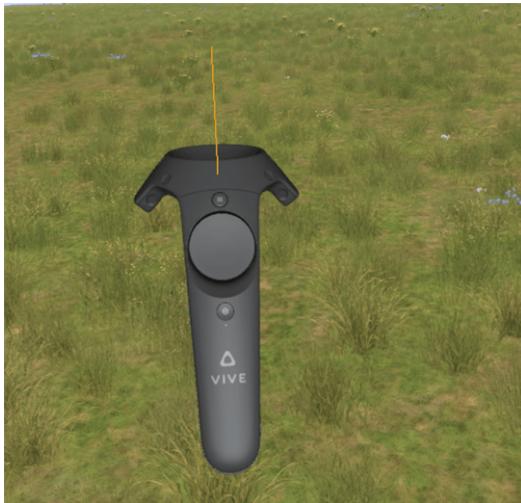
Users must be in Mask Editor mode to interact with and manipulate masks.

This mode can be accessed at any point when VBS4 is running.

Follow these steps:

1. Open the Mask Editor mode by pressing and holding the Touch Pad for 2 seconds.

The VR Controller rumbles and yellow picker lines appear on the controllers.



2. Close the Mask editor mode by pressing and holding the Touch Pad for 2 seconds

i NOTE

The yellow picker lines, mask outlines, and mask editor tools will all disappear

6.2.2 Adding / Removing A Mask

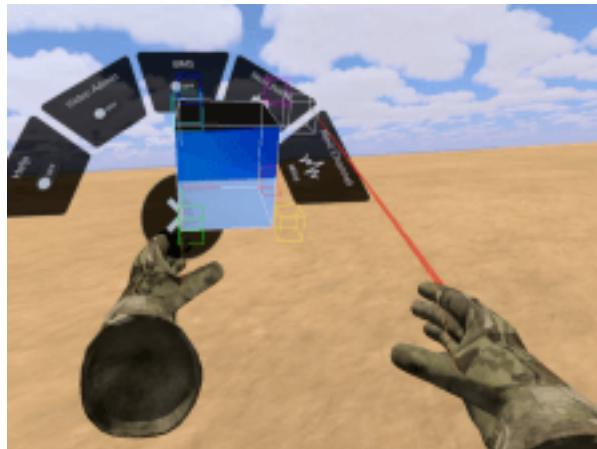
Add and remove masks in the scenario, as required.

Follow these steps:

1. To add a new mask, press the **Menu** button on the controller.

The mask is created at the tip of the yellow picker line.

- If the right-hand controller is used then the scaling root will be in the back bottom-right corner .
- If the left-hand controller is used then the scale root will be in the back bottom-left corner.



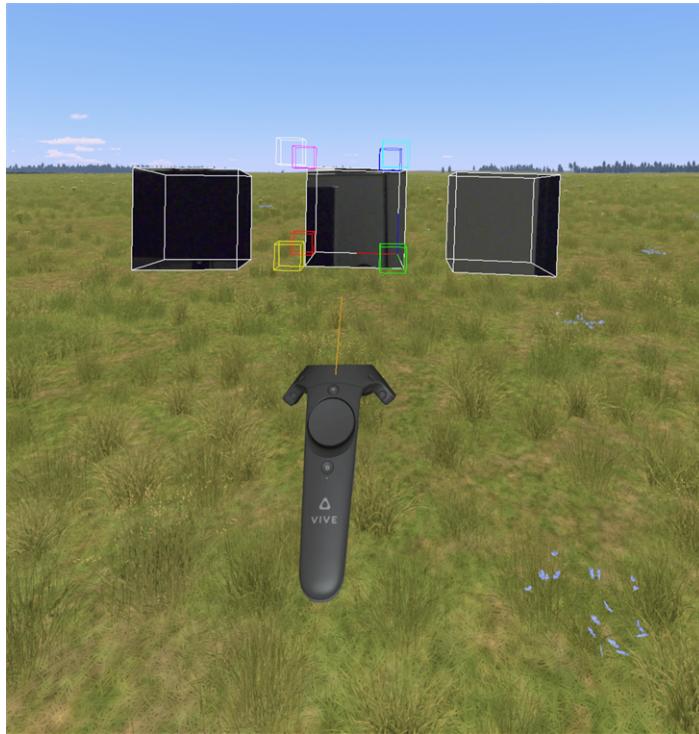
2. To add additional masks, press the **Menu** button again.



3. To remove a mask, press the touchpad when the yellow picker line is inside the mask.

6.2.3 Selecting A Mask

Select a mask by moving the yellow picker line into the mask. A mask is selected when the CAD tools appear around the mask. Once a mask is selected, you may scale, move, and rotate it.



6.2.4 Scaling Masks

Masks scale outwards from a corner (labeled with RGB axes), which changes based on the controller that creates the mask.

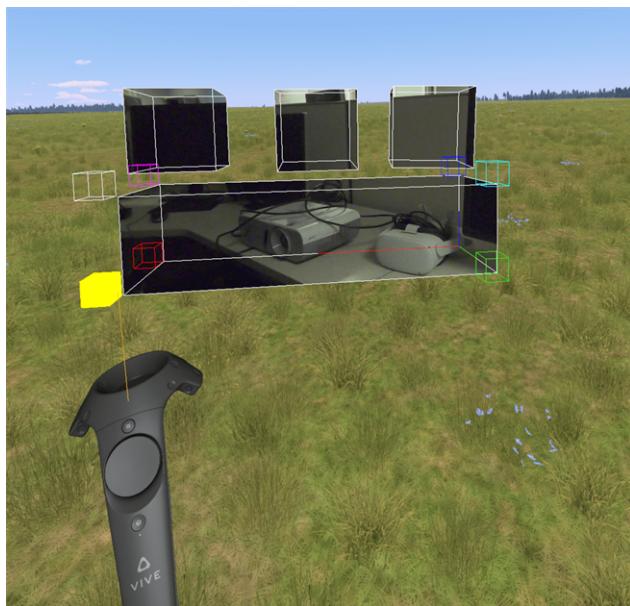
Select a cube grab point to scale a mask.

Use any of the available grab points to affect a different axis or multiple axes:

- **Red** - X-Axis
- **Green** - Y-Axis
- **Blue** - Z-Axis
- **Yellow** - X-Axis, Y-Axis
- **Purple** - X-Axis, Z-Axis
- **Cyan** - Y-Axis, Z-Axis
- **White** - X-Axis, Y-Axis, Z-Axis

TIP

The **White** grab point, which scales all three axes, is the most useful when first placing and scaling a mask. It is always at the opposite corner from the root corner.



6.2.4.1 Moving / Rotating Masks

Move and rotate masks simultaneously.

Follow these steps:

1. Place the yellow picker line inside the mask, then press and hold the trigger to grab the mask.

i NOTE

The mask highlights when the yellow picker line is placed inside the mask.

2. While grabbing a mask, move and rotate it with the controller.

6.3 SDK API Modifications

Defining rectangular masks is available in the VBS SDK APIs (Simulation SDK and IG SDK) with related documentation.

- [MR API Additions \(below\)](#)
- [MRLISTENER API Additions \(below\)](#)

6.3.1 MR API Additions

The VR API provides access to the state VR devices (HMD, controllers, trackers), querying whether and which VR runtime is active, and state of extra features such as mixed-reality masking, eye tracking and visual marker detection (if supported by the hardware and VR runtime).

- [CreateManualMask](#): Creates a new mask.
- [RemoveManualMask](#): Removes a mask.
- [SetManualMaskTransform](#): Transforms a mask via 4x3 transformation matrix .
- [GetManualMaskTransform](#): Gets a 4x3 transformation matrix for a mask.
- [GetManualMask](#): Gets the total list of created manual masks.
- [SetManualMaskShown](#): Toggles rendering for a mask.
- [SetManualMaskToolsEnabled](#): Toggles a mask transform tool for the given mask.
- [GetManualMaskToolsEnabled](#): Inquires whether a mask transform tool is enabled for the given mask.

6.3.2 MRLISTENER API Additions

The VR Listener API provides notifications to components when certain VR events happen, such as transformation updates from VR devices, button presses on VR controllers, or other VR-specific events such as recentering.

- [OnManualMaskCreated](#): Notifies the listener when a manual mask has been created.
- [OnManualMaskDeleted](#): Notifies the listener when a manual mask has been deleted.

7. Screen and Video Capture

VBS4 enables screen and video capture from the character viewpoint and the Editor (Prepare / Execute Mode).

- [Screen Capture \(below\)](#)
- [Video Capture \(on the next page\)](#)

7.1 Screen Capture

Press **Screenshot with UI (PrtScn)** or **Screenshot without UI (RShift + PrtScn)** to capture the current view with or without the HUD (in-game view) or the Editor UI (Prepare / Execute Mode).

NOTE

In VBS4, since the 2D map is part of the UI, pressing **Screenshot without UI (RShift + PrtScn)** results in a screenshot of the Default Camera view of the player.

Screen captures are stored in the VBS4 profile folder.

Default: `\Documents\VBS4\Screen\`

Change these default key settings located in **VBS4 Settings > Controls**:

- **Screenshot with UI** - Includes the HUD, Optics, or the Editor UI.
- **Screenshot without UI** - Does not include the HUD, Optics, or the Editor UI.

Image-27: A screen capture with and without the HUD





7.2 Video Capture

Capture video using any of the following options:

- Recording a Mission for AAR in the VBS4 AAR Manual to capture a complete recording of all mission participants.

Use AAR Playback in the VBS4 AAR Manual to playback the mission.

Bohemia Interactive Simulations recommends using free and readily available recording tools, such as Nvidia ShadowPlay, to capture video for other purposes.

8. Support Tools

VBS4 comes with utilities that can assist with the support and management of a VBS4 installation.

The following tools are available:

- [Build Integrity Checker \(below\)](#)
- [VBS Firewall Exception Tool \(on the next page\)](#)
- [VBS Crash Reporter \(on the next page\)](#)
- [Low-Level Memory Profiler \(on page 329\)](#)
- [Benchmark Tool \(on page 330\)](#)

NOTE

In addition to these tools, logging for the purpose of troubleshooting can be controlled using `Log.xml`, located in:

- Default VBS4 Profile location:

`%LOCALAPPDATA%\VBS4\Settings\`

- Other VBS4 Profile location:

`Path\Settings\`

`Path` is specified using the `-profiles=Path` command-line option - for more information, see [Command Line and Launcher Options \(on page 76\)](#).

The `Log.xml` file allows Administrators to switch logging for various VBS4 components on / off.



WARNING

Bohemia Interactive Simulations advises Administrators not to modify `Log.xml` directly, without consulting Customer Support at support@bisimulations.com first, since enabling too many log outputs and reducing log filters can have a negative impact on computer performance, memory, and / or storage space.

8.1 Build Integrity Checker

Use the Build Integrity Checker (`Support_Log_Generator.exe`) to check the VBS4 installation for registry entries, version numbers of some key files, and the revision numbers of addons.

Tool location:

`\VBS_Installation\optional\support\`

8.2 VBS Firewall Exception Tool

Use the Firewall Exception Tool (`Firewall_Exception_Tool.exe`) to add Windows Firewall exceptions for VBS4.

Tool location:

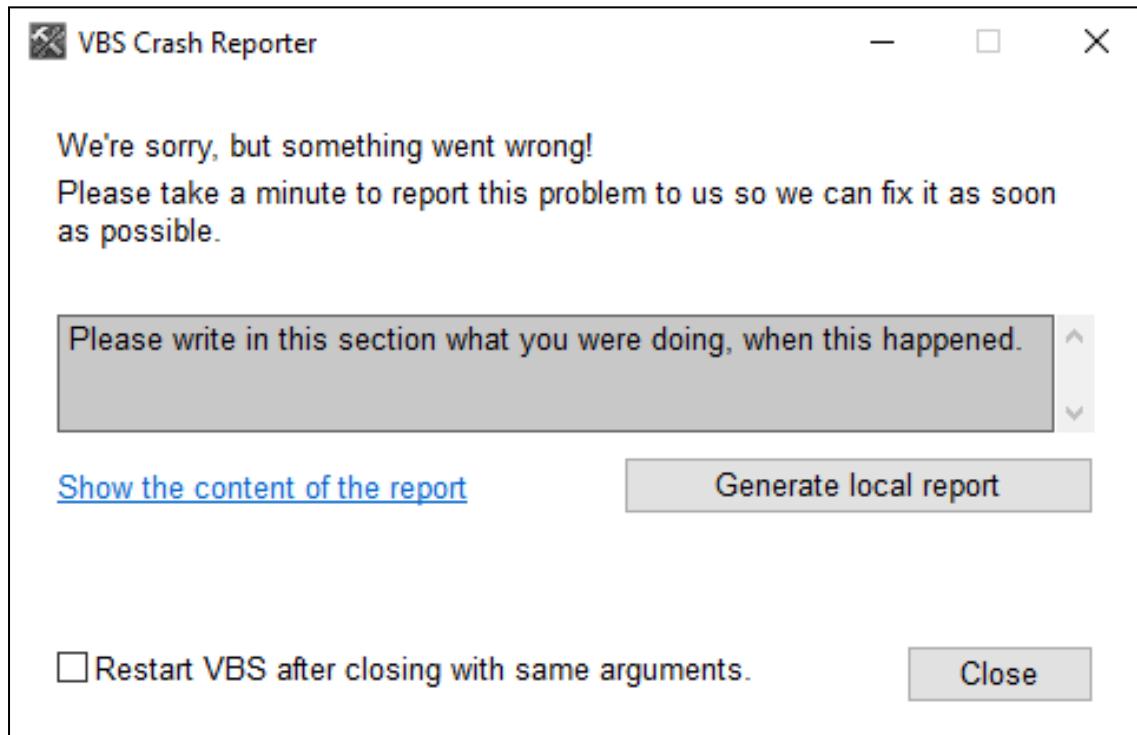
`\VBS_Installation\driver\firewallexceptions\`

8.3 VBS Crash Reporter

VBS4 includes a Crash Reporter Tool (`CrashReporter.exe`) to create crash debug reports to send to Bohemia Interactive Simulations Customer Support. The VBS Crash Reporter dialog opens, when VBS4 crashes.

Tool location:

`\VBS_Installation\optional\support\`

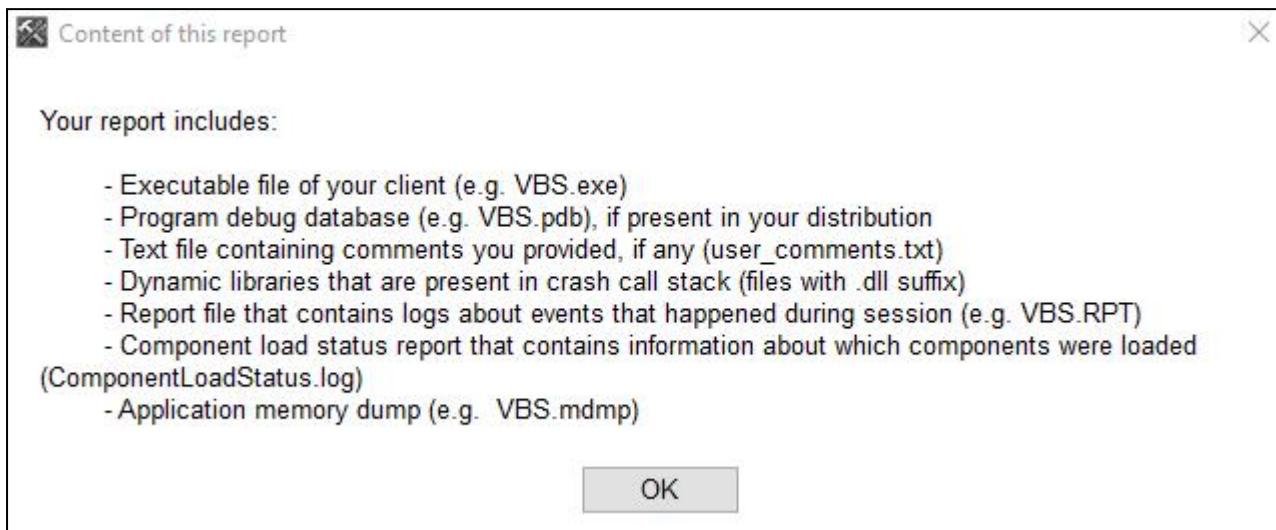


Follow these steps:

1. Enter any details about what you were doing in VBS4, before the crash occurred.

This information can help Bohemia Interactive Simulations Customer Support to determine what caused the crash.

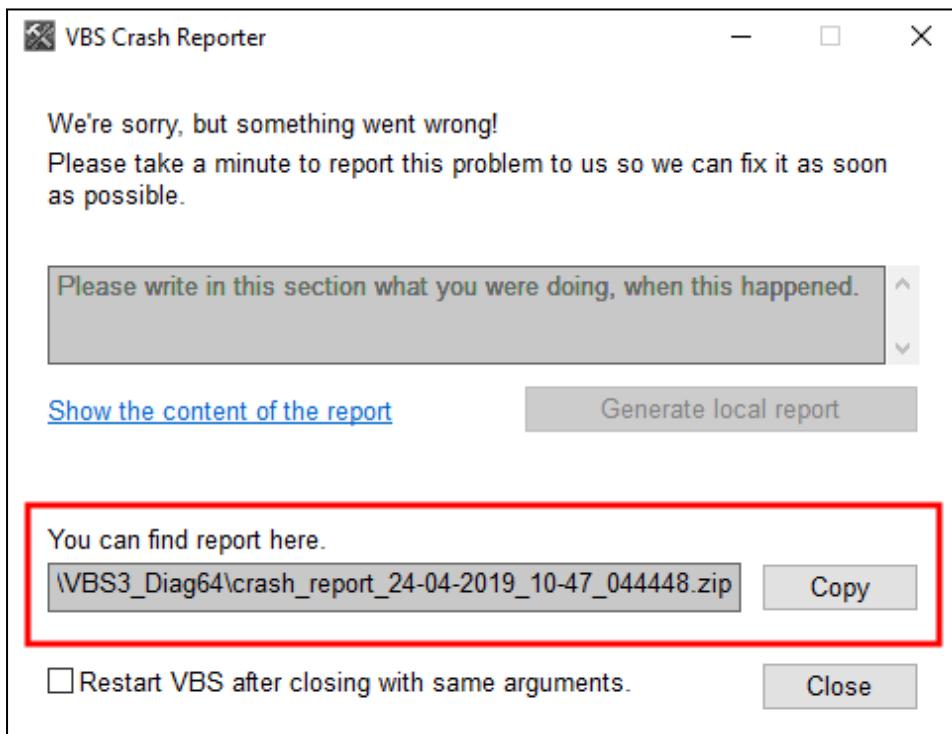
2. **Optional:** Click **Show the content of the report** to see what the report consists of, and the information categories the report is divided to.



3. **Optional:** Click **Generate local report**, to generate a crash report ZIP file locally, which can be later sent to Bohemia Interactive Simulations Customer Support.

The report ZIP file path appears in the dialog.

Image-28: Report ZIP file path, highlighted in red



4. Check **Restart VBS after closing with same arguments**, to restart VBS4 with the same startup parameters (see [Command Line and Launcher Options \(on page 76\)](#)).
5. Click **Close** to close the VBS Crash Reporter.

The crash report is created.

NOTE

The Crash Reporter Tool is optional. To disable this functionality, delete the Crash Reporter Tool executable:

`\VBS_Installation\optional\support\CrashReporter.exe`

8.4 Low-Level Memory Profiler

You can use the low-level memory profiler to capture memory states (for example, memory leaks) in log files.

Follow these steps:

1. Start VBS4 with the `-memoryProfilingLowLevel=N` command line option (if *N* is left unspecified, the default buffer size for profiling is 40000 MB), or run the following in the Developer Console (see the VBS4 Scripting Manual):

```
diag_captureMemory "start";
```

2. Use the [diag_captureMemory](https://sqf.bisimulations.com/display/SQF/diag_captureMemory) (https://sqf.bisimulations.com/display/SQF/diag_captureMemory) SQF command in the following modes:

Mode	Description
<code>"start"</code>	Has the same effect as <code>-memoryProfilingLowLevel</code> , attaching to the memory-related system functions. If the profiler starts with <code>-memoryProfilingLowLevel=buffer_size</code> , the last specified value is used (not the default buffer size of 40000 MB).
<code>"stop"</code>	Stops profiling, unattaching from all system functions.
<code>"snapshot"</code>	Takes a memory snapshot (a point in time from which you want to analyze memory changes).
<code>"dump"</code>	Dumps the allocated memory, since the last snapshot was taken, as a memory tree into a log file (stored as <code>memoryDATE.txt</code> , where <i>DATE</i> is the current date, at the root of the VBS4 installation folder).
<code>"dumpMemory"</code>	<p>NOTE</p> <p>If no snapshot is made (using <code>"snapshot"</code>) before using <code>"dump"</code>, the result is the same as when using <code>"dumpMemory"</code>.</p>

8.5 Benchmark Tool

The Benchmark Tool allows you to benchmark performance on the computer that runs VBS4.

The Benchmark Tool uses three [Graphics Settings \(on page 168\)](#) presets:

- **Low** - Overall low graphics settings.
- **Normal** - Overall medium graphics settings.
- **High** - Overall high graphics settings.



TIP

Bohemia Interactive Simulations recommends running the Benchmark Tool with the **Normal** preset, where comparisons to results based on the recommended [System Requirements \(on page 27\)](#) are made. The **Low** and **High** presets only test the ability of VBS4 to run at that graphics settings level.

The Benchmark Tool uses the `BenchmarkMissions.cfg` configuration file, located at:

`\VBS_Installation\Components\SceneStats\config\`



WARNING

Bohemia Interactive Simulations does not recommend modifying the configuration file directly. For specific system / benchmark requirements, contact support@bisimulations.com.

Follow these steps:

1. Start VBS4 with the `-benchmark` or `-benchmark="graphics_preset"` command-line option (see [Command Line and Launcher Options \(on page 76\)](#)), where `graphics_preset` can be **Low**, **Normal**, or **High**.



NOTE

If `graphics_preset` is unspecified, **Normal** is used by default.

VBS4 starts and runs the benchmark Battlespaces. As soon as the benchmark data is collected, VBS4 shuts down.

2. The benchmark data is now available - see [Benchmark Data \(below\)](#) for details.

8.5.1 Benchmark Data

When the Benchmark Tool finishes running, the benchmark data becomes available at:

`\Documents\VBS4\Benchmark\`

Each benchmark result is stored in the following folder:

Report_DD_MM_YYYY_HH_MM

Where **DD_MM_YYYY_HH_MM** indicate the benchmark date and time.

Inside, there are multiple JSON files and a single text (TXT) file (**ReportResults.txt**).

Each JSON file reflects the benchmark data per benchmark Battlespace, measured in the following categories:

- VBS VRAM usage [GiB]
- Overall GPU usage [%]
- VBS RAM usage [GiB]
- Overall RAM usage [%]
- VBS CPU usage [%]
- Frame Time [ms]

The contents of these JSON files do not need to be reviewed directly. Instead, the **ReportResults.txt** file contains the benchmark summary such as the example below:

VBS4 Benchmark

```
-----  
Command: O:\VBS4\VBS4.exe -admin -forceSimul -window -benchmark="High"  
VBS Version: 24.1.0.741  
Blue Version: 155.2.190369
```

Results

```
-----  
Average FPS in single-thread CPU oriented missions: 31.1044 (Recommended specs  
machine gives 35 FPS.)  
Average FPS in CPU multi-thread oriented missions: 43.395 (Recommended specs  
machine gives 60 FPS.)  
Your performance seems to be limited by multi-thread CPU performance (potentially  
also RAM or disk).  
Consider upgrading according to recommended specs.  
Average FPS in GPU oriented missions: 32.1112 (Recommended specs machine gives 50  
FPS.)  
Your performance seems to be limited by GPU.  
Consider upgrading according to recommended specs.
```

Benchmark Averages (Visual setting: Normal)

```
-----  
Benchmark took 1400 seconds to finish.  
FPS: 34.43  
#1: 32.11 #2: 28.25 #3: 33.96 #4: 43.40  
Frame variance: 10.72  
#1: 8.53 #2: 8.07 #3: 11.55 #4: 14.74
```

CPU utilization: 58%
RAM usage: 35.97GiB
System RAM utilization: 63%
VRAM usage: 8.673GiB
System GPU utilization: 76%

Hardware Specs

Windows 10 Version 10.0 (Build 19045)
BIOS Version: DELL - 2 1.16.0 Dell - 10000
12th Gen Intel(R) Core(TM) i7-12850HX
NVIDIA GeForce RTX 3080 Ti Laptop GPU (15.7959 GiB Dedicated Video Memory)
63.6921 GiB RAM Available

Network adapters info:

Network Adapter 2:

Adapter Desc: Fortinet SSL VPN Virtual Ethernet Adapter
Adapter Address: 00-09-0F-AA-00-01
IP Address: NNN.NNN.NNN.NNN
IP Mask: 255.255.255.255
Gateway: 0.0.0.0

DHCP Enabled: No

Network Adapter 4:

Adapter Desc: Intel(R) Wi-Fi 6E AX211 160MHz
Adapter Address: F4-CE-23-B8-E4-35
IP Address: NNN.NNN.NNN.NNN
IP Mask: 255.255.255.0
Gateway: NNN.NNN.NNN.NNN
DHCP Enabled: Yes
DHCP Server: NNN.NNN.NNN.NNN

9. Advanced Configuration

This section of the manual is designed for Administrators and covers the implementation of specialized features in VBS4.

- [Custom Map Styles \(on the next page\)](#)
- [VBS Call for Fire UI Configuration \(on page 343\)](#)
- [VBS Gateway Advanced Configuration \(on page 347\)](#)
- [VBS Radio Advanced Configuration \(on page 356\)](#)

9.1 Custom Map Styles

You can customize the standard 2D maps that appear in the VBS Editor (see Mission Designer Interface in the VBS4 Editor Manual and Instructor Interface in the VBS4 Instructor Manual), C2 (see Command and Control (C2) Screen in the VBS4 Trainee Manual), and AAR (see AAR Playback and the User Interface in the VBS4 AAR Manual) by changing the display of different map elements.

The custom map style also applies both to the Basic and Advanced Mini-Map. For more information, see Mini-Map Navigation in the VBS4 Trainee Manual.

The custom map styles are defined in a JSON file that contains objects defined in [Custom Map Style Elements \(on the next page\)](#).

You can also add custom map layers and switch them on / off. For more information, see Custom Map Layers in the VBS4 Editor Manual.

Follow these steps:

1. In the VBS4 Settings, navigate to **User Interface > Map**.
2. In the **Map Style** drop-down, select any of the available map-styles JSON files.

WARNING

To be able to select the files, they have to be located in:

- `\Documents\VBS4\Map\Styles` (default location)
- `\Path\User\Map\Styles` (if the `-profiles=Path` command-line option is used - see [Command Line and Launcher Options \(on page 76\)](#))

3. Click **Apply**.

The custom map style is applied.

NOTE

To reset to the VBS4 default map style, set **Map Style** to `VBS4-default`.

9.1.1 Custom Map Style Elements

Custom map elements that control the visual appearance of the map are defined in a JSON file (can be named arbitrarily, but needs to have a `.json` extension), which can then be specified using the procedure described in [Custom Map Styles \(on the previous page\)](#).

VBS4 uses the Mapbox GL JS technology for map styling, and the JSON file is based on the [Mapbox Style Specification](#) (<https://docs.mapbox.com/mapbox-gl-js/style-spec/>) format.

The JSON file consists of:

- **Mandatory Map Definitions**

Define the required [Sources \(below\)](#) and [Layers \(on the next page\)](#), which are the required minimum to make your custom map functional in VBS4.

- **Optional Map Definitions**

Define optional [Metadata \(on page 338\)](#), which can provide any additional metadata for your map styles.

VBS4 uses a default map-styles JSON file (`styles.json`). For more information on where the default version of that file and its modifications (patches) are located, see [Styles Patching \(on page 339\)](#).

In addition, for custom maps and their styles to work properly, Projections need to be used. Projections are defined in a separate JSON file. For more information, see [Custom Map Projections \(on page 342\)](#).

9.1.1.1 Sources

The map Sources define your map source data types and Layer names. For general information on Mapbox Sources, see <https://docs.mapbox.com/mapbox-gl-js/style-spec/sources/>.

NOTE

While the Mapbox Source data types can be `vector`, `raster`, `raster-dem`, `geojson`, `image`, or `video`, VBS4 only supports the `vector` type.

The supported `vector` formats are (these formats require Sources to be defined):

- KML / KMZ
- GeoJSON
- WFS

Sources are specified in the `sources` JSON object.

Example: Define Layer names, where the Layers are of the `vector` Source type:

```
"sources": {  
    "lines": { "type": "vector" },  
    "polygons": { "type": "vector" },  
    "points": { "type": "vector" },  
    "custom_layer_name": { "type": "vector" }  
}
```

The default VBS4 Sources are lines, polygons, and points, but you can also define your own custom Sources, which can then be specified using the procedure described in Custom Map Layers in the VBS4 Editor Manual.

WARNING

The Source name must match the ID used in the layer definition. For more information, see Custom Map Layers in the VBS4 Editor Manual.

9.1.1.2 Layers

The Layers allow you to define your map elements further, based on [Sources \(on the previous page\)](#). For general information on Mapbox Layers, see <https://docs.mapbox.com/mapbox-gl-js/style-spec/layers/>.

Layers are specified in the `layers` JSON object.

Example: Define a tree area on the map:

```
"layers": {  
    "tree_area": {  
        "type": "fill",  
        "source": "polygons",  
        "source-layer": "main_source",  
        "filter": ["any", [ "==", "MapComponent", "TreeArea"]],  
        "paint": {  
            "fill-antialias": true,  
            "fill-color": "#CFFFCE",  
            "fill-opacity": 1  
        }  
    },  
    ...  
}
```

Mandatory Layer properties:

Property	Description
<code>id</code>	Layer name and object key ("tree_area" in the preceding example). ⚠️ WARNING The layer name/ object key has to be unique.
<code>type</code>	Layer rendering type. The supported types are: <ul style="list-style-type: none">• <code>fill</code>• <code>line</code>• <code>symbol</code>• <code>background</code> The unsupported types include: <ul style="list-style-type: none">• <code>circle</code>• <code>heatmap</code>• <code>fill-extrusion</code>• <code>raster</code>• <code>hillshade</code>• <code>sky</code> ⚠️ WARNING The following layer rendering types depend on the source (below) , and must be set accordingly: <ul style="list-style-type: none">• The <code>fill</code> type applies to polygon sources.• The <code>line</code> type applies to polyline sources.• The <code>symbol</code> type applies to point sources.
<code>source</code>	Any of the defined Sources (on page 335).
<code>source-layer</code>	Layer to use from a vector tile Source. ℹ️ NOTE Can only be <code>main_source</code> in VBS4.

Main Optional Layer properties:

Property	Description
<code>filter</code>	A Filter (https://docs.mapbox.com/mapbox-gl-js/style-spec/layers/#filter) is a Mapbox Expression that specifies conditions on Source features. Only features that match the filter are displayed.
	<div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"><p>NOTE</p><p>The following considerations apply:</p><ul style="list-style-type: none">For the possible values of each Attribute, see the default VBS4 map-styles JSON file (styles.json), located in: <code>VBS_Installation\Components\WebMapController\Styles\</code>If you use a custom Source, you need to know the Attributes names and their possible values.</div>
<code>layout</code>	Layout sub-properties for the Layer. For the full list of layout sub-properties, see the https://docs.mapbox.com/mapbox-gl-js/style-spec/layers/#layout-property .
<code>paint</code>	Default paint sub-properties for the Layer. For the full list of paint sub-properties, see https://docs.mapbox.com/mapbox-gl-js/style-spec/layers/#paint-property .

For other optional Layer properties, see <https://docs.mapbox.com/mapbox-gl-js/style-spec/layers/#layer-properties>.

9.11.3 Metadata

The map Metadata defines any additional metadata you want to add to your map styles, which includes arbitrary properties useful to track with the map-styles JSON file. The Metadata properties do not influence the map rendering.

Metadata is specified in the `metadata` JSON object.

```
"metadata": {  
    "lines:version": "3.x"  
},
```

9.1.1.4 Styles Patching

Map styles are stored in a JSON file, which has a default version and patch (modification) versions:

- **Default Map Styles** - The default map styles are stored at: `VBS_Installation\Components\WebMapController\styles.json`



WARNING

The **Default Map Styles** file should not be modified directly, as any changes are lost when installing / updating VBS4.

- **Custom Map Styles** - Any changes to the default map styles are stored as patches (differences in content from the **Default Map Styles** `styles.json`) in:

- `\Documents\VBS4\Map\Styles\` (default patches location)
- `\Path\User\Map\Styles\` (if the `-profiles=Path` command-line option is used - see [Command Line and Launcher Options \(on page 76\)](#))

The map-styles patching follows the [RFC 7386: JSON Merge Patch](#) (<https://www.rfc-editor.org/rfc/rfc7386>) standard.

Example: The following map-styles patch updates the line color for tertiary roads.

Before patching:

```
{  
    "version": 8,  
    "name": "VBS4 Style",  
    ...  
    "layers": {  
        "tree_area": {  
            "type": "fill",  
            "source": "polygons",  
            "source-layer": "main_source",  
            "filter": ["any", [ "==", "MapComponent", "TreeArea"]],  
            "paint": {  
                "fill-antialias": true,  
                "fill-color": "#FFFFFF",  
                "fill-opacity": 1  
            }  
        },  
        "tertiary": {  
            "type": "line",  
            "source": "roads",  
            "source-layer": "main_source",  
            "filter": [ "==", "highway", "tertiary"],  
            "paint": {  
                "line-color": "#000000",  
                "line-width": 2  
            }  
        }  
    }  
}
```

```
"layout": {  
    "line-cap": "round",  
    "line-join": "round",  
    "visibility": "visible"  
},  
"paint": {  
    "line-color": "#ffff",  
    "line-width": 2  
}  
},  
...  
}
```

Patch:

```
{  
    "layers": {  
        "tertiary": {  
            "paint": { "line-color": "#FFB100" }  
        }  
    }  
}
```

After patching:

```
{  
    "version": 8,  
    "name": "VBS4 Style",  
    ...  
    "layers": {  
        "tree_area": {  
            "type": "fill",  
            "source": "polygons",  
            "source-layer": "main_source",  
            "filter": ["any", [ "==", "MapComponent", "TreeArea"]],  
            "paint": {  
                "fill-antialias": true,  
                "fill-color": "#FFFFFF",  
                "fill-opacity": 1  
            }  
        },  
        "tertiary": {  
            "type": "line",  
            "source": "roads",  
            "source-layer": "main_source",  
            "filter": [ "==", "highway", "tertiary"],  
            "paint": {  
                "line-color": "#FFB100",  
                "line-width": 2  
            }  
        }  
    }  
}
```

```
"layout": {  
    "line-cap": "round",  
    "line-join": "round",  
    "visibility": "visible"  
},  
"paint": {  
    "line-color": "#FFB100",  
    "line-width": 2  
}  
,  
...  
}
```

9.1.2 Custom Map Projections

You can define Projections for your custom map. A Projection allows you to transform 2D map locations into geo-locations that take Earth curvature into account.

Projections are defined in a JSON file called `projections.json`, located in:

- `\Documents\VBS4\Map\` (default location)
- `\Path\User\Map\` (if the `-profiles=Path` command-line option is used - see [Command Line and Launcher Options \(on page 76\)](#))

VBS4 relies on [Proj4js](#) (<http://proj4js.org/>), which is a third-party software library used to transform point coordinates from one coordinate system to another.

The `projections.json` structure is as follows:

```
{  
  "projections": {  
    "EPSG_Code_1": "Proj4js_Data_1",  
    "EPSG_Code_2": "Proj4js_Data_2",  
    ...  
  }  
}
```

`EPSG_Code` is a European Petroleum Survey Group (EPSG) code that can represent geodetic datums, spatial reference systems, Earth ellipsoids, coordinate transformations, and related units of measurement.

EPSG codes and their Proj4js-compatible export data can be found on <http://epsg.io/>.

Example Map Projections defined for the UK, Sweden, and Poland:

```
{  
  "projections": {  
    // UK  
    "EPSG:27700": "+proj=tmerc +lat_0=49 +lon_0=-2 +k=0.9996012717  
    +x_0=400000 +y_0=-100000 +ellps=airy  
    +towgs84=446.448,-125.157,542.06,0.15,0.247,0.842,-20.489 +units=m +no_defs",  
    // Sweden  
    "3006": "+proj=utm +zone=33 +ellps=GRS80 +towgs84=0,0,0,0,0,0,0 +units=m  
    +axis=neu +no_defs",  
    // Poland  
    "EPSG:2180": "+proj=tmerc +lat_0=0 +lon_0=19 +k=0.9993 +x_0=500000  
    +y_0=-5300000 +ellps=GRS80 +towgs84=0,0,0,0,0,0,0 +units=m +no_defs'"  
  }  
}
```

9.2 VBS Call for Fire UI Configuration

Administrators can configure the Fire Direction Center (FDC) UI in VBS Call for Fire (CFF) to offer any VBS4 gun or ammunition type, in addition to those included by default.

To do this, the `config.json` file must be edited on the computer CFF is administered from, which is found at the following location:

`\VBS_Installation\Components\CallForFire\`

WARNING

Only the gun and ammunition types provided by default in CFF are tested and supported. Other types of guns and ammunition found in VBS4 may be compatible with CFF, but this is not guaranteed.

Editing the `config.json` file is intended for advanced administrative users. Incorrect editing prevents CFF from functioning properly. It is advisable to create a backup before editing the file.

The `config.json` file is divided into the following segments:

- [Fuse Types \(below\)](#)
- [Ammo Types \(on page 345\)](#)
- [Gun Types \(on page 345\)](#)

9.2.1 Fuse Types

The following table lists the parameters used in the `FuseTypes` segment of the configuration.

Parameter	Description
className	Defines the unique name you want to refer to the fuse configuration by, when defining fuse types supported by ammunition types.
fuseName	Defines the fuse configuration class name, found inside the relevant VBS4 ammunition configuration. Select from: <code>impact</code> , <code>proximity</code> , <code>nearSurface</code> , <code>delay</code> , or <code>timed</code> .
fuseMode	Defines the VBS4 simulation type. Select from: <code>pointDetonating</code> , <code>proximity</code> , <code>nearSurface</code> , <code>delay</code> , <code>timed</code> , or <code>bonus</code> .



NOTE

The `fuseName` and `fuseMode` should match, with the exception of `impact` / `pointDetonating` and `timed` / `bonus`, which can be used together.

Parameter	Description
burstHeight	Defines the default height of burst, presented in the CFF UI for timed fuses (in meters). NOTE For proximity or near-surface fuses, the value cannot be changed by the FDC Operator.
delay	Defines the time-after-impact that the fuse is set to explode, for delay fuses (in seconds).
armingTime	Defines an arming time, before which a round does not detonate (in seconds). Prevents proximity fuses from exploding as soon as they are fired.



EXAMPLE

```
"fuseTypes": [
  {
    "className": "timed_m930",
    "fuseName": "timed",
    "fuseMode": "timed",
    "burstHeight": 500,
    "delay": 0,
    "armingTime": 0
  }
]
```

9.2.2 Ammo Types

The following table lists the parameters used in the `ammoTypes` segment of the configuration.

Parameter	Description
<code>className</code>	Defines the VBS4 class name of the magazine type you want to use.
<code>fuseTypes</code>	Defines a list of class names (array) of the fuses you want to make available for the ammunition type.
<code>defaultAmmoCount</code>	Defines the number of the ammunition type you wish gunlines to be equipped with, unless changed by the FDC Operator.



EXAMPLE

```
"ammoTypes": [
  {
    "className": "vbs_mag_sh_m_1rnd_60mm_HE_m720",
    "fuseTypes": ["pointDetonating", "nearSurface_m374",
                  "delay_m734", "proximity_m734"],
    "defaultAmmoCount": 100
  }
]
```



NOTE

The minimum and maximum range for the ammunition type is defined in the weapon configuration, using the `minRange` and `maxRange` parameters. For more information, see [Weapon Parameters](#) in the VBS Developer Reference.

9.2.3 Gun Types

The following table lists the parameters used in the `gunTypes` segment of the configuration.

Parameter	Description
<code>className</code>	Defines the VBS4 class name of the gun type you want to use. Only simple, static turrets behave as expected.
<code>turnOutForFiring</code>	Defines if the Gunner needs to be turned out to fire. Boolean value (<code>1</code> / <code>0</code>).
<code>forceGunnerTurretID</code>	Defines the index of the firing turret.

Parameter	Description
ammoTypes	Defines a list of magazines (array) that you want the gun to support. Must be usable by the gun in VBS4.
gunStatusDelays	Defines the default delays which are used when the gun type is placed (in seconds).



EXAMPLE

```
"gunTypes": [
  {
    "className": "VBS2_US_Army_M224_Static_W",
    "ammoTypes": [ "vbs_mag_sh_m_1rnd_60mm_HE_m720",
                   "vbs_mag_sh_m_1rnd_60mm_SMOKE_WP_m722",
                   "vbs_mag_sh_m_1rnd_60mm_ILLUM_m721"],
    "gunStatusDelays": {"preparing": 5, "attention": 5, "laying": 5,
                       "loading": 3,                               "unloading": 5, "stowing": 5}
  }
]
```

For more information about weapon configuration for VBS4, see the Configuration Manual in the VBS Developer Reference.

9.3 VBS Gateway Advanced Configuration

In the event that the configuration available in the Settings tab does not resolve issues with VBS Gateway or a running exercise, there are a number of other options available for diagnosis and configuration:

- [VBS Gateway Configuration File \(on the next page\)](#)
- [VBS Gateway Logging \(on page 350\)](#)
- [VBS Gateway Troubleshooting \(on page 353\)](#)
- [VBS Gateway Script Commands \(on page 354\)](#)

9.3.1 VBS Gateway Configuration File

The base configuration set during Configure VBS Gateway (in the VBS Gateway Manual) saves your setup to the VBS Gateway Configuration file. This file contains additional settings that may help to resolve issues with VBS Gateway or a running exercise.

Configuration file:

`\VBS_Installation\Settings\Gateway_Settings.xml`

The configuration file contains the following XML structure:

XML Element	Description
<code><General></code>	Contains settings to configure VBS Gateway logging. For more information, see VBS Gateway Logging (on page 350) .
<code><Networking></code>	Contains the communications protocol settings defined during initial setup. For more information, see Configure VBS Gateway in the VBS Gateway Manual.
<code><VBS></code>	Contains the configuration to specify the behavior of remote entities in VBS4 and VBS4 connectivity. For more information, see Configure VBS Gateway in the VBS Gateway Manual.
<code><GUI></code>	Additional configuration settings to specify the behavior of the VBS Gateway UI. For more information, see VBS Gateway UI Settings (below) .
<code><DeadReckoning></code>	Contains the entity appearance and performance settings defined during initial setup. For more information, see Configure VBS Gateway in the VBS Gateway Manual.
<code><Filtering></code>	Contains the Geofilter settings defined during initial setup. For more information, see Configure VBS Gateway in the VBS Gateway Manual.

9.3.1.1 VBS Gateway UI Settings

Modify parameters in the `<GUI>` tag of the configuration file to change the VBS Gateway UI settings.

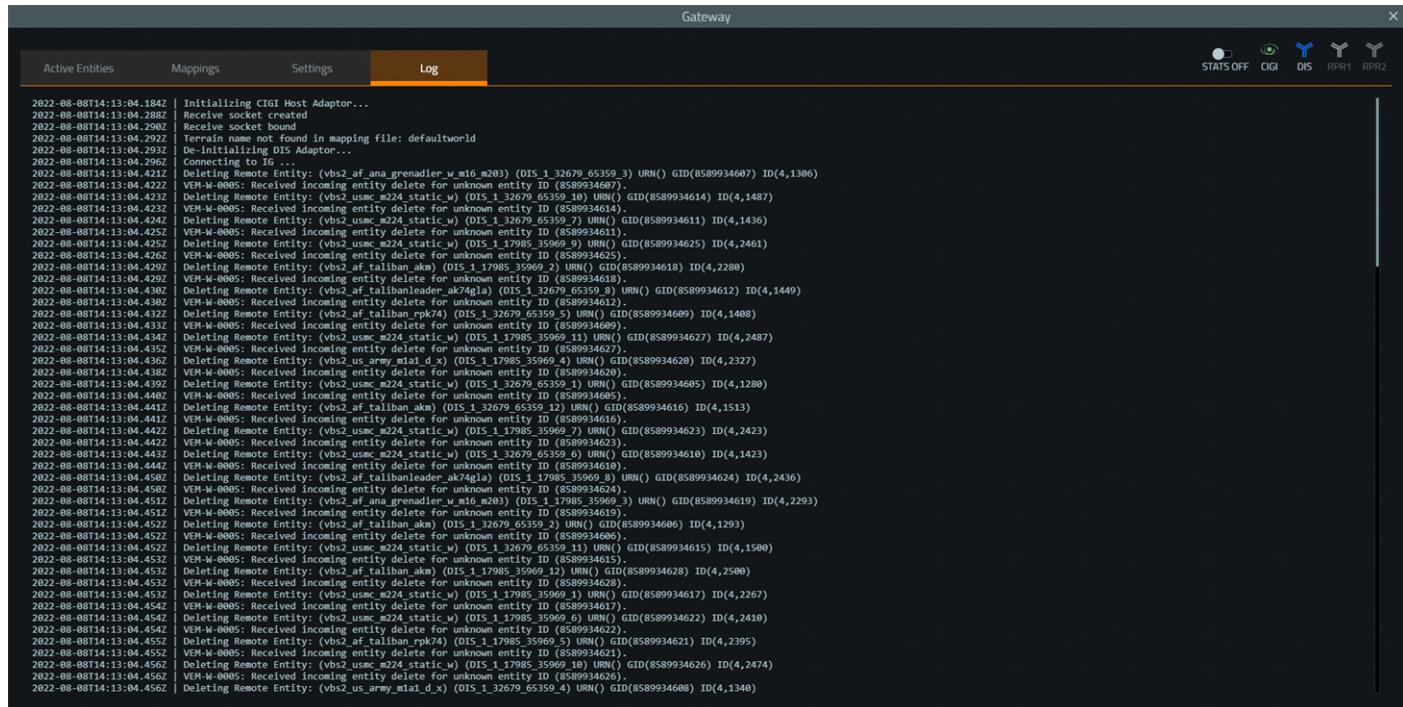
Parameter	Description
<code><Enabled></code>	If false (0), the UI service does not initialize with the Gateway plugin. Only change this value to 0 - false for debugging purposes. Default: 1 - true

Parameter	Description
<code><EntitiesRefreshInterval></code>	<p>Specifies the interval between Active Entities tab auto-updates. Smaller values provides more frequent updates at the expense of possible performance degradation.</p> <p>Default: 2.5 seconds</p> <p>Limits: .1 to 6 seconds</p>
<code><MunitionsGuiLifetime></code>	<p>Time in seconds that munitions remain displayed on the Active View Page, after being destroyed.</p> <p>Default: 10 seconds</p>
<code><NetworkArrowTimeout></code>	<p>Specifies the timeout period for message receipt and transmission. If no messages are sent or transmitted within this period, the arrow indicators in the UI header change to red.</p>

9.3.2 VBS Gateway Logging

VBS Gateway provides full logging to monitor and troubleshoot the operation of VBS Gateway and remote entities. Changes to logging can be made while VBS Gateway is running, with the settings options in the Settings tab on the VBS Gateway UI.

Logging data is displayed in the Log tab of the VBS Gateway UI and can also be displayed in a console window or saved to text files. The Log tab displays the 1000 most recent messages. To avoid unnecessary accumulation of files, logging to file is set to off by default.



The screenshot shows the VBS Gateway application window. At the top, there are tabs for Active Entities, Mappings, Settings, and Log. The Log tab is active, displaying a scrollable list of log entries. The log entries are timestamped and show various system and entity-related events. The interface includes a toolbar with icons for STAT OFF, CIGI, DIS, RPR1, and RPR2, and a status bar at the bottom.

```

Gateway

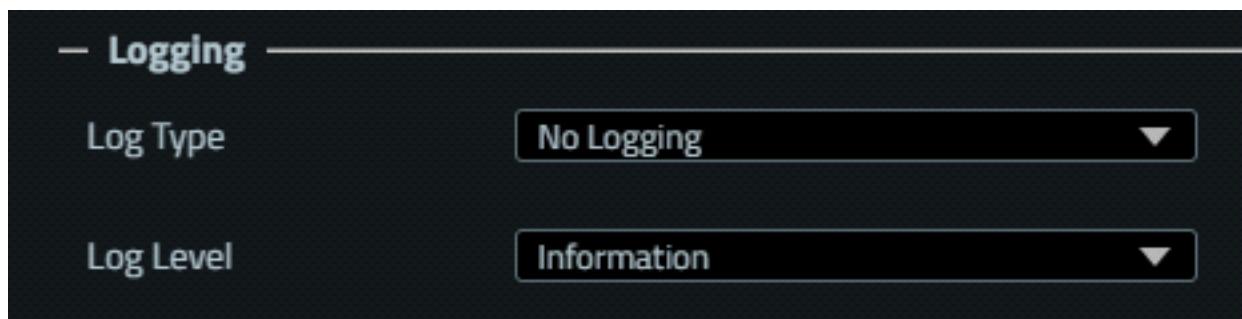
Active Entities Mappings Settings Log

2022-08-08T14:13:04.184Z | Initializing CGI Host Adaptor...
2022-08-08T14:13:04.288Z | Receive socket created
2022-08-08T14:13:04.290Z | Receive socket bound
2022-08-08T14:13:04.291Z | Received incoming entity found in mapping file: defaultworld
2022-08-08T14:13:04.292Z | De-initializing CGI Adaptor...
2022-08-08T14:13:04.296Z | Connecting to IG ...
2022-08-08T14:13:04.421Z | Deleting Remote Entity: (vbz2_af_afan_grenadier_w_m16_m20) (DIS_1_32679_65359_3) URN() GID(8589934607) ID(4,1306)
2022-08-08T14:13:04.422Z | VEM-W-0005: Received incoming entity delete for unknown entity ID (8589934607).
2022-08-08T14:13:04.423Z | Deleting Remote Entity: (vbz2_usmc_m224_static_w) (DIS_1_32679_65359_10) URN() GID(8589934614) ID(4,1487)
2022-08-08T14:13:04.424Z | VEM-W-0005: Received incoming entity delete for unknown entity ID (8589934614).
2022-08-08T14:13:04.424Z | Deleting Remote Entity: (vbz2_usmc_m224_static_w) (DIS_1_32679_65359_7) URN() GID(8589934611) ID(4,1436)
2022-08-08T14:13:04.425Z | VEM-W-0005: Received incoming entity delete for unknown entity ID (8589934611).
2022-08-08T14:13:04.425Z | Deleting Remote Entity: (vbz2_usmc_m224_static_w) (DIS_1_17985_35969_9) URN() GID(8589934625) ID(4,2461)
2022-08-08T14:13:04.426Z | VEM-W-0005: Received incoming entity delete for unknown entity ID (8589934625).
2022-08-08T14:13:04.429Z | Deleting Remote Entity: (vbz2_af_taliban_aka) (DIS_1_17985_35969_2) URN() GID(8589934618) ID(4,2280)
2022-08-08T14:13:04.430Z | VEM-W-0005: Received incoming entity delete for unknown entity ID (8589934618).
2022-08-08T14:13:04.430Z | Deleting Remote Entity: (vbz2_af_talibaneader_ak7agle) (DIS_1_32679_65359_8) URN() GID(8589934612) ID(4,1449)
2022-08-08T14:13:04.430Z | VEM-W-0005: Received incoming entity delete for unknown entity ID (8589934612).
2022-08-08T14:13:04.432Z | Deleting Remote Entity: (vbz2_af_taliban_rpk74) (DIS_1_32679_65359_5) URN() GID(8589934609) ID(4,1408)
2022-08-08T14:13:04.433Z | VEM-W-0005: Received incoming entity delete for unknown entity ID (8589934609).
2022-08-08T14:13:04.434Z | Deleting Remote Entity: (vbz2_usmc_m224_static_w) (DIS_1_17985_35969_11) URN() GID(8589934627) ID(4,2487)
2022-08-08T14:13:04.434Z | VEM-W-0005: Received incoming entity delete for unknown entity ID (8589934627).
2022-08-08T14:13:04.436Z | Deleting Remote Entity: (vbz2_us_army_m11_d_x) (DIS_1_17985_35969_4) URN() GID(8589934620) ID(4,2327)
2022-08-08T14:13:04.438Z | VEM-W-0005: Received incoming entity delete for unknown entity ID (8589934620).
2022-08-08T14:13:04.439Z | Deleting Remote Entity: (vbz2_usmc_m224_static_w) (DIS_1_32679_65359_1) URN() GID(8589934605) ID(4,1288)
2022-08-08T14:13:04.440Z | VEM-W-0005: Received incoming entity delete for unknown entity ID (8589934605).
2022-08-08T14:13:04.441Z | Deleting Remote Entity: (vbz2_af_taliban_aka) (DIS_1_32679_65359_12) URN() GID(8589934616) ID(4,1513)
2022-08-08T14:13:04.441Z | VEM-W-0005: Received incoming entity delete for unknown entity ID (8589934616).
2022-08-08T14:13:04.442Z | Deleting Remote Entity: (vbz2_usmc_m224_static_w) (DIS_1_17985_35969_7) URN() GID(8589934623) ID(4,2423)
2022-08-08T14:13:04.442Z | VEM-W-0005: Received incoming entity delete for unknown entity ID (8589934623).
2022-08-08T14:13:04.443Z | Deleting Remote Entity: (vbz2_usmc_m224_static_w) (DIS_1_32679_65359_6) URN() GID(8589934618) ID(4,1423)
2022-08-08T14:13:04.444Z | VEM-W-0005: Received incoming entity delete for unknown entity ID (8589934618).
2022-08-08T14:13:04.446Z | Deleting Remote Entity: (vbz2_af_talibaneader_ak7agle) (DIS_1_17985_35969_9) URN() GID(8589934624) ID(4,2436)
2022-08-08T14:13:04.447Z | VEM-W-0005: Received incoming entity delete for unknown entity ID (8589934624).
2022-08-08T14:13:04.451Z | Deleting Remote Entity: (vbz2_af_afan_grenadier_w_m16_w20) (DIS_1_17985_35969_3) URN() GID(8589934619) ID(4,2293)
2022-08-08T14:13:04.451Z | VEM-W-0005: Received incoming entity delete for unknown entity ID (8589934619).
2022-08-08T14:13:04.452Z | Deleting Remote Entity: (vbz2_af_taliban_aka) (DIS_1_32679_65359_2) URN() GID(8589934606) ID(4,1293)
2022-08-08T14:13:04.452Z | VEM-W-0005: Received incoming entity delete for unknown entity ID (8589934606).
2022-08-08T14:13:04.452Z | Deleting Remote Entity: (vbz2_usmc_m224_static_w) (DIS_1_17985_35969_15) URN() GID(8589934615) ID(4,1580)
2022-08-08T14:13:04.452Z | VEM-W-0005: Received incoming entity delete for unknown entity ID (8589934615).
2022-08-08T14:13:04.452Z | Deleting Remote Entity: (vbz2_af_taliban_aka) (DIS_1_17985_35969_12) URN() GID(8589934628) ID(4,2500)
2022-08-08T14:13:04.452Z | VEM-W-0005: Received incoming entity delete for unknown entity ID (8589934628).
2022-08-08T14:13:04.453Z | Deleting Remote Entity: (vbz2_usmc_m224_static_w) (DIS_1_17985_35969_17) URN() GID(8589934617) ID(4,2267)
2022-08-08T14:13:04.454Z | VEM-W-0005: Received incoming entity delete for unknown entity ID (8589934617).
2022-08-08T14:13:04.454Z | Deleting Remote Entity: (vbz2_usmc_m224_static_w) (DIS_1_17985_35969_6) URN() GID(8589934622) ID(4,2418)
2022-08-08T14:13:04.454Z | VEM-W-0005: Received incoming entity delete for unknown entity ID (8589934622).
2022-08-08T14:13:04.455Z | Deleting Remote Entity: (vbz2_af_afan_grenadier_w_m16_w20) (DIS_1_17985_35969_5) URN() GID(8589934621) ID(4,2395)
2022-08-08T14:13:04.455Z | VEM-W-0005: Received incoming entity delete for unknown entity ID (8589934621).
2022-08-08T14:13:04.456Z | Deleting Remote Entity: (vbz2_usmc_m224_static_w) (DIS_1_17985_35969_16) URN() GID(8589934626) ID(4,2474)
2022-08-08T14:13:04.456Z | VEM-W-0005: Received incoming entity delete for unknown entity ID (8589934626).
2022-08-08T14:13:04.456Z | Deleting Remote Entity: (vbz2_us_army_m11_d_x) (DIS_1_32679_65359_4) URN() GID(8589934608) ID(4,1348)

```

9.3.2.1 Log Settings

The Log settings are found in the General section of the Settings Page.



General Settings	Description						
Log Type	<p>Specifies whether or not to log messages. The logging type settings are:</p> <ul style="list-style-type: none">• No logging (default)• Log to file <p>Additional logging options are available in the Gateway_Settings.xml file. See Log Files.</p>						
Log Level	<p>Specifies the severity of messages to log. Messages of the selected severity level and higher are logged. Message levels are listed in descending order of severity. A higher severity setting results in fewer messages being logged.</p> <p>The levels of message severity are as follows:</p> <table><tbody><tr><td>• Critical</td><td>• Information</td></tr><tr><td>• Error</td><td>• Debug</td></tr><tr><td>• Warning</td><td></td></tr></tbody></table>	• Critical	• Information	• Error	• Debug	• Warning	
• Critical	• Information						
• Error	• Debug						
• Warning							

9.3.2.2 Log Files

VBS Gateway outputs all message to the following log file:

- [Gateway.log](#) in:

[%LOCALAPPDATA%\VBS4\Logs\log\](#)

WARNING

If customer support is required for VBS Gateway, send both the [\log\](#) folder, and the [\Settings\](#) folders from the VBS4 installation folder, in a zip file with your support request.

9.3.2.2.1 Configure Logging

If necessary, configure logging directly in:

`\VBS_Installation\Settings\Gateway_Settings.xml`

The `<General>` tag contains the settings available to configure logging.

Logging Configuration	Description
<code><Log_Enabled></code>	<p>Specifies the log output method:</p> <ul style="list-style-type: none">0. Logging disabled (default)1. Output to the log files in: <code>%LOCALAPPDATA%\VBS4\Logs\log\Gateway.log</code>2. Output to the log files and a command line console window.
<code><Log_Level></code>	<p>Specifies the level of log messages to output:</p> <ul style="list-style-type: none">0. Critical1. Error2. Warning3. Information4. Debug <p>The log level is cumulative and outputs all preceding log levels.</p>

 **WARNING**

When logging to the console window, do not close the console window. Doing so also closes VBS4.

9.3.3 VBS Gateway Troubleshooting

The primary method of troubleshooting VBS Gateway is to enable logging.

Follow these steps:

1. Open the configuration settings file with a text editor:

`\VBS_Installation\Settings\Gateway_Settings.xml`

2. Set the `<General><Log_Enabled>` value to **2** to output log messages to both the log file and a command line console window.
3. Set the `<General><Log_Level>` value to **4** to output all messages including debug messages.

The information in the command line console window and the log file helps to diagnose your issue.

Locate the `Gateway.log` file in:

`%LOCALAPPDATA%\VBS4\Logs\log\`

For more information about logging, see [VBS Gateway Logging \(on page 350\)](#).

Common Errors

RPR2 Adaptor failed to connect (1261): HlaConnectException

This error indicates that Pitch RTI or MÄK RTI are unable to locate and load the RTI DLLs.

- Reinstall Pitch RTI or MÄK RTI, ensuring that **Visual C++ 14.0 or 15.0** is selected for installation.
- Verify that the path environment variable has a reference to the RTI bin folder.

9.3.4 VBS Gateway Script Commands

The following script commands are available to change VBS Gateway settings at runtime.

- [Gateway_ApplySettings](https://sqf.bisimulations.com/display/SQF/Gateway_ApplySettings) (https://sqf.bisimulations.com/display/SQF/Gateway_ApplySettings)
Applies queued settings changes and updates all adapters that were changed.
- [Gateway_CenterMotionDevice](https://sqf.bisimulations.com/display/SQF/Gateway_CenterMotionDevice) (https://sqf.bisimulations.com/display/SQF/Gateway_CenterMotionDevice)
Centers the motion device by sending `IG_CenterMotionDevice` to the IGs.
- [Gateway_ChangeSetting](https://sqf.bisimulations.com/display/SQF/Gateway_ChangeSetting) (https://sqf.bisimulations.com/display/SQF/Gateway_ChangeSetting)
Queues a setting change for the given adapter setting.
- [Gateway_GetSetting](https://sqf.bisimulations.com/display/SQF/Gateway_GetSetting) (https://sqf.bisimulations.com/display/SQF/Gateway_GetSetting)
Retrieves the current value for the given adapter.
- [Gateway_Enabled](https://sqf.bisimulations.com/display/SQF/Gateway_Enabled) (https://sqf.bisimulations.com/display/SQF/Gateway_Enabled)
Gets the state of the Gateway UI as set in the settings file.
- [Gateway_EnableMotionTracking](https://sqf.bisimulations.com/display/SQF/Gateway_EnableMotionTracking) (https://sqf.bisimulations.com/display/SQF/Gateway_EnableMotionTracking)
Enables or disables the motion device on the given IGs.
- [Gateway_ShowUI](https://sqf.bisimulations.com/display/SQF/Gateway_ShowGUI) (https://sqf.bisimulations.com/display/SQF/Gateway_ShowGUI)
Shows the Gateway UI in VBS if true, or in the default web browser if false.
- [Gateway_SendCommand](https://sqf.bisimulations.com/display/SQF/Gateway_SendCommand) (https://sqf.bisimulations.com/display/SQF/Gateway_SendCommand)
Sends script commands as strings through the active adapters to connected clients. If the Script Datum ID matches in the settings files, the other Gateway clients execute the script.
- [Gateway_SendString](https://sqf.bisimulations.com/display/SQF/Gateway_SendString) (https://sqf.bisimulations.com/display/SQF/Gateway_SendString)
Sends strings through the active adapters to connected clients. Other Gateway clients log the message.
- [Gateway_ViewAttachGroup](https://sqf.bisimulations.com/display/SQF/Gateway_ViewAttachGroup) (https://sqf.bisimulations.com/display/SQF/Gateway_ViewAttachGroup)
Loads an XML file of view configurations, or parses an array of view configurations, and attaches them to the designated entity.
- [Gateway_ViewGet](https://sqf.bisimulations.com/display/SQF/Gateway_ViewGet) (https://sqf.bisimulations.com/display/SQF/Gateway_ViewGet)
Returns the configuration for the view according to the View Configuration array structure.

- [Gateway_ViewModify](https://sqf.bisimulations.com/display/SQF/Gateway_ViewModify) (https://sqf.bisimulations.com/display/SQF/Gateway_ViewModify)
Updates the view configuration according to the View Configuration array structure.
- [Gateway_ViewClearGroup](https://sqf.bisimulations.com/display/SQF/Gateway_ViewClearGroup) (https://sqf.bisimulations.com/display/SQF/Gateway_ViewClearGroup)
Removes all views attached to the given entity.
- [Gateway_ViewRemove](https://sqf.bisimulations.com/display/SQF/Gateway_ViewRemove) (https://sqf.bisimulations.com/display/SQF/Gateway_ViewRemove)
Removes the specified views, so they cannot be retrieved by [Gateway_ViewGet](#).
- [Gateway_ViewSetSensor](https://sqf.bisimulations.com/display/SQF/Gateway_ViewSetSensor) (https://sqf.bisimulations.com/display/SQF/Gateway_ViewSetSensor)
Sets IG views to display as various types of sensors.

TIP

If you run a Dedicated Server with VBS Gateway and want to view the output of VBS Gateway script commands in the Admin Client, you can execute script commands:

```
if (isServer) then {
    ServerResult = [
        "DIS", "VerticalOffset", 20
    ] call Gateway_Changesetting;
    publicvariable "ServerResult"
}
```

View the output (value of [ServerResult](#)) in the Watch field of the Developer Console (in the VBS4 Scripting Manual). The command [Gateway_ChangeSetting](#) can be replaced with the appropriate script command.

Alternatively, you can also call:

```
executeOnServer [
    "ServerResult = [] call Gateway_Enabled; publicVariable 'ServerResult'"
]
```

Similarly, the output can be viewed in the watch field. The command [Gateway_Enabled](#) can be replaced with the appropriate script command.

The VBS Scripting Reference is the primary resource on VBS scripting:

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

Detailed explanations and example uses for Gateway script commands can be found at:

<https://sqf.bisimulations.com/display/SQF/VBS+Gateway>

9.4 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 \(on page 361\)](#)

9.4.1 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 in the VBS Radio Manual.

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).
<div style="border: 2px solid red; padding: 10px; text-align: center;">  WARNING The value must be higher than 0. </div>	

Parameter	Description
Radio_TransmissionStartSound / Radio_TransmissionEndSound	<p>Defines the start- and end-transmission sound effects. The following considerations apply:</p> <ul style="list-style-type: none"> 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.

i 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 (on page 275)**.

Default VBS Radio Settings:

```
<?xml version="1.0"?>
<VBSRadioSettings>
  <Version>1</Version>
  <DirectTalk_CutoffDistance>80.00000000000000</DirectTalk_CutoffDistance>
  <DirectTalk_Volume>5.00000000000000</DirectTalk_Volume>
  <DirectTalk_Mode>Ptt</DirectTalk_Mode>
  <DirectTalk_WhisperingDistance>5.00000000000000</DirectTalk_WhisperingDistance>
  <DirectTalk_TalkingDistance>20.00000000000000</DirectTalk_TalkingDistance>
  <DirectTalk_ShoutingDistance>40.00000000000000</DirectTalk_ShoutingDistance>
  <Voice_Volume>1.00000000000000</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>1.00000000000000</Radio_Volume>
  <Radio_Height>1.00000000000000</Radio_Height>
  <Radio_FadeoutDistance>20.00000000000000</Radio_FadeoutDistance>
  <Radio_NoiseVolume>0.50000000000000</Radio_NoiseVolume>
  <Radio_NoiseRedness>0.8000001192092896</Radio_NoiseRedness>
  <Radio_JammerNoiseRedness>0.50000000000000</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.

9.4.2 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 \(on page 363\)](#)
 - [General Issues \(on page 365\)](#)
 - [Radio Logs and the Diagnostic Dump \(on page 366\)](#)
- [User Interfaces \(on page 370\)](#)
 - [PitchTalk Admin Console \(on page 370\)](#)
 - [pRTI Explorer UI \(on page 370\)](#)
 - [Pitch Control Center \(on page 371\)](#)
 - [Web UI \(on page 371\)](#)
- [VBS Radio Known Limitations \(on page 372\)](#)

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 \(on page 366\)](#)).
- 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.

9.4.2.1 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 \(on page 368\)](#) 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 in the VBS4 Administrator Manual).

NOTE

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

- If used, logs are written to a dedicated [Radio Component Log \(on page 368\)](#) file.
- If not used, a limited amount of information is logged to the [VBS4.RPT \(on page 368\)](#) file.

These files are also included in a [.zip](#) file when the diagnostic dump feature is employed (see [Radio Logs and the Diagnostic Dump \(on page 366\)](#)).

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.

9.4.2.1.1 Server Admin Panel Recovery Actions

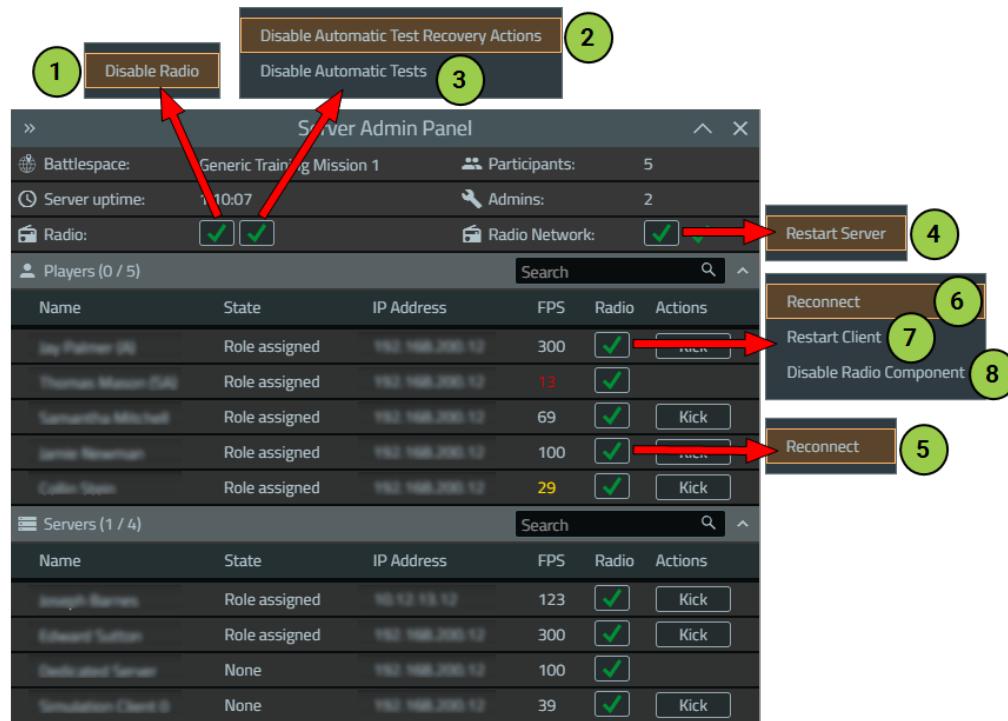
VBS Radio automatically detects issues in the background, using named automatic tests. The status of VBS Radio infrastructure is shown in the Server Admin Panel (see Server Admin Panel in the VBS4 Instructor Manual). When using `-vbsRadioDebug`, test output is also logged in the `VBSPitchRadio.log`. 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-29: 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	<p>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.</p> <p>If VBS Radio is blocking training or causing other major issues, it can be turned off, but as a last resort.</p> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p>NOTE</p> <p>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).</p> <p>If VBS Radio is disabled on the server and there are any new join-in-progress clients, their VBSPitchRadio component is not disabled.</p> </div>
2	Disable / Enable Automatic Test Recovery Actions	<p>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.</p> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p>NOTE</p> <p>If you select Disable Automatic Test Recovery Actions, automatic tests continue to run and report / log fails, but with no recovery action.</p> </div>
3	Disable / Enable Automatic Tests	<p>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.</p>
4	Restart Server	<p>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.</p>
5	Reconnect	<p>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.</p>

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) or channels in the Communications Panel (see Communications Panel).
8	Disable / Enable Radio Component	<p>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.</p> <p>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.</p> <p>In addition, you can use this action to disable a troublesome VBS Radio of a client, if it is affecting general radio stability.</p>

9.4.2.1.2 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.
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.

Issue	Solution
The ClientHasComponentEnabled test is failing	Means either of the following: <ul style="list-style-type: none">The client has the <code>VBSPitchRadio</code> component disabled (<code>-disableVBSRadio</code>).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), 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.

9.4.2.1.3 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 \(on page 88\)](#) in the VBS4 Administrator Manual.
- 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 <code>(5dd555f7-9cd6-4014-b703-b1a8c1fe458c.admin)</code>	Contains the project of the radio mission that is currently deployed. Generated on the computer where the mission is hosted (VBS server). File path: <code>\VBS_Installation\lib64\pitchTalk\pitchtalk\admindata\projects\</code>
PitchTalk Admin Log <code>(adminserver-date-time.log)</code>	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: <code>\VBS_Installation\lib64\pitchTalk\pitchtalk\logs\</code>
Pitch pRTI / CRC Log <code>(CRC-date-time-N.log)</code>	Contains information about connected clients ("federates") from the perspective of PitchTalk. Generated on the computer where the mission is hosted (VBS server). File path: <code>\VBS_Installation\lib64\pitchTalk\prti\logs\</code>
Radio Component Internal State <code>(MissionData.json)</code>	VBS Radio mission configuration file. File path: <code>%LOCALAPPDATA%\VBS4\RadioDiagnostic\year-month-day-hour-minutes-seconds.zip\</code>
CRC Settings <code>(prti1516eCRC.settings)</code>	Central RTI Component (CRC) server RTI configuration file. File path: <code>\VBS_Installation\lib64\pitchTalk\prti\conf\</code>

File**LRC Settings**

(prti1516eLRC.settings)

Description

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.

Name	Date modified	Type	Size
BeDingolInteraction.log	11/28/2023 12:04	LOG File	0 KB
CV9040Interaction.log	11/28/2023 12:04	LOG File	0 KB
FennekBAAIInteraction.log	11/28/2023 12:04	LOG File	0 KB
GazelleInteractionSystem.log	11/28/2023 12:04	LOG File	0 KB
Leopard2Interaction.log	11/28/2023 12:04	LOG File	0 KB
PT91Interaction.log	11/28/2023 12:04	LOG File	0 KB
ReconB2FOInteraction.log	11/28/2023 12:04	LOG File	0 KB
RWSInteractionSystem.log	11/28/2023 12:04	LOG File	0 KB
VBS_Leopard2.log	11/28/2023 12:04	LOG File	0 KB
VBS_Polish_PT-91.log	11/28/2023 12:04	LOG File	0 KB
VBSPitchRadio-2023-11-28-10-51-03-274976.log	11/28/2023 11:19	LOG File	161 KB
VBSPitchRadio-2023-11-28-11-20-29-279340.log	11/28/2023 11:42	LOG File	259 KB
VBSPitchRadio-2023-11-28-11-43-39-281572.log	11/28/2023 11:49	LOG File	116 KB
VBSPitchRadio-2023-11-28-11-50-14-288752.log	11/28/2023 11:55	LOG File	3 KB
VBSPitchRadio-2023-11-28-11-58-36-269764.log	11/28/2023 12:03	LOG File	103 KB
VBSPitchRadio-2023-11-28-12-04-54-289600.log	11/28/2023 12:04	LOG File	0 KB

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

(VBSPradioSettings.xml)

Radio settings .xml file. For more information, see [VBSPradioSettings Configuration File \(on page 357\)](#).

File path: %LOCALAPPDATA%\VBS4\Settings\

Admin and Trainee Computers

File	Description
Radio Component Internal State (MissionData.json)	See Radio Component Internal State (on page 367) .
LRC Settings (pti1516eLRC.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

Name	Type
2e3158b-3af8-4d55-9ba5-01c2c264b4ac.admin	ADMIN File
adminserver-231128-105054.523.log	Text Document
CRC-231128_10.50.55-0.log	Text Document
MissionData.json	JSON File
pti1516eCRC.settings	SETTINGS File
pti1516eLRC.settings	SETTINGS File
VBSPitchRadio-2023-11-28-10-50-54-11472.log	Text Document
VBSRadioSettings.xml	Microsoft Edge HTML Document

Admin / Trainee computer

Name	Type
MissionData.json	JSON File
pti1516eLRC.settings	SETTINGS File
VBSPitchRadio-2023-11-28-10-51-03-274976.log	Text Document
VBSRadioSettings.xml	Microsoft Edge HTML Document

9.4.2.2 User Interfaces

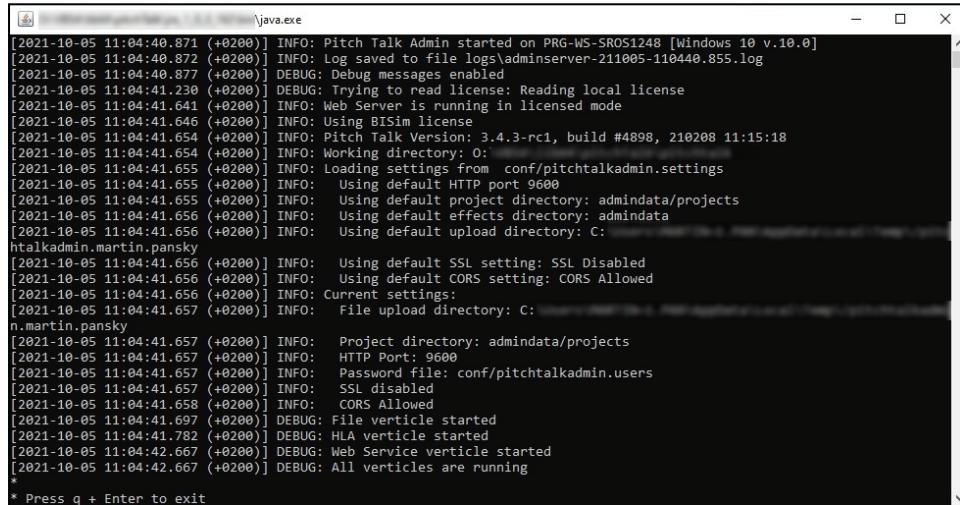
The following user interfaces (UIs) are also available to check for errors.

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 \(on page 367\)](#).

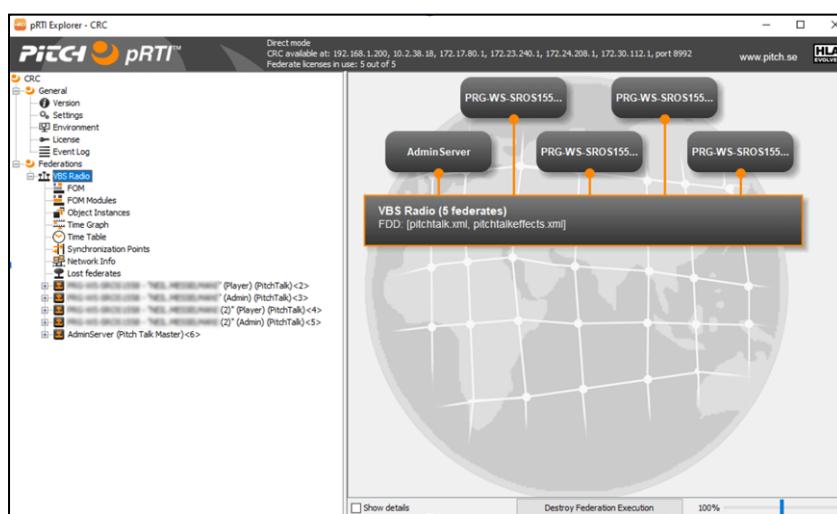
However, if there is a Java exception in PitchTalk Admin, the console is the only place where the exception appears.



```
[2021-10-05 11:04:40.871 (+0200)] INFO: Pitch Talk Admin started on PRG-WS-SROS1248 [Windows 10 v.10.0]
[2021-10-05 11:04:40.872 (+0200)] INFO: Log saved to file logs\adminserver-211005-110440.855.log
[2021-10-05 11:04:40.877 (+0200)] DEBUG: Debug messages enabled
[2021-10-05 11:04:41.230 (+0200)] DEBUG: Trying to read license: Reading local license
[2021-10-05 11:04:41.641 (+0200)] INFO: Web Server is running in licensed mode
[2021-10-05 11:04:41.646 (+0200)] INFO: Using BISim license
[2021-10-05 11:04:41.654 (+0200)] INFO: Pitch Talk Version: 3.4.3-rc1, build #4898, 210208 11:15:18
[2021-10-05 11:04:41.654 (+0200)] INFO: Working directory: O:
[2021-10-05 11:04:41.655 (+0200)] INFO: Loading settings from conf/pitchtalkadmin.settings
[2021-10-05 11:04:41.655 (+0200)] INFO: Using default HTTP port 9600
[2021-10-05 11:04:41.655 (+0200)] INFO: Using default project directory: admindata/projects
[2021-10-05 11:04:41.656 (+0200)] INFO: Using default effects directory: admindata
[2021-10-05 11:04:41.656 (+0200)] INFO: Using default upload directory: C:
[2021-10-05 11:04:41.656 (+0200)] INFO: Current settings:
[2021-10-05 11:04:41.657 (+0200)] INFO: File upload directory: C:
[n.martin.pansky]
[2021-10-05 11:04:41.656 (+0200)] INFO: Project directory: admindata/projects
[2021-10-05 11:04:41.657 (+0200)] INFO: HTTP Port: 9600
[2021-10-05 11:04:41.657 (+0200)] INFO: Password file: conf/pitchtalkadmin.users
[2021-10-05 11:04:41.657 (+0200)] INFO: SSL disabled
[2021-10-05 11:04:41.658 (+0200)] INFO: CORS Allowed
[2021-10-05 11:04:41.697 (+0200)] DEBUG: File verticle started
[2021-10-05 11:04:41.782 (+0200)] DEBUG: HLA verticle started
[2021-10-05 11:04:42.667 (+0200)] DEBUG: Web Service verticle started
[2021-10-05 11:04:42.667 (+0200)] DEBUG: All verticles are running
*
* Press q + Enter to exit
```

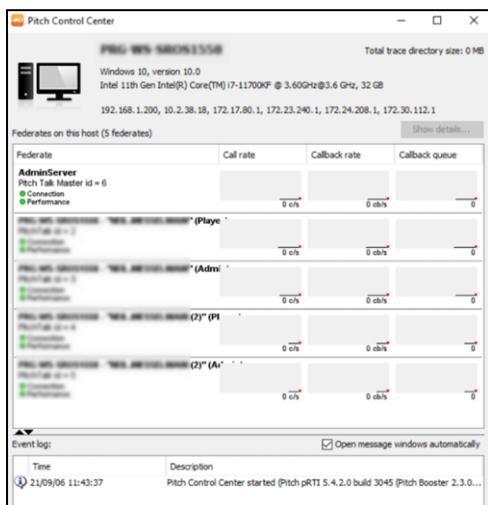
pRTI Explorer UI

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

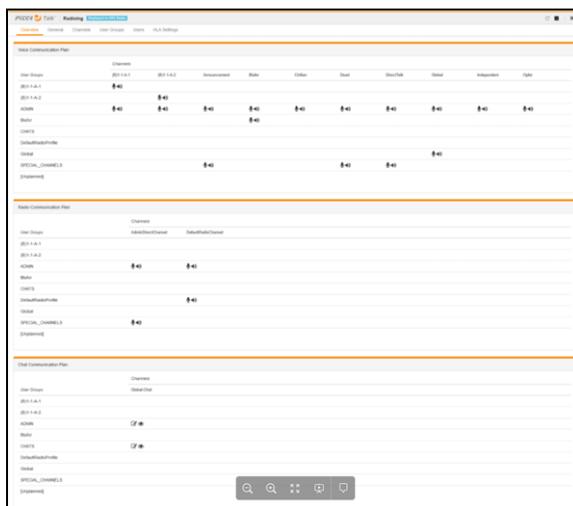
This UI shows information about all PitchTalk radio clients which are on the local computer, and also flags any problems found with PitchTalk. The UI must be launched manually. For more information, see the PitchTalk [website](#).



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 \(on page 367\)](#), [PitchTalk Admin Console \(on the previous page\)](#), [PitchTalk Admin Project \(on page 367\)](#)).



9.4.2.3 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) 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) when VBS Radio is ready.

10. VBS4.xml Options

Advanced simulation parameters, typically not exposed in the Settings user interface, are stored in the **VBS4.xml** file.

The file can be found at:

- Default VBS4 Profile location:

`%LOCALAPPDATA%\VBS4\Settings\`

- Other VBS4 Profile location:

`\Path\Settings\`

`Path` is specified using the `-profiles=Path` command-line option - for more information, see [Command Line and Launcher Options \(on page 76\)](#).

Power users can modify the parameter values in this file, typically for specialist use cases or to address specific performance issues.

- **aarBonesRecorderDiffRate**

Sets sampling rate for bone recording. Lower numbers produce AAR recordings with more fluid animations, but greater in size. Higher numbers create smaller AAR recordings with less fluid animations, but with slightly better performance.

The value can range from 0 to 2.

Default: 0.025

- **aarParticlesRecorderRate**

Sets the sampling rate of the particles recorder in AAR.

- Recording rate (in FPS) = $1/\text{aarParticlesRecorderRate}$ or the server FPS, whichever is lower.
- Minimal value is 0 (particles are then sampled every frame).

Lower values result in particles being recorded more frequently. However, the `.particles` file is larger. With a higher value, the `.particles` file is smaller, but some particles may be missing in the recorded AAR.

Default: 0.05 (20 FPS)

- **adapter**

Sets the Direct3D display adapter for VBS4.

0 (default) is always the primary adapter which is set in Windows as the primary display (where the task bar appears), and the IDs increase from that. All monitors have their own adapter ID, even if they are on the same video card.

This works in both full-screen and window mode (in window mode, the window appears on that monitor).

- **allowC2**

Enables / disables the C2 for users.

- 1 - Enabled (default)
- 0 - Disabled. If disabled, pressing **Map (M)** does nothing, and if you press **Pause (Esc)**, there is no **Command** option in the menu.

- **allowJoinInProgress**

Determines if JIP is possible on the server. Default is 1.

If set to **false (0)**, players without a chosen role are removed from the lobby at the start of the mission, and it is not possible to connect to an already running game.

Only server settings matter, client **allowJoinInProgress** settings have no influence. The "Joining in progress not allowed by server configuration" message is displayed to clients during JIP if **allowJoinInProgress** is false on the server.

With a lot of entities, the server performs better with **allowJoinInProgress=0;**

- **CursorCapture**

Enables VBS IG or VBS4 to take control of the mouse.

- 0 - Control-override disabled.
- 1 - Control-override enabled (default).

- **customTrackFade**

Enables fading-out for custom vehicle tracks. When disabled (=0), custom vehicle tracks never disappear based on elapsed time.

Default: 1 (tracks fade)

- **customTrackMaxCount**

The maximum number of custom-made tracks per vehicle. To disable custom-made tracks completely, set this parameter to 0 or less.

Default: 100

 **NOTE**

Higher values for this parameter are more performance intensive.

- **deadReckoning**

Controls interpolation and extrapolation of externally controlled entities.

- 0 - Disables interpolation and extrapolation.
- 1 - Enables interpolation and extrapolation (default).

- **DRAirplane**

Configures Dead Reckoning (DR) for airplanes (under Airplane and Helicopter classes).

- 0 - DR off
- 1 - Just interpolation
- 2 - Interpolation + extrapolation

- **drawURNMarkings**

Draws URN markings on vehicles.

- 0 - URN markings on vehicles are not visible (default).
- 1 - URN markings on vehicles are visible.

- **DRCar**

Configures Dead Reckoning (DR) for cars (under Car and Tank classes).

- 0 - DR off
- 1 - Just interpolation (default)
- 2 - Interpolation + extrapolation

- **DRShip**

Configures Dead Reckoning (DR) for ships (under Ship classes).

- 0 - DR off
- 1 - Just interpolation (default)
- 2 - Interpolation + extrapolation

- **DRUnit**

Configures Dead Reckoning (DR) for units (under class `Man`). `DRUnit` is the default setting for objects not falling under the other three classes).

- 0 - DR off
- 1 - Just interpolation
- 2 - Interpolation + extrapolation

- **FileTransferPort**

Sets the port number for TCP connections (used for Battlespace and AAR uploads and downloads between the VBS4 Dedicated Server to VBS4 Clients).

Default: 1598

- **fatigueScaling**

Configures the multiplier factor for unit fatigue. Reduce the scaling factor to slow down the fatigue rate.

Default: 0.5 (half normal fatigue rate).

- **HMDOpticsOrientationControl**

If set to 1, HMD free-look mode in turret optics is not affected by gun movement.

- **HMDOrientationControl**

When set to 0 (default), the HMD affects camera direction.

When set to 1, the HMD affects direction of unit instead of camera.

- **hmdOsvrTrackingInterface**

References the head position tracker in the OSVR configuration. Used only to get information about active positional tracking, to avoid drifting.

Influences the orientation and position of the head of the player unit, which sets the VBS4 camera.

The values are:

- `"/me/head"` - Default
- `"null"` - Disables positional tracking from any interface

NOTE

Tracker device can only be set up in `osvr_config:****.json`.

- **hmdTrackingOrientationEnabled**

Enables / disables rotational tracking influence on VBS4 camera.

The values are:

- 1 - Enabled (default)
- 0 - Disabled

- **hmdTrackingPositionEnabled**

Enables / disables positional tracking influence on VBS4 camera.

The values are:

- 1 - Enabled (default)
- 0 - Disabled

- **hmdUIDistanceOffset**

Offsets the visible 3D UI panel distance from the camera, which is normally 10m away at the front (a positive value brings the panel closer to the camera view).

The values are:

- 0 - 10m (default)
- 3.5 - 6.5m
- 9 - 1m

i NOTE

Cannot be closer than 1m.

- **hmdUIFixed**

Indicates whether the UI should always be centered in the HMD view direction (independent from [HMDOrientationControl](#)).

The values are:

- 0 - On (default)
- 1 - Off

- **hmdUIScale**

Scales the size of the visible 3D UI panel.

Default: 1

- **internalNetworkBandwidth**

Sets a bandwidth limit (Mbps) for network servers and clients.

Default: 250 Mb/s

- **internalNetworkBandwidthFor**

Sets the scope **type** to use to apply the **internalNetworkBandwidth**, **maxBandwidth**, and **minBandwidth** parameters:

- **local** - Enables the server and all clients to use their own bandwidth setting. Requires the administrator to set the value individually on the server and each client.
- **server** - Forces the server to use the value set on the Admin Client. Other clients use their own setting. Requires the administrator to set the value individually on each client.
- **all** - Forces the server and all clients to use the value set on the Admin Client.

- **interopDisableParticlesSpeedCorrection**

When set to 1, VBS4 does not use velocity for determining the initial position of dust particles for vehicles managed by an external simulation.

Only use this parameter when the external simulation is unable to calculate the correct vehicle velocity to send to VBS4.

Default: 0

- **interopForwarding**

When connecting VBS4 to external simulators via a gateway or SDK, **interopForwarding** must be enabled and set to **1** in order to allow external entity traffic.

Default: 0

- **LVCAlignToGround**

Automatic HLA alignment:

- 0 - Off
- 1 - On

- **LVCCanEnterExternalTurret**

Controls if it is possible to enter a turret / fire weapon in any turret of an externally controlled vehicle.

To enable this functionality, set the value to 1.

Default: 0

- **LVCExplosionClamp**

Controls whether an explosion transmitted from a remote application is created clamped to the ground or in the air.

If the explosion happens underground and is not in an underground structure it is automatically clamped to the ground.

If the explosion happens less than **LVCExplosionClamp** meters above the ground it is also clamped to the ground.

 **NOTE**

The explosion is not clamped to the sea level but the ground level.

Value is in meters.

Default: 1.5

- **maxBandwidth**

Sets a maximum bandwidth value (Mbps) for network servers and clients.

- **maximizedWindow**

If set to 1 all the window size and positioning settings are ignored and the window covers the whole screen including the task bar.

VBS4 must be in windowed mode, so started with the **-window** parameter. Must also be used in combination with the **noBorder=1;** option.

Default: 0

- **maxMissionPreloadTime**

Sets the maximum Battlespace preload time (in seconds).

Default: 120

- **minBandwidth**

Sets a minimum bandwidth value (Mbps) for network servers and clients.

- **minCursorTargetCheckDistance**

Sets a minimum distance (in meters) that is always checked by [cursorTarget](https://sqf.bisimulations.com/display/SQF/cursorTarget) (<https://sqf.bisimulations.com/display/SQF/cursorTarget>). Guarantees the minimum distance at which **cursorTarget** definitely returns the value of aimed objects (name, if filled / group name, if part of group / class name).

Default: 50 (meters)

- **NetworkInterface**

Specify the network adapter using its MAC or IP address, as follows:

```
<Value>
  <Name>NetworkInterface</Name>
  <Value>"{"TYPE", "VALUE"}"</Value>
</Value>
```

Where **TYPE** can be **idx**, **mac**, or **ip4** and **VALUE** can be a NIC, MAC address, or IPv4 address (preferably MAC or IPv4).



EXAMPLE

NIC example (where **N** specifies the NIC):

```
<Value>
  <Name>NetworkInterface</Name>
  <Value>"{"idx", "N"}"</Value>
</Value>
```

MAC example:

```
<Value>
  <Name>NetworkInterface</Name>
  <Value>"{"mac", "aa-bb-cc-dd-ee-ff"}"</Value>
</Value>
```

IPv4 example:

```
<Value>
  <Name>NetworkInterface</Name>
  <Value>"{"ip4", "192.168.0.1"}"</Value>
</Value>
```

Previously, the following deprecated parameter was used, where a value of **0** referred to the primary NIC, and a value of **1** referred to the secondary NIC:

```
<Value>
  <Name>NetworkInterface</Name>
  <Value>N</Value>
  <!-- 0 uses the primary NIC-->
  <!-- 1 uses the secondary NIC-->
</Value>
```

Which is now equivalent to:

```
<Value>
  <Name>NetworkInterface</Name>
  <Value>"{"idx", "N"}"</Value>
</Value>
```

As it is backwards compatible, it may still be correctly read by the engine. However, it is automatically replaced by the `NetworkInterface` parameter.

- `noBorder`

If set to 1, the VBS4 window is shown without any borders in windowed mode.

Default: 0

- `noForceMonitor`

Allow windowed mode to span multiple monitors. Can be set to 1 or 0 (default).

Set to 1 to allow VBS4 to span over multiple monitors (horizontally or vertically), depending on `winW` and `winH` settings.

If set to 1, the window is forced to fit the monitor.

VBS4 presumes that your main monitor is on the far-left (horizontally) / upmost (vertically), regardless of the position of your secondary monitor (it is possible to correct this by simply inputting negative values for the `WinX` / `WinY` parameters).

- `pointLights`

Makes distance light sources more visible.

- 0 - Disabled
- 1 - Enabled

- `reverse2DMapScrollDirection`

Reverses the 2D map scroll mode.

- 0 (default) - Scrolling up zooms in, scrolling down zooms out.
- 1 - Scrolling up zooms out, scrolling down zooms in.

- **RTTScattering**

Can have the following values:

- 0 - Prevents scattering of Rendering (default)
- 1 - Enables Render-to-Texture scattering and distributes the Render-To-Texture task over several frames to improve performance.

This results in the Render-to-Texture rendering to be one or more frames behind. Only has an effect if more than one Render-To-Texture texture is visible.

- **StationaryDefaultColor**

Default color of the Ink-Spot (see Ink-Spot Visualization in the VBS4 Instructor Manual).

For example, `StationaryDefaultColor="r,g,b,a";`

- **StationaryUnitMaxSpeed**

Defines how slow (in m / s) the unit must move to be considered stationary.

Default: 0.1

- **StationaryUnitMinDistance**

The unit is considered stationary as long as it does not traverse the minimal distance (in meters) defined by this option.

Default: 0.1

- **StationaryUnitTime**

Defines how long (in seconds) the unit is considered stationary, if it does not traverse the minimal distance specified in `StationaryUnitMinDistance`.

Default: 0.5

- **VOIPRange**

Controls the VoIP sound cut-off distance (in meters).

Default: 80

NOTE

This sets the range at which VOIP transmissions are delivered, not the fade out of volume.

- **VONTransmissionFrequency**

Frequency of VON transmissions. Defines how many times per second data is being sent.

Default: 16

- `winX, winY`

Position of the window relative to the top left of the primary screen.

Even if the adapter chosen is not the primary one, these coordinates are still relative to the top-left of the primary screen and are reset by VBS4 if the adapter changes and these values are not set to the correct range for the new adapter.

Network Parameters	Type	Description
<code>ackRedundancy</code>	unsigned	Acknowledge redundancy (repeat count for each VIM acknowledgment).
<code>ackTimeoutA</code>	unsigned	Multiplicative coefficient for actual ack-timeout computation.
<code>ackTimeoutB</code>	unsigned	Additive coefficient for actual ack-timeout computation (in microseconds).
<code>ackWindow</code>	unsigned	Window for ack-based bandwidth estimation (in microseconds).
<code>dropGap</code>	unsigned	Channel-drop interval in seconds.
<code>goodAckBandFade</code>	float	Fading coefficient for <code>goodAckBandwidth</code> .
<code>initBandwidth</code>	unsigned	Initial bandwidth in bytes per second.
<code>initLatency</code>	unsigned	Initial latency in microseconds.
<code>latencyBestAdd</code>	float	Upper bound for the best grow-state (additive coef.).
<code>latencyBestMul</code>	float	Upper bound for the best grow-state (multiplicative coef.).
<code>latencyOkAdd</code>	float	Upper bound for "OK" state (additive coef.).
<code>latencyOkMul</code>	float	Upper bound for "OK" state (multiplicative coef.).
<code>latencyOverAdd</code>	float	Additive upper bound of actual latency (over <code>minLatency</code>) for output restrictions.
<code>latencyOverMul</code>	float	Multiplicative upper bound of actual latency (over <code>minLatency</code>) for output restrictions.
<code>latencyWorseAdd</code>	float	Upper bound for "small restrictions" state (additive coef.).
<code>latencyWorseMul</code>	float	Upper bound for "small restrictions" state (multiplicative coef.).
<code>lostLatencyAdd</code>	float	Time at which a message is considered lost (additive coef. in microseconds).

Network Parameters	Type	Description
<code>lostLatencyMul</code>	float	Time at which a message is considered lost (multiplicative coef. for aveLatency).
<code>maxBandOverGood</code>	float	Maximum <code>maxBandwidth / goodAckBandwidth</code> ratio.
<code>maxBandwidth</code>	unsigned	Maximal bandwidth in bytes per second. <code>maxBandwidth</code> should never rise over this value.
<code>maxChannelBitMask</code>	unsigned	Maximum size of internal NetChannel bit-masks.
<code>maxDropouts</code>	float	Maximum ratio of packet dropouts (switches the most radical slow-down mode on).
<code>maxOutputAckMask</code>	unsigned	Maximum size of <code>outputAckMask</code> . Another restriction is based on time (<code>outWindow</code>).
<code>maxPacketSize</code>	unsigned	Maximum (BRUTTO) packet size transferred over the net.
<code>maxServersPerIP</code>	unsigned	Specifies a maximum numbers of servers on a single machine that a client can connect to. Default is 4 to prevent endpoint protection software on the server machine from considering the client attempts to connect to multiple ports as a UDP attack and blocking communication.
<code>midDropouts</code>	float	Packet drop-out ratio for slow-down.
<code>minAckHistory</code>	unsigned	Minimum acknowledgement-history size (in number of messages) for dropout restrictions.
<code>minActivity</code>	unsigned	Minimum channel traffic for <code>maxBandwidth</code> growing.
<code>minBandwidth</code>	unsigned	Minimal bandwidth in bytes per second. <code>maxBandwidth</code> should never drop below this value.
<code>minDropouts</code>	float	This drop-out ratio is considered as "noise" (does not matter).
<code>minLatencyAdd</code>	float	Additive coefficient for periodic <code>minLatency</code> update (in microseconds).
<code>minLatencyMul</code>	float	Multiplicative coefficient for periodic <code>minLatency</code> update.
<code>minLatencyUpdate</code>	unsigned	Update interval for <code>minLatency</code> .
<code>okDropouts</code>	float	Early warning => leave the optimistic grow-mode.
<code>outWindow</code>	unsigned	Sent-bandwidth computation window (for <code>getPreparedMessage</code> in microseconds).

Network Parameters	Type	Description
<code>reconciliationAcceleration</code>	float	Used to mitigate the rubber-banding effect in multiplayer sessions. If rubber-banding is detected, instead of snapping the entity to the new position and creating the visual occurrence of rubber-banding, the parameter is applied in the direction of the wanted position, gradually pulling the entity to the correct position. The unit of measurement is m/s ² . If the value is 0 or lower, rubber-banding mitigation is not applied. The default value is 5.
<code>rcvBufSize</code>	unsigned	SO_RCVBUF parameter of socket.
<code>safeMaxBandOverGood</code>	float	Safe over-estimation of <code>maxBandwidth</code> over <code>goodAckBandwidth</code> (used in case of drop-out alert).
<code>winsockVersion</code>	float	WSAStartup WinSock required version.

11. VBS4 Profile Options

The User Profile configuration contains options for a specific VBS4 user.

The Profile data is stored in:

- `%LOCALAPPDATA%\VBS4\`, which is the default location.
- An alternate location, which can be specified using the `-profiles=path` (on page 88) command-line option.

The Profile configuration consists of the following XML files:

- **Video Profile Configuration:**

`\Profile_Path\Settings\VideoSettings.xml`

- **Audio Profile Configuration:**

`\Profile_Path\Settings\AudioSettings.xml`

- **User Interface Profile Configuration:**

`\Profile_Path\Settings\UISettings.xml`

- **Simulation Profile Configuration:**

`\Profile_Path\Settings\SimulationSettings.xml`

- **Controls Profile Configuration:**

`\Profile_Path\Settings\ControlsSettings.xml`

- **Input Devices Profile Configuration:**

`\Profile_Path\Settings\InputSettings.xml`

- **General Profile Configuration:**

`\Profile_Path\Settings\VBS4.USER.xml`

The vast majority of the Profile options are available in the [VBS4 Settings \(on page 158\)](#) User Interface (UI) and there is rarely a requirement to modify them directly in the Profile XML files.

The Profile options are divided further into the following categories:

- | | |
|---|---|
| <ul style="list-style-type: none">• Video (on the next page)• Audio (on page 408)• User Interface (on page 410)• Command and Control (C2) Screen Devices (on page 430) | <ul style="list-style-type: none">• Simulation (on page 417)• Controls (on page 426)• Input Devices (on page 428) |
|---|---|

11.1 Video

The following Video Profile options are stored in:

`\Profile_Path\Settings\VideoSettings.xml`

They correspond to the [Video Settings \(on page 165\)](#) in the [VBS4 Settings \(on page 158\)](#) UI.

WARNING

If you have a pre-VBS4 23.1 custom Profile `VideoSettings.xml`, you need to recreate it from the default `VideoSettings.xml` (automatically generated by VBS4).

WARNING

Changing the Video Settings resets any snow modifications. For more information, see Weather Settings in the VBS4 Editor Manual.

The XML has the following high-level structure:

- [window \(on the next page\)](#)
- [graphics \(on page 389\)](#)
 - [global \(on page 390\)](#)
 - [viewport \(on page 392\)](#)
 - [compositor \(on page 408\)](#)

11.1.1 window

The **window** section contains all the [Display Settings \(on page 167\)](#).

Option	Description
<code>vsync</code>	<p>Vertical synchronization. This option limits the frame rate to the refresh rate. The values are: <code>true</code> (enabled), <code>false</code> (disabled).</p> <div style="border: 1px solid green; padding: 10px; margin-top: 10px;"><p> TIP Enable this option to prevent screen tearing and lower power consumption.</p></div>
<code>brightness</code>	<p>Brightness of the rendered scene. The values are between 0.5 - 1.5.</p>
<code>gamma_1</code>	<p>Gamma to reflect monitor capabilities. By default, the value is 2.4, which corresponds to a standard conversion to sRGB space. The values are between 1.0 - 3.5.</p> <div style="border: 1px solid #0070C0; border-radius: 10px; padding: 10px; margin-top: 10px;"><p> NOTE This setting applies to the rendered scene, but not to the VBS4 UI (for example, menus).</p></div>

11.1.2 graphics

The **graphics** section contains all the [Graphics Settings \(on page 168\)](#).

Option	Description
<code>mirror_fidelity</code>	<p>Controls the quality and overall fidelity of vehicle mirrors.</p> <p>The values are:</p> <ul style="list-style-type: none">• Off• Low• Normal• High
<code>camera_fidelity</code>	<p>Controls the quality and overall fidelity of Render-to-Texture (RTT) cameras.</p> <p>The values are:</p> <ul style="list-style-type: none">• Off• Low• Normal• High
<code>periscope_fidelity</code>	<p>Controls the quality and overall fidelity of Render-to-Texture (RTT) periscopes.</p> <p>The values are:</p> <ul style="list-style-type: none">• Off• Low• Normal• High

The **graphics** sub-sections are:

- [global \(on the next page\)](#)
- [viewport \(on page 392\)](#)
- [compositor \(on page 408\)](#)

11.1.2.1 global

The **global** section contains all the [Global Settings \(on page 170\)](#).

The **global** sub-sections are:

- [global_render_detail \(below\)](#)
- [global_vegetation_detail \(below\)](#)
- [global_particle_detail \(on page 392\)](#)

11.1.2.1.1 global_render_detail

The **global_render_detail** section contains the global [Render Detail \(on page 171\)](#) settings.

Option	Description
<code>rtt_per_frame</code>	Number of render targets to update per frame on Render To Texture (RTT) surfaces. The values are between 1 - 8.
<code>hmd_render_scale_2</code>	Supersampling setting for HMDs. Applies on top of any supersampling configured in the HMD vendor settings (for example, Oculus pixel per display). The values are between 50 - 200.

11.1.2.1.2 global_vegetation_detail

The **global_vegetation_detail** section contains the global [Vegetation Detail \(on page 172\)](#) settings.

Option	Description
<code>rtt_per_frame</code>	Number of render targets to update per frame on Render To Texture (RTT) surfaces. The values are between 1 - 8.

The **global_vegetation_detail** sub-sections are:

- [global_tree_detail \(on the next page\)](#)
- [global_bush_detail \(on the next page\)](#)
- [global_grass_detail \(on the next page\)](#)

11.1.2.1.2.1 global_tree_detail

The **global_tree_detail** section contains the global Tree Detail (on page 173) settings.

Option	Description
biome_tree_types_limit	Sets the limit for the amount of biome tree types per surface. The values are: <ul style="list-style-type: none">• 1 (one type per surface)• 2 (two types per surface)• 3 (three types per surface)• 4 (four types per surface)• 5 (five types per surface)• Unlimited

11.1.2.1.2.2 global_bush_detail

The **global_bush_detail** section contains the global Bush Detail (on page 174) settings.

Option	Description
biome_bush_types_limit	Sets the limit for the amount of biome bush types per surface. The values are: <ul style="list-style-type: none">• 1 (one type per surface)• 2 (two types per surface)• 3 (three types per surface)• 4 (four types per surface)• 5 (five types per surface)• Unlimited

11.1.2.1.2.3 global_grass_detail

The **global_grass_detail** section contains the global Grass Detail (on page 174) settings.

Option	Description
biome_grass_types_limit	Sets the limit for the amount of biome grass types per surface. The values are: <ul style="list-style-type: none">• 1 (one type per surface)• 2 (two types per surface)• 3 (three types per surface)• 4 (four types per surface)• 5 (five types per surface)• Unlimited

11.1.2.1.3 global_particle_detail

The **global_particle_detail** section contains the global [Particle Detail \(on page 175\)](#) settings.

Option	Description
particle_count_limit	<p>Particle count limit.</p> <p>NOTE The number of simulated particles in the scene is limited by this number.</p> <p>The values are between 100 - 20000.</p>

11.1.2.2 viewport

The **viewport** section contains all the [Viewport Settings \(on page 175\)](#).

The **viewport** sub-sections are:

- [viewport_render_detail \(on the next page\)](#)
- [viewport_shadow_detail \(on page 395\)](#)
- [viewport_terrain_detail \(on page 396\)](#)
- [viewport_vegetation_detail \(on page 397\)](#)
- [viewport_object_detail \(on page 401\)](#)
- [viewport_particle_detail \(on page 405\)](#)
- [viewport_light_detail \(on page 406\)](#)
- [viewport_postprocess_effects_detail \(on page 406\)](#)
- [viewport_feature_draw \(on page 407\)](#)

11.1.2.2.1 `viewport_render_detail`

The `viewport_render_detail` section contains the viewport [Render Detail](#) (on page 176) settings.

Option	Description
<code>dlss</code>	<p>Deep Learning Super Sampling (DLSS) is an up-scaling method capable of rendering smooth anti-aliased images with significant performance boost.</p> <p>The values are:</p> <ul style="list-style-type: none">• Disabled - DLSS is disabled.• Ultra-Performance - Ultra performance boost with low visual quality.• Performance - Very high performance boost with medium visual quality.• Balanced - High performance boost with high visual quality.• Quality - Medium performance boost with very high visual quality.• Ultra-Quality - Low performance boost with ultra visual quality.
	<div style="border: 2px solid red; padding: 10px;"><p> WARNING</p><p>There are several available drivers, which are supported and required for DLSS to work. However, be aware that some drivers can be locked from updating and you may require a newer version than the one you have installed. In addition, a GPU is required which supports DLSS technology (currently only NVIDIA RTX GPUs).</p><p>For more information, see: https://www.nvidia.com/en-gb/geforce/technologies/dlss/</p></div>
<code>render_resolution_1</code>	<p>Render resolution for the current view.</p> <p>If set higher than 100%, VBS4 supersamples the image to achieve higher resolution quality, but this may also impact performance.</p> <p>If set lower than 100%, VBS4 downsamples the image which can achieve higher performance, but this may also produce a blurry image.</p> <p>The values are between 10 - 400.</p>
<code>msaa</code>	<p>Multi-Sample Anti-Aliasing (MSAA) level used in the scene. Set a higher value to reduce the jagged edges of the geometry.</p> <div style="border: 2px solid blue; padding: 10px;"><p> NOTE</p><p>Higher values affect performance and video memory.</p></div> <p>The values are: Disabled, 2x MSAA, 4x MSAA, 8x MSAA.</p>

Option	Description
<code>transparency_render_scale</code>	Resolution of transparent objects in the exterior scene. NOTE Lower numbers result in more blurred transparent objects, but faster rendering. The values are between 25 - 100.
<code>transparency_method</code>	Transparency Method you want to use. The values are: <ul style="list-style-type: none">• Simple - Renders transparent exterior objects in lower resolution.• MultiResolution - Combines low and full resolution rendering.• MultiDistance - Only applies the Transparency Method to transparent objects up to 40m from the camera. Transparent objects farther away from the camera are rendered in full resolution.
<code>multi_projection_technology</code>	Multi-Projection Technology you want to use. The values are: <ul style="list-style-type: none">• None• SPS - Single Pass Stereo.• MVR / SPS - Multi-View Rendering (MVR) with fallback to Single Pass Stereo (SPS).
<code>anisotropy_quality</code>	Level of anisotropic filtering used in the scene. This improves the detail of textures, when viewed at sharp angles. The values are between 0 - 16.

11.1.2.2.2 `viewport_shadow_detail`

The `viewport_shadow_detail` section contains the viewport [Shadow Detail \(on page 179\)](#) settings.

Option	Description
<code>biome_shadows</code>	Shadows cast by biome vegetation. The values are: <code>true</code> (enabled), <code>false</code> (disabled).
<code>exterior_shadow_cascades</code>	Number of exterior shadow maps covering the view. The more cascades (the higher the number), the higher the shadow quality. The values are between 2 - 4.
<code>interior_shadow_cascades</code>	Number of interior shadow maps covering the view. The more cascades (the higher the number), the higher the shadow quality. The values are: 1, 2.
<code>shadow_quality</code>	Quality of the shadow map resolution. The values are: <ul style="list-style-type: none">• 0 - Disabled• 1 - Low• 2 - Good• 3 - Ultra
<code>exterior_shadow_draw_distance</code>	Distance in meters at which shadows are rendered. The values are between 200 - 2000.

11.1.2.2.3 `viewport_terrain_detail`

The `viewport_terrain_detail` section contains the viewport Terrain Detail (on page 180) settings.

Option	Description
<code>segment_subdiv_depth</code>	Terrain segment subdivision depth. NOTE Settings below 13 contain no road or vegetation data. Recommended settings: 19 - 23. The values are between 0 - 23.
<code>terrain_vertex_count</code>	Terrain segment resolution. The higher the value, the more detailed the terrain is. Recommended setting: 65 The values are: 17, 33, 65.
<code>terrain_detail_3</code>	Draw distance (in meters) of the terrain. The value is the distance up to which a segment with one-meter size is split into smaller segments when the camera field of view is 90 degrees. Segments with k-meter size are split up to k-times greater distance. The values are between 0.1 - 2.0.
<code>ssr</code>	Reflections of objects and terrain on the water. The values are: <code>true</code> (enabled), <code>false</code> (disabled).
<code>preload_dist</code>	Maximum pre-loading distance around the camera. Set at <code>0</code> for FOV < 52.21°. NOTE Pre-loading is limited to loading one more detail level than is currently visible. The values are between 0 - 1000000.
<code>preload_fov_multiplicator</code>	Maximum terrain pre-loading distance around the camera frustum. A value of <code>1</code> disables pre-loading. NOTE Standard scene subdivision still applies, so that setting extreme values does not preload into infinity. The values are between 1.0 - 3.0.

11.1.2.2.4 `viewport_vegetation_detail`

The `viewport_vegetation_detail` section contains the viewport [Vegetation Detail](#) (on page 181) settings.

Option	Description
<code>_3dtree_enabled</code>	Enable / disable 3D trees. The values are: <code>true</code> (enabled), <code>false</code> (disabled).

The `viewport_vegetation_detail` sub-sections are:

- [viewport_tree_detail](#) (on the next page)
- [viewport_bush_detail](#) (on page 399)
- [viewport_grass_detail](#) (on page 400)

11.1.2.2.4.1 `viewport_tree_detail`

The `viewport_tree_detail` section contains the viewport [Tree Detail \(on page 182\)](#) settings.

Option	Description
<code>tree_resolution_limit</code>	<p>Limit the best loaded texture resolution for biome trees. The total surface area is considered, which means that a 2048 x 512 texture is equivalent to a 1024 x 1024 texture.</p> <p>The values are:</p> <ul style="list-style-type: none">• 1/4k (256x256)• 1/2k (512x512)• 1k (1024x1024)• 2k (2048x2048)• Unlimited
	<p>NOTE</p> <p>The recommended value is Unlimited for graphics cards with >= 4 GB VRAM, or 2k (2048x2048) in more restricted memory conditions.</p>
<code>draw_dist_coeff_stream_tree</code>	<p>Maximum draw distance (in meters) of streamed tree objects.</p> <p>These are objects that are embedded in the terrain database.</p> <p>The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees.</p> <p>The values are between 100 - 2000.</p>
<code>draw_dist_coeff_dynamic_tree</code>	<p>Maximum draw distance (in meters) of tree objects.</p> <p>These are objects such as runtime created trees.</p> <p>The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees.</p> <p>The values are between 100 - 2000.</p>
<code>tree_3d_detail</code>	<p>The higher the value, the better the LODs of biome and placed trees used, when positioned close to the camera. Increasing the value results in higher-quality objects at further distances.</p> <p>The values are between 50.0 - 2000.0.</p>
<code>biome_tree_fidelity_1</code>	<p>Density of biome trees.</p> <p>Lower values mean lower density with distance.</p> <p>The values are between 0.0 - 1.0.</p>
<code>biome_tree_detail_2</code>	<p>Draw distance (in meters) of trees.</p> <p>The value is the distance at which trees disappear when the camera field of view is 90 degrees.</p> <p>The values are between 500 - 20000.</p>

11.1.2.2.4.2 `viewport_bush_detail`

The `viewport_bush_detail` section contains the viewport [Bush Detail \(on page 184\)](#) settings.

Option	Description
<code>bush_resolution_limit</code>	<p>Limit the best loaded texture resolution for biome bushes. The total surface area is considered, which means that a 2048 x 512 texture is equivalent to a 1024 x 1024 texture.</p> <p>The values are:</p> <ul style="list-style-type: none">• 1/4k (256x256)• 1/2k (512x512)• 1k (1024x1024)• 2k (2048x2048)• Unlimited
 NOTE	<p>The recommended value is Unlimited for graphics cards with >= 4 GB VRAM, or 2k (2048x2048) in more restricted memory conditions.</p>
<code>bush_3d_detail</code>	<p>The higher the value, the better the LODs of biome bushes used, when positioned close to the camera. Increasing the value results in higher-quality objects at further distances.</p> <p>The values are between 50.0 - 2000.0.</p>
<code>biome_bush_fidelity_1</code>	<p>Density of biome bushes.</p> <p>Lower values mean lower density with distance.</p> <p>The values are between 0.0 - 1.0.</p>
<code>biome_bush_detail_2</code>	<p>Maximum draw distance (in meters) of bushes.</p> <p>The value is the distance at which bushes disappear when the camera field of view is 90 degrees.</p> <p>The values are between 100 - 5000.</p>

11.1.2.2.4.3 viewport_grass_detail

The **viewport_grass_detail** section contains the viewport [Grass Detail \(on page 185\)](#) settings.

Option	Description
grass_resolution_limit	<p>Limit the best loaded texture resolution for biome grass. The total surface area is considered, which means that a 2048 x 512 texture is equivalent to a 1024 x 1024 texture.</p> <p>The values are:</p> <ul style="list-style-type: none">• 1/4k (256x256)• 1/2k (512x512)• 1k (1024x1024)• 2k (2048x2048)• Unlimited
	<div style="border: 1px solid #0070C0; padding: 5px; margin-top: 10px;"><p>NOTE</p><p>The recommended value is Unlimited for graphics cards with >= 4 GB VRAM, or 2k (2048x2048) in more restricted memory conditions.</p></div>
grass_3d_detail	<p>The higher the value, the better the LODs of biome grass used, when positioned close to the camera. Increasing the value results in higher-quality objects at further distances.</p> <p>The values are between 10.0 - 500.0.</p>
biome_grass_fidelity_1	<p>Density of biome grass.</p> <p>Lower values mean lower density with distance.</p> <p>The values are between 0.0 - 1.0.</p>
biome_grass_detail_2	<p>Maximum draw distance (in meters) of grass.</p> <p>The value is the distance at which grass disappears when the camera field of view is 90 degrees.</p> <p>The values are between 10.0 - 500.0.</p>

11.1.2.2.5 `viewport_object_detail`

The `viewport_object_detail` section contains the viewport [Object Detail \(on page 186\)](#) settings.

Option	Description
<code>exterior_object_resolution_limit</code>	<p>Limit the best loaded texture resolution for exterior objects. The total surface area is considered, which means that a 2048 x 512 texture is equivalent to a 1024 x 1024 texture.</p> <p>The values are:</p> <ul style="list-style-type: none">• 1/4k (256x256)• 1/2k (512x512)• 1k (1024x1024)• 2k (2048x2048)• Unlimited <div style="border: 1px solid #0072BC; padding: 10px; margin-top: 10px;"><p>NOTE The recommended value is Unlimited for graphics cards with >= 4 GB VRAM, or 2k (2048x2048) in more restricted memory conditions.</p></div>
<code>interior_object_resolution_limit</code>	<p>Limit the best loaded texture resolution for interior objects. The total surface area is considered, which means that a 2048 x 512 texture is equivalent to a 1024 x 1024 texture.</p> <p>The values are:</p> <ul style="list-style-type: none">• 1/4k (256x256)• 1/2k (512x512)• 1k (1024x1024)• 2k (2048x2048)• Unlimited <div style="border: 1px solid #0072BC; padding: 10px; margin-top: 10px;"><p>NOTE The recommended value is Unlimited for graphics cards with >= 4 GB VRAM, or 2k (2048x2048) in more restricted memory conditions.</p></div>
<code>transparency_detail</code>	<p>Distance (in meters) at which the VBS4 engine stops handling objects with transparency accurately, and starts using approximation methods.</p> <p>The smaller the value, the better the performance.</p> <p>The value is the distance at which objects with one-meter radius are handled differently by the VBS4 engine, when the camera field of view is 90 degrees.</p> <p>The values are between 0.1 - 200.0.</p>

Option	Description
<code>draw_dist_coeff_stream_static_2</code>	Maximum draw distance (in meters) of streamed static objects. These are objects that are embedded in the terrain database. The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees. The values are between 100 - 2000.
<code>draw_dist_coeff_dynamic_static_2</code>	Maximum draw distance (in meters) of static objects. These are objects such as runtime created buildings. The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees. The values are between 100 - 2000.
<code>draw_dist_coeff_dynamic_land_2</code>	Maximum draw distance (in meters) of land objects. These are objects such as runtime created ground vehicles and lifeforms. The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees. The values are between 100 - 2000.
<code>draw_dist_coeff_dynamic_water_2</code>	Maximum draw distance (in meters) of water objects. These are objects such as runtime created water vehicles. The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees. The values are between 100 - 2000.
<code>draw_dist_coeff_dynamic_air_2</code>	Maximum draw distance (in meters) of air objects. These are objects such as runtime created aircraft. The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees. The values are between 100 - 2000.
<code>draw_dist_coeff_stream_wind_emitter</code>	Maximum draw distance (in meters) of streamed wind emitter objects. These are objects such as runtime created force emitters. The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees. The values are between 1.0 - 200.0.
<code>draw_dist_coeff_dynamic_wind_emitter</code>	Maximum draw distance (in meters) of wind emitter objects. These are objects such as runtime created wind emitters. The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees. The values are between 0 - 200.

Option	Description
<code>draw_dist_coeff_stream_force_emitter</code>	Maximum draw distance (in meters) of streamed force emitter objects. These are force emitters that are embedded in the terrain database. The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees. The values are between 0 - 200.
<code>draw_dist_coeff_dynamic_force_emitter</code>	Maximum draw distance (in meters) of force emitter objects. These are objects such as runtime created wind emitters. The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees. The values are between 0 - 200.
<code>draw_dist_coeff_stream_global_damage_area</code>	Maximum draw distance (in meters) of streamed damage areas objects. These are damage areas that are embedded in the terrain database. The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees. The values are between 0 - 2000.
<code>draw_dist_coeff_dynamic_global_damage_area</code>	Maximum draw distance (in meters) of dedicated damage area objects. These are objects such as runtime created damage areas. The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees. The values are between 0 - 2000.
<code>obj_fidelity_stream_static</code>	Quality of LODs to use for objects that are embedded in the terrain database. The higher the value, the better the LODs used when close to the camera. This results in higher quality objects at further distances. The values are between 10 - 3600.
<code>obj_fidelity_dynamic_static</code>	Quality of LODs to use for objects, such as runtime created buildings. The higher the value, the better the LODs used when close to the camera. This results in higher quality objects at further distances. The values are between 10 - 3600.
<code>obj_fidelity_dynamic_land</code>	Quality of LODs to use for objects, such as runtime created ground vehicles and lifeforms. The higher the value, the better the LODs used when close to the camera. This results in higher quality objects at further distances. The values are between 10 - 3600.

Option	Description
<code>obj_fidelity_dynamic_water</code>	Quality of LODs to use for objects, such as runtime created water vehicles. The higher the value, the better the LODs used when close to the camera. This results in higher quality objects at further distances. The values are between 10 - 3600.
<code>obj_fidelity_dynamic_air</code>	Quality of LODs to use for objects such as runtime created aircraft. The higher the value, the better the LODs used when close to the camera. This results in higher quality objects at further distances. The values are between 10 - 3600.
<code>obj_dot_size_dynamic_air</code>	Dot size for sub-pixel rendering for air objects (mainly, aircraft, but also applies to tracer ammunition, for example), which allows you to visually enhance air-object visibility at larger distance, when a lower screen resolution is used. <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"><p>NOTE</p><p>The following considerations apply:</p><ul style="list-style-type: none">• The color of the dot representing the air object is gray and cannot be modified.• The dot transparency changes, based on the air-object distance.• The dot visibility depends on Air Draw Distance.</div> The values are between 0.0 - 4.0.
<code>point_cloud_detail_2</code>	Maximum draw distance (in meters) of point cloud data. The value is the distance up to which a segment with one-meter size is split into smaller segments when the camera field of view is 90 degrees. Segments with k-meter size are split up to k-times greater distance. The values are between 0.1 - 2.0.
<code>cloud_detail_2</code>	Maximum draw distance (in meters) of clouds. The value is the distance up to which a segment with one-meter size is split into smaller segments when the camera field of view is 90 degrees. Segments with k-meter size are split up to k-times greater distance. The values are between 0.5 - 2.0.
<code>volumetric_cloud_high_detail</code>	Toggle to enable / disable high-detail volumetric clouds.
<code>volumetric_cloud_reprojection_quality</code>	Specifies the reprojection (reflection) quality for volumetric clouds. The values are: <ul style="list-style-type: none">• Automatic• Normal• High

Option	Description
<code>building_detail_3</code>	<p>Maximum draw distance (in meters) of the geometry layer (buildings per segment).</p> <p>The value is the distance up to which a segment with one-meter size is split into smaller segments when the camera field of view is 90 degrees.</p> <p>Segments with k-meter size are split up to k-times greater distance.</p> <p>The values are between 0.0 - 4.0.</p>

11.1.2.2.6 `viewport_particle_detail`

The `viewport_particle_detail` section contains the viewport Particle Detail (on page 190) settings.

Option	Description
<code>particle_effect_fidelity_2</code>	<p>Quality of particles in the scene.</p> <p>The lower the value, the better particle LODs are selected, when positioned closer to the camera.</p> <p>The values are between 6.0 - 0.0.</p>
<code>particle_effect_detail</code>	<p>Particle count limit.</p> <div style="border: 1px solid #0070C0; padding: 10px; margin-left: 20px;"><p>i NOTE</p><p>The number of simulated particles in the scene is limited by this number.</p></div> <p>The values are between 0.0 - 1.0.</p>
<code>draw_dist_coeff_particles_1</code>	<p>Maximum distance at which particles are drawn.</p> <p>The values are between 1 - 100.</p>

11.1.2.2.7 `viewport_light_detail`

The `viewport_light_detail` section contains the viewport [Light Detail \(on page 191\)](#) settings.

Option	Description
<code>draw_dist_coeff_stream_light_2</code>	<p>Maximum draw distance (in meters) of streamed light objects.</p> <p>These are lights that are embedded in the terrain database and the value can be understood as the lightmap transition distance.</p> <p>The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees.</p> <p>The values are between 1.0 - 40.0.</p>
<code>draw_dist_coeff_dynamic_light_2</code>	<p>Maximum draw distance (in meters) of light objects.</p> <p>These are objects such as runtime created lights.</p> <p>The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees.</p> <p>The values are between 100 - 2000.</p>
<code>draw_dist_coeff_stream_emissive_plane</code>	<p>Maximum draw distance (in meters) of streamed emissive planes of light reflectors.</p> <p>The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees.</p> <p>The values are between 1.0 - 2000.0.</p>
<code>draw_dist_coeff_dynamic_emissive_plane</code>	<p>Maximum draw distance (in meters) of dynamic emissive planes of light reflectors.</p> <p>The value is the distance at which objects with one-meter radius disappear when the camera field of view is 90 degrees.</p> <p>The values are between 100 - 2000.</p>

11.1.2.2.8 `viewport_postprocess_effects_detail`

The `viewport_postprocess_effects_detail` section contains the viewport [Post-Process Effects \(on page 192\)](#) settings.

Option	Description
<code>ambient_occlusion</code>	<p>Activates the ambient occlusion, which improves the visual quality of lighting, and shadows on objects. Can be:</p> <ul style="list-style-type: none"> • Disabled • SSAO (Screen Space Ambient Occlusion) • HBAO (Horizon Based Ambient Occlusion)
<code>motion_blur</code>	<p>Motion blur in the scene (for example, during fast movement of objects).</p> <p>The values are: <code>true</code> (enabled), <code>false</code> (disabled).</p>

11.1.2.2.9 `viewport_feature_draw`

The `viewport_feature_draw` section contains the viewport [Draw Features \(on page 193\)](#) settings.

Option	Description
<code>feature_draw_sky</code>	Enables (<code>true</code>) / disables (<code>false</code>) the presence of the sky and atmosphere.
<code>feature_draw_sun</code>	Enables (<code>true</code>) / disables (<code>false</code>) the presence of the Sun.
<code>feature_draw_moon</code>	Enables (<code>true</code>) / disables (<code>false</code>) the presence of the Moon.
<code>feature_draw_stars</code>	Enables (<code>true</code>) / disables (<code>false</code>) the presence of the stars.
<code>feature_draw_ground</code>	Enables (<code>true</code>) / disables (<code>false</code>) the presence of the ground surface.
<code>feature_draw_water</code>	Enables (<code>true</code>) / disables (<code>false</code>) the presence of water surfaces.
<code>feature_draw_biome_trees</code>	Enables (<code>true</code>) / disables (<code>false</code>) the presence of biome trees.
<code>feature_draw_biome_bushes</code>	Enables (<code>true</code>) / disables (<code>false</code>) the presence of biome bushes.
<code>feature_draw_biome_grass</code>	Enables (<code>true</code>) / disables (<code>false</code>) the presence of biome grass.
<code>feature_draw_geometry</code>	Enables (<code>true</code>) / disables (<code>false</code>) the presence of procedural geometry (such as in extruded buildings).
<code>feature_draw_point_clouds</code>	Enables (<code>true</code>) / disables (<code>false</code>) the presence of point-cloud objects.
<code>feature_draw_objects</code>	Enables (<code>true</code>) / disables (<code>false</code>) the presence of streamed and dynamic objects, such as lifeforms and platforms.
<code>feature_draw_lights</code>	Enables (<code>true</code>) / disables (<code>false</code>) the presence of lights.
<code>feature_draw_particles</code>	Enables (<code>true</code>) / disables (<code>false</code>) the presence of particles (such as from explosions).
<code>feature_draw_clouds</code>	Enables (<code>true</code>) / disables (<code>false</code>) the presence of clouds.
<code>feature_draw_precipitation</code>	Enables (<code>true</code>) / disables (<code>false</code>) the presence of precipitation effects.

11.1.2.3 compositor

The **compositor** section contains all the Compositor Settings (on page 194).

The **compositor** sub-sections are:

- **compositor_postprocess_effects_detail** (below)

11.1.2.3.1 compositor_postprocess_effects_detail

The **compositor_postprocess_effects_detail** section contains the compositor Post-Process Effects (on page 194) settings.

Option	Description
<code>bloom_spread_level</code>	Size of the bloom effect (halo / flare around strong light sources). The values are between 2 - 10.
<code>bloom_strength</code>	Bloom effect intensity. The values are between 0.0 - 2.0.
<code>lens_effects</code>	Camera lens effects, such as dirt and flare. Affected by <code>bloom_spread_level</code> . The values are between 0.0 - 2.0.
<code>sharpening_strength</code>	Image sharpening strength applied to the 3D View. The values are between 0.0 - 1.0.

11.2 Audio

The following Audio Profile options are stored in:

`\Profile_Path\Settings\AudioSettings.xml`

They correspond to the [Audio Settings \(on page 236\)](#) in the [VBS4 Settings \(on page 158\)](#) UI.

The XML has the following structure:

- [AudioSettings \(on the next page\)](#)

11.2.1 AudioSettings

The **AudioSettings** section contains all the audio settings from [Audio Settings \(on page 236\)](#).

Option	Description
<code>primaryOutputDevice</code>	Primary audio output device (for example, speakers, headphones). NOTE The options in the drop-down are populated based on the available audio output devices set up in Microsoft Windows. The Default Output Device option matches the Primary default Microsoft Windows audio output device (Microsoft Windows has Primary, Multimedia, and Communication defaults). If you plug / unplug audio output devices in Microsoft Windows, close and open the VBS4 Settings to refresh the drop-down options. If you change the Microsoft Windows settings for any of the plugged audio output devices, the drop-down options are refreshed automatically.
<code>volumeFX</code>	The sound effects volume.
<code>VolumeUI</code>	UI sounds (for example, when browsing through menu options).
<code>volumeSpeech</code>	The speech volume.
<code>radioOutputDevice</code>	VBS Radio audio output device (for example, speakers, headphones). NOTE The following considerations apply: <ul style="list-style-type: none">This setting is not available if VBS Radio is disabled (<code>- disableVBSRadio</code>). For more information, see Command Line and Launcher Options in the VBS4 Administrator Manual.The options in the drop-down are populated based on the available audio output devices set up in Microsoft Windows. The Default Output Device option matches the Primary default Microsoft Windows audio output device (Microsoft Windows has Primary, Multimedia, and Communication defaults). If you plug / unplug audio output devices in Microsoft Windows, close and open the VBS4 Settings to refresh the drop-down options. If you change the Microsoft Windows settings for any of the plugged audio output devices, the drop-down options are refreshed automatically.

Option	Description
radioInputDevice	VBS Radio audio input device (microphone). <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"><p>NOTE</p><p>The following considerations apply:</p><ul style="list-style-type: none">This setting is not available if VBS Radio is disabled (- disableVBSRadio). For more information, see Command Line and Launcher Options in the VBS4 Administrator Manual.The options in the drop-down are populated based on the available audio input devices set up in Microsoft Windows. The Default Input Device option matches the Primary default Microsoft Windows audio input device (Microsoft Windows has Primary, Multimedia, and Communication defaults). If you plug / unplug audio input devices in Microsoft Windows, close and open the VBS4 Settings to refresh the drop-down options. If you change the Microsoft Windows settings for any of the plugged audio input devices, the drop-down options are refreshed automatically.</div>

11.3 User Interface

The following User Interface Profile options are stored in:

`\Profile_Path\Settings\UISettings.xml`

They correspond to the [User Interface Settings \(on page 239\)](#) in the [VBS4 Settings \(on page 158\)](#) UI.

The XML has the following structure:

- [Localization \(below\)](#)
- [Appearance \(on the next page\)](#)
- [Range Visibility Settings \(on the next page\)](#)
- [Map \(on page 414\)](#)
- [Symbology Settings \(on page 415\)](#)

11.3.1 Localization

The [Localization](#) section contains all the [Localization \(on page 240\)](#) settings.

Option	Description
language	The language used in the VBS4 UI.

11.3.2 Appearance

The **Appearance** section contains all the **Appearance (on page 242)** settings.

Option	Description
UiScale	VBS4 UI-scaling percentage. The following UI-scaling percentages are available: <ul style="list-style-type: none">• Default• 100%• 125%• 150%• 175%• 200%• 225%• 250%• 300%• 350%• 400%• 450%• 500%

NOTE
The following considerations apply:

- The option varies, based on the used screen resolution.
- The supported display types are: Full HD, 2K, 4K, and others that share the same height.
- Not all the percentages available in **UiScale** can be set using the counterpart **UI Scale** setting in **User Interface Settings (on page 239)** in the **VBS4 Settings (on page 158)** UI.

WARNING
The scaling depends on the used display. Bohemia Interactive Simulations does not recommend using higher values, or values that are not present in **UI Scale**, since the result may be unpredictable.

11.3.3 Range Visibility Settings

The **RangeVisibilitySettings** section contains all of the **Range Visibility Settings (on page 245)**.

11.3.3.1 Categories

The Range Visibility Settings are contained within the following main categories.

Category	Description
bisim_gateway_geofilter	VBS Gateway Geo Filters
bisim_electronic_warfare	Electronic Warfare
bisim_vbs_contamination	Hazardous Area
bisim_vbs_pitch_radio	Radio
crew	CREW
boomerang	Boomerang
aps	Active Protection System (APS)
cai_waypoints	SUPPRESS WAYPOINTS
cai_patternOfLife	Pattern Of Life

11.3.3.2 Core Settings

The following core settings are similar for all Range Visibility Settings, and are mostly found in [Sub-Categories \(on the next page\)](#), with the exception of Boomerang (see Boomerang in the VBS4 Editor Manual), CREW (see Enabling CREW in the VBS4 Editor Manual), Suppress Waypoints (see Suppress Order in the VBS Control AI Manual), and Pattern Of Life (see Population Editor Object in the VBS Control AI Manual).

Setting	Description
Visibility2d	If enabled, range visualizations are visible in 2D view.
Fill2d	If enabled, fill is visible in 2D view.
Line2d	If enabled, the line-to-origin is visible in 2D view.
Text2d	If enabled, text is visible in 2D view.
Visibility3d	If enabled, range visualizations are visible in 3D view.
FillFromInside3d	If enabled, fill from inside of the range visualization is visible in 3D view.
Line3d	If enabled, the line-to-origin is visible in 3D view.
Text3d	If enabled, text is visible in 3D view.

11.3.3.3 Sub-Categories

The following sub-categories each contain the [Core Settings \(on the previous page\)](#) for each feature.

Gateway Geo Filter

Sub-Category	Description
bisim_gateway_geofilter_lifeform	Life Form
bisim_gateway_geofilter_ground	Ground
bisim_gateway_geofilter_marine	Marine
bisim_gateway_geofilter_air	Air
bisim_gateway_geofilter_munition	Munition
bisim_gateway_geofilter_other	Other

For more information, see [Configure Gateway Geofiltering](#) in the VBS Gateway Manual.

Electronic Warfare

Sub-Category	Description
bisim_electronic_warfare_radar	Radar
bisim_electronic_warfare_cbs	CBS

For more information, see [Electronic Warfare](#) in the VBS4 Editor Manual.

Hazardous Area

Sub-Category	Description
bisim_vbs_contamination_vbs_cwa_hd	Mustard Gas
bisim_vbs_contamination_vbs_cwa_cl	Chlorine Gas
bisim_vbs_contamination_vbs_cwa_lna	Liquid Nerve Agent
bisim_vbs_contamination_vbs_cwa_sa	Sarin Gas
bisim_vbs_contamination_vbs_cwa_rad	Radioactive

For more information, see [Hazardous Area](#) in the VBS4 Editor Manual.

Radio

Sub-Category	Description
bisim_vbs_pitch_radio_antenna	Antenna
bisim_vbs_pitch_radio_jammer	Jammers

For more information, see Retractable Radio Mast and Radio Jamming Device in the VBS Radio Manual.

Active Protection System (APS)

Sub-Category	Description
apsMinRange	APS minimum range
apsMaxRange	APS maximum range

For more information, see Active Protection System in the VBS4 Editor Manual.

11.3.4 Map

The **Map** section contains all the **Map** (on page 250) settings.

Option	Description
MapStyle	<p>Relative path to the map style to use.</p> <p>The map-styles JSON files (<code>map_styles.json</code> is the wanted JSON file) can be stored at:</p> <ul style="list-style-type: none"> • <code>\Documents\VBS4\Map\Styles\map_styles.json</code> (default patches location) • <code>\Path\User\Map\Styles\map_styles.json</code> (if the <code>-profiles=Path</code> command-line option is used - see Command Line and Launcher Options (on page 76)) <p>The following considerations apply:</p> <ul style="list-style-type: none"> • The relative path to the map style JSON file needs to be specified in the format: <code>\Map\Styles\map_styles.json</code>. • The map-styles JSON files at these locations work as modifications (patches) for the default <code>styles.json</code>. For more information on the file structure, see Custom Map Style Elements (on page 335). <p>The default <code>.json</code> file used by VBS4 is called <code>styles.json</code>, stored at: <code>\VBS_Installation\Components\WebMapController\styles.json</code></p> <div style="border: 2px solid red; padding: 10px; margin-top: 10px;"> <p> WARNING</p> <p>This file should not be modified directly, as any changes get overwritten by default values. Therefore, it cannot be specified in the <code>MapStyle</code> option.</p> </div>

11.3.5 Symbology Settings

The **Symbology** section contains all of the **Symbology Settings** (on page 243).

Option	Description	Default
<code>UnitSymbolSize</code>	Size of single entity (unit / vehicle) symbols.	<code>20.000000000</code>
<code>UnitSymbolFades</code>	If enabled (<code>true</code>), single entity symbols can become partially transparent (can fade away).	<code>false</code>
<code>GroupSymbolSize</code>	Size of group (units / vehicles) symbols.	<code>30.000000000</code>
<code>GroupSymbolRescales</code>	If enabled (<code>true</code>), group symbols scale with the map zoom (the more the map is zoomed out, the smaller the symbol).	<code>true</code>
<div style="border: 1px solid #0070C0; padding: 10px;"> i NOTE Only applies to groups that are assigned to higher echelons. Groups that are not part of a higher-echelon hierarchy are considered top-level groups. </div>		
<code>GroupSymbolFades</code>	If enabled (<code>true</code>), group symbols can become partially transparent (can fade away).	<code>false</code>
<code>TopGroupRescales</code>	If enabled (<code>true</code>), top-level group symbols scale with the map zoom.	<code>false</code>
<div style="border: 1px solid #0070C0; padding: 10px;"> i NOTE Top-level group scaling only works if <code>GroupSymbolRescales</code> is enabled. </div>		
<code>GroupSymbolHideOnSingleVehicle</code>	If enabled (<code>true</code>), group symbols are not displayed when there is only one vehicle in a group. However, the vehicle must satisfy the crew member threshold.	<code>true</code>

Option	Description	Default
<code>GroupSymbolVehicleCrewThreshold</code>	<p>Defines the crew member threshold for single vehicles.</p> <p>If the number of crew members for a single vehicle is lower than the defined threshold number, the group symbol can be hidden for that vehicle.</p> <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"> NOTE The group symbol becomes visible when the mouse cursor hovers over the vehicle, but fades after approximately 1.5 seconds, once your cursor moves away from the vehicle symbol. </div>	4
<code>SubordinateGroupSmaller</code>	If enabled (<code>true</code>), groups get smaller and smaller on each hierarchy level, until the minimum size is reached.	<code>false</code>
<code>UnitSymbolEISHideSizeThreshold</code>	<p>Defines the minimum symbol size for single entities.</p> <p>If a unit symbol is smaller than the threshold, the display information is not shown for that symbol.</p>	10
<code>GroupSymbolEISHideSizeThreshold</code>	<p>Defines the minimum symbol size for groups.</p> <p>If a group symbol is smaller than the threshold, the display information is not shown for that symbol.</p>	10
<code>EISCharacterLimit</code>	Defines the maximum number of characters allowed in the Entity Information System (EIS) text display boxes.	14

11.4 Simulation

The following Simulation Profile options are stored in:

`\Profile_Path\Settings\SimulationSettings.xml`

They correspond to the [Simulation Settings \(on page 251\)](#) in the [VBS4 Settings \(on page 158\)](#) UI.

The XML has the following high-level structure:

- [GunneryStats \(below\)](#)
- [AAR \(below\)](#)
- [WeaponSystems \(on the next page\)](#)
- [HeadsUpDisplay \(on page 420\)](#)
- [Multiplayer \(on page 422\)](#)
- [Simulation \(on page 423\)](#)
- [Camera \(on page 426\)](#)

11.4.1 GunneryStats

The `GunnyerStats` section contains the [AAR Gunnyer Stats Options \(on page 252\)](#).

Option	Description
<code>AarGunnerEnableStats</code>	If enabled, gunner data is recorded when the main cannon of a vehicle is fired.
<code>AarGunnerLogCannonAndMachinegun</code>	If enabled, gunner data is recorded when both the main cannon and machine gun of a vehicle are fired.

11.4.2 AAR

The `AAR` section contains the [After Action Review \(AAR\) \(on page 253\)](#) settings.

Option	Description
<code>ShowSpeakerIcons</code>	If enabled, shows additional audio channels on the AAR Timeline for VBS Radio.
<code>ShowRadioIcons</code>	If enabled, shows simulated radios on the AAR Timeline for VBS Radio.
<code>ShowDirectTalkIcons</code>	If enabled, shows Direct Talk on the AAR Timeline for VBS Radio.
<code>ShowIntercomIcons</code>	If enabled, shows when vehicle intercom transmission is used on the AAR Timeline.
<code>AARTimelineMissionTime</code>	If enabled, shows the mission time on the AAR Timeline.

11.4.3 WeaponSystems

The **WeaponSystems** section contains the [Weapon Systems \(on page 254\)](#) settings.

Option	Description
<code>NVGwithWeapScope</code>	Enabling this option allows the player to use night vision (NVG) while looking and aiming down the sight / scope of a weapon. Default is disabled.
<code>Mouselook</code>	If enabled, allows the camera to rotate much more quickly as the restrictions of unit movement are removed. This feature is disabled as default.
<code>SafetyOn</code>	Activates the weapon safety mode (default: on).
<code>WeaponCursor</code>	Enables or Disables the 'crosshair' visible without looking through the sights. Its purpose is to give an approximation of where the weapon barrel is pointing.
<code>GrenadeThrowInstant</code>	If enabled (default), the grenade-throwing animation is skipped, and grenades are thrown instantly.
<code>GrenadeTrajectory</code>	When enabled, shows the approximate trajectory line for the throwing of grenades and 40mm grenade launcher.
<code>GrenadeShowLethalRange</code>	If enabled, shows the approximate lethal range, using a bubble visualization, for thrown and launched grenades.
<div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><p>NOTE Only works with GrenadeTrajectory (above) enabled.</p></div>	
<code>ManualFire</code>	Enables a manual fire Quick Menu item (see Quick Menu Actions in the VBS4 Trainee Manual).
<code>ConstantTurretSlewRate</code>	If enabled, turrets have the same turn rate irrespective of whether they are zoomed or not.

Option	Description
AutoAim	If enabled, assists aiming on XInput controllers by slowly moving the weapon crosshair on the target. Is represented by XInput Aim-Assist in Simulation Settings (on page 251) .
RealisticGunnery	<p>When enabled:</p> <ul style="list-style-type: none">• Main armament start unloaded.• Changing the nature of the selected round does not unload the current loaded round, it only affects the next loaded round.• This setting only applies to updated vehicles - the fin / sabot round is loaded automatically if the gunner is AI.• With difficulty disabled - all tanks start with fin / sabot round loaded automatically.

11.4.4 HeadsUpDisplay

The **HeadsUpDisplay** section contains the **Heads Up Display (HUD)** (on page 256) settings.

Option	Description
<code>GunPositionIndicator</code>	<p>If enabled, shows the commander and primary-turret orientation on tank-type vehicles and UGVs.</p> <ul style="list-style-type: none"> • Orange Line - Shows the primary turret orientation. Only present if the vehicle has a turret. • White Line - Shows the commander orientation. Only present if the vehicle has a commander position. <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p>i NOTE</p> <p>The following considerations apply:</p> <ul style="list-style-type: none"> • The mils indicator only applies to the Orange Line. • The Gun Position Indicator is hull-up, with the compass rotating around it. • Overrides VehicleAwareness (below), if it is enabled. If it is disabled, <code>GunPositionIndicator</code> still displays. • Needs to be set together with the <code>unitInfoType</code> vehicle configuration parameter set to "<code>UnitInfoTank</code>". For more information, see General Vehicle Parameters in the VBS Developer Reference. If <code>unitInfoType</code> is not set, the VehicleAwareness (below) is displayed instead. </div>
<code>HideUnitsOnRadar</code>	If enabled, hides Vehicles / Empty Vehicles on the Situational Awareness Indicator (see Heads Up Display (HUD) in the VBS4 Trainee Manual). If disabled, vehicles are shown as small colored diamonds (lilac for Vehicles, green for Empty Vehicles).
<code>AdvancedMinimap</code>	Changes the Mini-Map to advanced view mode. See Mini-Map Navigation in the VBS4 Trainee Manual.
<code>InfantryHeading</code>	Heading indicator (compass strip) for infantry.
<code>NoParaglideHUD</code>	Hides special HUD controls shown when player is in a steerable parachute.
<code>InfantryAwareness</code>	Situational awareness radar with FOV indicators.
<code>VehicleAwareness</code>	Situational awareness radar with Turret direction and FOV indicators.
<code>ShowArmAMap</code>	If enabled, VBS4 uses the old-style Armed Assault game map instead of the C2 Interface.

Option	Description
<code>PeripheralVision</code>	Adds visual signals for characters slightly out of direct view.
	<p>NOTE</p> <p>For performance reasons, <code>PeripheralVision</code> is off by default.</p>
<code>VisualDirection</code>	Visualize nearby shots directions.
<code>AllowHUDLabels</code>	If false, this turns off HUD labels for everything except player controlled avatars.
<code>HUDWpPerm</code>	The next waypoint is persistently shown, rather than fading in and out.
<code>HUDWp</code>	Waypoints are shown "floating" above their location with an icon and distance indicator.
<code>HUDGroupInfo</code>	Enables arrows at the edge of the screen to indicate the direction of team members.
<code>HideUI</code>	Removes unit info resources from the screen such as: Health Bar, Fuel Bar, Weapon Type, Radar, Weapon Cursor, and so on. A VBS4 server forces these settings on all VBS4 clients in multiplayer.
<code>FriendlyTag</code>	If enabled, shows the health and name of the entity as your crosshairs point at it. The information disappears after the crosshairs leave the target.
<code>Map</code>	If enabled, VBS4 uses the old-style Armed Assault game map instead of the C2 Interface.
<code>HUDPerm</code>	Shows extended HUD information persistently, rather than fading in and out.
<code>HUD</code>	If enabled, provides extended HUD information on the location of enemy forces. This is provided by an indicator arrow and an estimated distance to target. This information is available from all friendly sources and appears automatically on your screen.
<code>EnemyTag</code>	If enabled, shows the health and name of the entity as your crosshairs point at it. The information disappears after the crosshairs leave the target.
<code>FriendlyKillMessage</code>	If disabled, players do not receive friendly fire messages such as: "Player 1 killed Player 2 (friendly fire)".
	<p>NOTE</p> <p>If an Administrator enforces this option, it is applied to all connected clients.</p>

Option	Description
ClockIndicator	When enabled, this indicator provides a "Clock method" of target indication. For example, the clock is displayed as: "Enemy at 3 o'clock". It only appears when an enemy is located. Disable setting removes this feature and no target indication is given by the AI.
SoldierNames	When disabled, removes the health bar and name field from above the soldiers on your team.

11.4.5 Multiplayer

The **Multiplayer** section contains the [Multiplayer \(on page 259\)](#) settings.

Option	Description
SkipMultiplayerBriefing	If enabled, always skips the Mission Briefing (see Edit the Mission Briefing in the VBS4 Editor Manual) at the start of a multiplayer session.
StartAARInMultiplayer	Automatically starts AAR recording during multiplayer sessions.
VonID	If enabled, the VOIP ID is shown.
AllowSeagull	This setting toggles between a dead player respawning as a seagull above the battle field, or receiving the "You are dead" message on a black background.
CanHost	Allows users to host multiplayer sessions.

11.4.6 Simulation

The **Simulation** section contains the **Simulation (on page 260)** settings.

Option	Description
AdvancedBallistics	<p>If enabled, the following atmospheric parameters affect munition ballistics:</p> <ul style="list-style-type: none">Wind Speed and Direction.Air Friction, determined by Air Temperature and Pressure settings.For specific vehicles, the Fire Control System (FCS) may enable compensation for the atmospheric parameters. <p>To set atmospheric parameters, see Atmospheric Parameters in the VBS4 Editor Manual.</p> <p>To display atmospheric parameters in VBS4, see Atmospheric Parameters in the VBS4 Trainee Manual and Edit the Mission Briefing in the VBS4 Editor Manual.</p> <p>If enabled, the Magnus Effect (https://en.wikipedia.org/wiki/Magnus_effect) for ballistics is activated, which affects how projectiles travel through the air. This effect causes projectiles to deflected sideways due to their spin. How the Magnus Effect is configured for VBS is discussed in Ammunition Parameters in the VBS Developer Reference.</p>
FlightModelWindAffection	<p>If enabled, wind affects rotary wing aircraft behavior.</p> <p>This setting can also be enabled / disabled, using SQF command: setWind (https://sqf.bisimulations.com/display/SQF/setWind).</p> <p>The Wind Speed / Direction and Gust Speed / Direction settings in Weather Settings, described in the VBS4 Editor Manual, are used to define the specific wind characteristics.</p>
VehicleQualification	<p>If enabled, limits the available vehicle roles and weapon usage based on the qualifications of the unit. Default is disabled.</p> <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><p>NOTE</p><p>Requires a version of VBS4 with this feature enabled, as this is not generally available.</p></div>
Wakes3D	If enabled, watercraft wakes are shown in 3D.

Option	Description
<code>CASDispersion</code>	If enabled, allows the simulation of aircraft munitions dispersion in VBS Close Air Support. For general information, see VBS Close Air Support in the Introduction to VBS4 Guide. For information on how to configure specific dispersion, see the Dispersion JSON parameter in the VBS Plan Manual.
<code>UnlimitedFuel</code>	If disabled, the vehicle adopts normal fuel usage rates and eventually requires refueling from an external source. If enabled, allocates limitless fuel to the vehicle.
<code>InversedShipControl</code>	Reverses the ship steering controls. <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><p>NOTE</p><p>Used in adjustment of specific ship controllers whose steering central position is set to 0.5, and not 0, which reverses the axis logic.</p></div>
<code>AutomaticDoorAnimations</code>	When enabled (enabled by default), plays vehicle-door opening / closing animations during the performance of the Get In / Get Out actions. <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><p>NOTE</p><p>The following considerations apply:</p><ul style="list-style-type: none">• The option only works for specifically configured content models. For more information, contact support@bisimulations.com.• Bohemia Interactive Simulations recommends to use the option with RealisticVehicleEntry (below) enabled.</div>
<code>UnlimitedSaves</code>	Save single player mission unlimited times.
<code>SimplifiedHeliModel</code>	When enabled, the flight model of the helicopter becomes less reliant on the users flying skills. The helicopter is extremely easy to fly and does not crash into the ground. Speed and Elevation are controlled by single key presses on the keyboard and don't require them to be held down.
<code>RealisticVehicleEntry</code>	If enabled, forces units to use proper access points (which a vehicle model may have) to board the various vehicle positions (disabled by default).
<code>RealisticRepairs</code>	Repairs take longer and players have to get out of repair trucks to carry them out.

Option	Description
<code>RealisticFatigue</code>	Enables unit realistic fatigue.
<code>LifeformSnowCompression</code>	If enabled (default), lifeform entities (people and animals) leave snow trails. If disabled, the lifeform entities clip through the snow visually, but do not leave trails.
<code>WheelSnowCompression</code>	If enabled (default), wheeled vehicle entities leave tire marks on snow. If disabled, the wheeled vehicle entities still leave tire marks visually, but remain on the snow surface.
<p>NOTE</p> <p>Can only be modified in Prepare mode.</p>	
<code>OneIncapacitatedScreen</code>	Same text "You are Incapacitated" on screen for death and unconsciousness.
<code>FollowContour</code>	If enabled, forces the helicopter to follow the contours of the ground, adopting a 'tactical flying' attitude. It gains / decreases altitude according to the lay of the land.
<code>HitBodyEffect</code>	If enabled, units aim up when hit. Enabled by default.
<code>TremblingHands</code>	If enabled, damage to the arms of a unit causes them to start trembling, making aiming more difficult. The higher the damage, the worse the trembling. Disabled by default.
<code>HealthDegrade</code>	This option allows the user to enable / disable the health degradation (bleeding out) simulation. If enabled then health degrades when less than 75%, and stops at 10%.
<code>Armor</code>	If enabled, simulates the addition of extra armor plates to armored vehicles. This allows the vehicle to sustain more damage before total destruction.
<code>SuppressPlayer</code>	If enabled, the player is effectively suppressed by incoming fire. The player notices a "white out" flashing of the screen, momentarily losing focus on the current FOV.
<code>ShowHints</code>	Simplifies user interface. Toggles the visibility of hints for specific items.
<code>Bleeding</code>	If enabled, units can die from bleeding out from wounds.
<code>BackblastDamage</code>	Disable to prevent damage from backblasts.

Option	Description
<code>FootprintRendering</code>	Allows non-vehicle entities (people and animals) to leave distant footprints (outside of the player vicinity). The number of footprints per entity is limited to 600 (the number may change in future releases). When that limit is reached, the oldest footprints begin to disappear, if there are new ones to replace them.
<code>Wound</code>	Simulates injuries to specific limbs including amputations, and bleeding out. Requires units to be configured for wounds / amputations.
<code>AdvancedHeadInjury</code>	If enabled, units that receive head injuries experience dizziness and blurred vision, which affects their accuracy when using weapons, for example.

11.4.7 Camera

The [Camera](#) section contains the [Camera \(on page 264\)](#) settings.

Option	Description
<code>ShowAvatar</code>	Enables / disables the drawing of the avatar proxy in first-person view, when in vehicles.
<code>RTECamAbsolute</code>	Allows the VBS Editor camera in Execute mode to follow an absolute height instead of a relative height.
<code>AutoVehicleCameraTurn</code>	If true, then when controlling a vehicle, the view direction is affected by the direction the vehicle is headed. If false then the camera is independent of vehicle steering.
<code>ThirdPersonView</code>	Enables / disables third-person view.

11.5 Controls

The following Controls Profile options are General Profile options, stored in:

`\Profile_Path\Settings\ControlsSettings.xml`

They correspond to the [Controls Settings \(on page 265\)](#) in the [VBS4 Settings \(on page 158\)](#) UI.

The XML has the following high-level structure:

- [HWNodes \(on the next page\)](#)
 - [Device_Type \(on the next page\)](#)

11.5.1 HWNodes

The **HWNodes** section contains all the controller hardware types.

Option	Description
<code>Device_Type</code>	<p>The <code>Device_Type</code> can be:</p> <ul style="list-style-type: none"> • <code>KeyboardAndMouse</code> - Combined controls for keyboard and mouse. • <code>XInput</code> - Controls for XInput devices (such as Microsoft Xbox controllers). • <code>TrackIR</code> - Controls for TrackIR devices.

The **HWNodes** sub-sections are:

- *Device_Type (below)*

11.5.1.1 Device_Type

The `Device_Type` section contains the following controls, for each of the three device types (`KeyboardAndMouse`, `XInput`, `TrackIR`):

Option	Description
<code>DeviceInfo</code>	Name of the input controller device.
<code>Other</code>	<p>Any miscellaneous other controls outside the categories listed further in this table.</p> <p>KeyboardAndMouse</p> <p>The keyboard and mouse other controls are:</p> <ul style="list-style-type: none"> • <code>MouseSensitivityX</code> - Mouse sensitivity along the X-axis. The full range is 1 - 500%, with the default set to 100%. • <code>MouseSensitivityY</code> - Mouse sensitivity along the Y-axis. The full range is 1 - 500%, with the default set to 100%. • <code>RevMouse</code> - If set to <code>true</code>, inverts the mouse movement along the Y-axis. <p>XInput</p> <p>The XInput device other controls are:</p> <ul style="list-style-type: none"> • <code>XInputDeadzone</code> - Controller-sensitivity threshold on XInput controllers. The full range is 1 - 99%. <p>TrackIR</p> <p>TrackIR devices have no other controls.</p>
<code>BasicInfantryControls</code>	Contains the general infantry controls, such as movement, firing, and so on.

Option	Description
SkyDivingControls	Contains the skydiving controls.
OpticsControls	Contains the optics controls, such as sights usage, and so on.
Car	Contains the land-vehicle controls.
CarAdvanced	Contains the advanced vehicle controls.
Helicopter	Contains the helicopter controls.
HelicopterRTD	Contains the helicopter RTD controls.
Air	Contains the general aircraft controls.
Buldozer	Contains Buldozer controls, such as the camera crosshair.
Editor	Contains the VBS Editor controls.
SystemKeys	Contains the VBS4 system controls.
UserInputEmulation	Contains controls to emulate user input.
spike_lr_group	Contains controls specific to the Spike LR (Long-Range) portable missile system.
ElectronicWarfare	Contains Electronic Warfare (EW) controls.

11.6 Input Devices

The following Input Devices Profile options are stored in:

`\Profile_Path\Settings\InputSettings.xml`

They correspond to the [Input Devices Settings \(on page 304\)](#) in the [VBS4 Settings \(on page 158\)](#) UI.

The XML has the following structure:

- [InputSettings \(on the next page\)](#)

11.6.1 InputSettings

InputSettings contains all audio settings from [Input Devices Settings \(on page 304\)](#).

Option	Description
TrueSteering	Toggles true steering mode for vehicles. When enabled, sets the xInputDeadzone (see XInput (on page 427)) to 70%.
ForceFreelookMode	Forces the simulation to be in free-look mode.
floatingZoneArea	The floating zone for aiming. While aiming within the floating zone, the body of the player does not turn in the direction of the aim. Once the aim exceeds the floating zone boundaries, the body of the player turns in the direction of the aim.
GearboxMode	Switches the gearbox mode (off, basic, real) for vehicles.
Vibrations	Enable / disable controller vibrations.
ControllerYReversed	Toggles the controller Y-axis inversion.
EditorCameraMovementSpeed	Sets the speed the Spectator Camera moves in the VBS Editor.

11.7 Command and Control (C2) Screen Devices

The following C2 Profile options are General Profile options, stored in:

\Profile_Path\Settings\VBS4.USER.xml

Option	Description
class Compass { ... };	Each device class has the same set of parameters: <ul style="list-style-type: none">• inBack - Indicates whether the device is in the background or in the foreground of the C2 screen.• position[] - The position of the device in the foreground of the C2 screen.• positionBack[] - The position of the device in the background of the C2 screen.
class Watch { ... };	
class WalkieTalkie { ... };	
class GPS2 { ... };	

i NOTE

It is not advisable to configure these parameters in the Profile file. Instead, adjust the devices visually as they appear on the Command and Control (C2) Screen in the VBS4 Trainee Manual.

11.7.1 Change the Position and Size of Screen Devices

You can change the position and size of the compass, watch, and Mini-Map (the Advanced Mini-Map is not affected) by adjusting the values of the parameters in the following section of the **VBS4.USER.xml** file:

The default settings are as follows:

```
<StandardEquipment>
    <Equipment>
        <Name>Watch</Name>
        <PositionX>-0.076200001</PositionX>
        <PositionY>-0.029999999</PositionY>
        <Scale>1.00000000</Scale>
    </Equipment>
    <Equipment>
        <Name>Compass</Name>
        <PositionX>0.000000000</PositionX>
        <PositionY>0.020000000</PositionY>
        <Scale>1.00000000</Scale>
```

```
</Equipment>
<Equipment>
    <Name>Minimap</Name>
    <PositionX>-0.560469985</PositionX>
    <PositionY>0.268500000</PositionY>
    <Scale>1.000000000</Scale>
</Equipment>
</StandardEquipment>
```

i NOTE

The scale of all of the devices is currently limited to between 0.3 - 2.0.

⚠ WARNING

The following considerations apply:

- Make sure that VBS4 is not running, when you edit and save [VBS4.USER.xml](#).
- If the compass is moved from its original position (defined in the [VBS4.USER.xml](#)), the values may not be what the Trainee expects them to be because the reading of the compass always shows values as if the compass is centered.

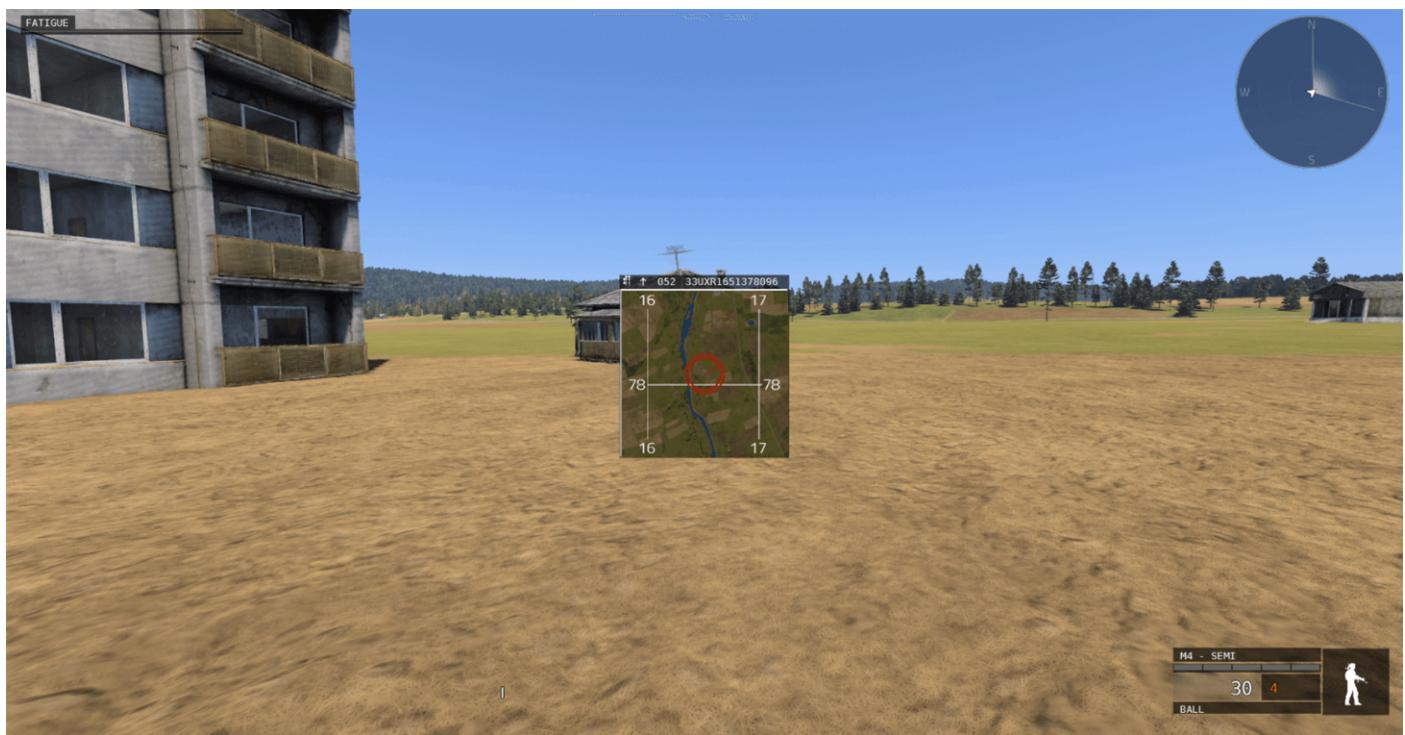
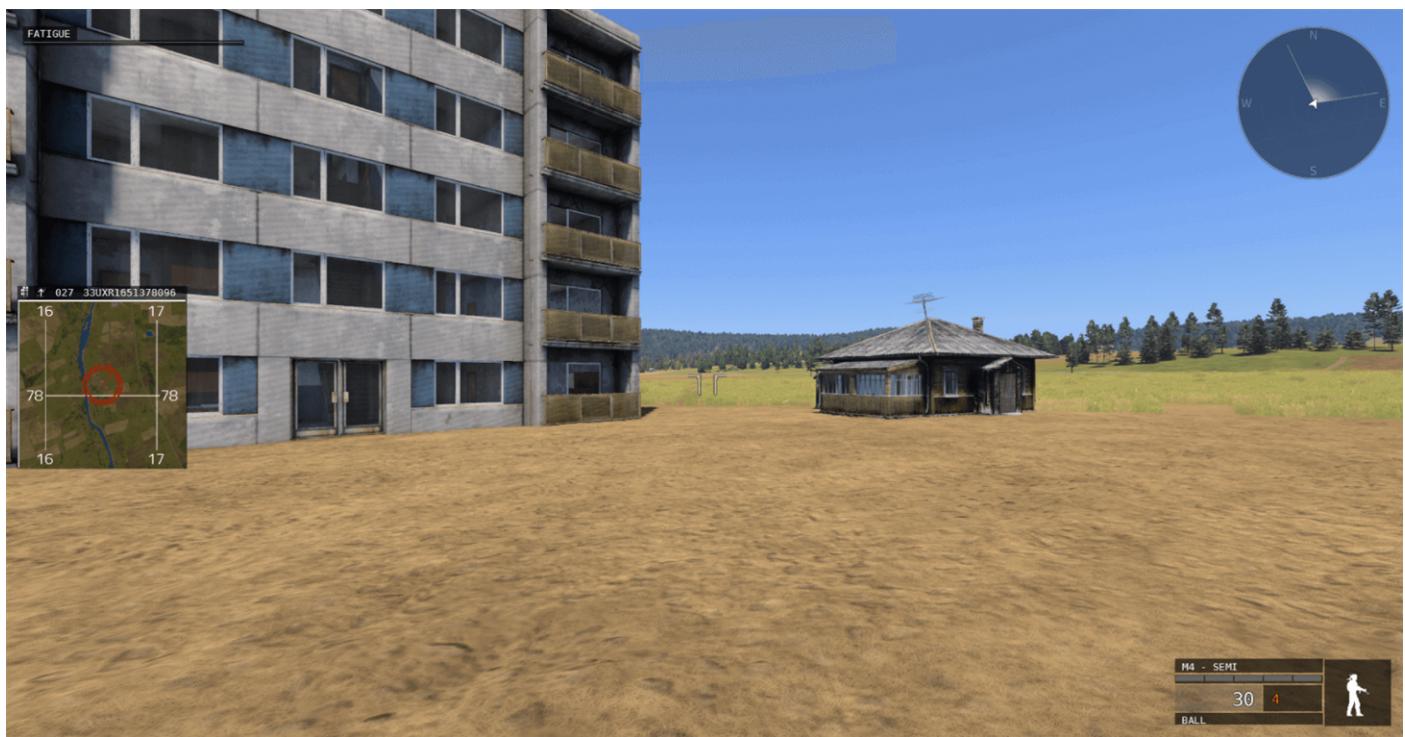
The following screenshots illustrate a selection of device sizes and positions:

Image-30: Compass - Default Position and Size



Image-31: Compass - Default Position with Size Scaled to 0.3**Image-32: Compass - Default Position with Size Scaled to 0.7**

Image-33: Watch - Position 0 / 0 with Scale 1**Image-34: Watch - Position 0 / 0 with Size Scaled to 0.5****Image-35: Watch - Position 0.05 / 0.03 with Size Scaled to 0.5**

Image-36: Mini-Map - Position 0 / 0 with Scale 1**Image-37: Mini-Map - Position -0.6 / 0 with Scale 1**

12. Config Patch Builder

The Config Patch Builder (CPB) allows users to generate patch files ([.pbo](#)) that contain parameter and value changes for assets in VBS. It does this without requiring the user to have an indepth understanding of configuration file writing, configuration syntax, or other technical knowledge.

Such simple changes could be:

- Changing the maximum speed of a vehicle.
- Changing the engine power of a vehicle.
- Increasing the damage and velocity of specific ammunition.
- Changing the default weapons of a tank.

Advanced Use Cases

The CPB is also capable of inserting new configuration parameters / name-value pairs, and even entire new classes. Using the [Batch Import \(on page 446\)](#) feature, it enables you to edit configurations from a spreadsheet environment, and then transfer the value changes automatically into a patch file that VBS can load and apply to alter a simulation. In addition, the CPB can serve as a quick and simple offline configuration browser.

This topic covers the following:

- [Basic Concepts \(on the next page\)](#)
- [Basic Workflow \(on page 440\)](#)
- [Editing Values \(on page 440\)](#)
- [Adding Entries \(on page 441\)](#)
- [Adding Classes \(on page 443\)](#)

Further sub-topics include:

- [CPB Batch Editing \(on page 446\)](#)
- [CPB Example - M1A1 Tank \(on page 451\)](#)

The CPB GUI is found at the following location:

[`\VBS_Installation\optional\configpatchbuilder\`](#)

12.1 Basic Concepts

The CPB has the following basic concepts and functions.

Config Cache

The CPB operates from a config cache that is generated by VBS4. You need to run VBS4 at least once and reach the Main Menu for a config cache to be built. The cache is saved at the following location:

`\VBS4_Installation\cache\config.cache`

When you launch the CPB, you have to first load a config cache using the **Load Config** button, and then select the cache file. On every subsequent launch of CPB, the last loaded config cache is automatically loaded again for you.

TIP

The config cache files do not necessarily need to be stored in the VBS4 installation directory. You can copy a config cache file from the VBS4 installation folder to an auxiliary location, and keep it there for version control.

It is recommended that you make a copy of the original VBS4 config cache file, store it somewhere safe, and then use it as a basis for any changes.

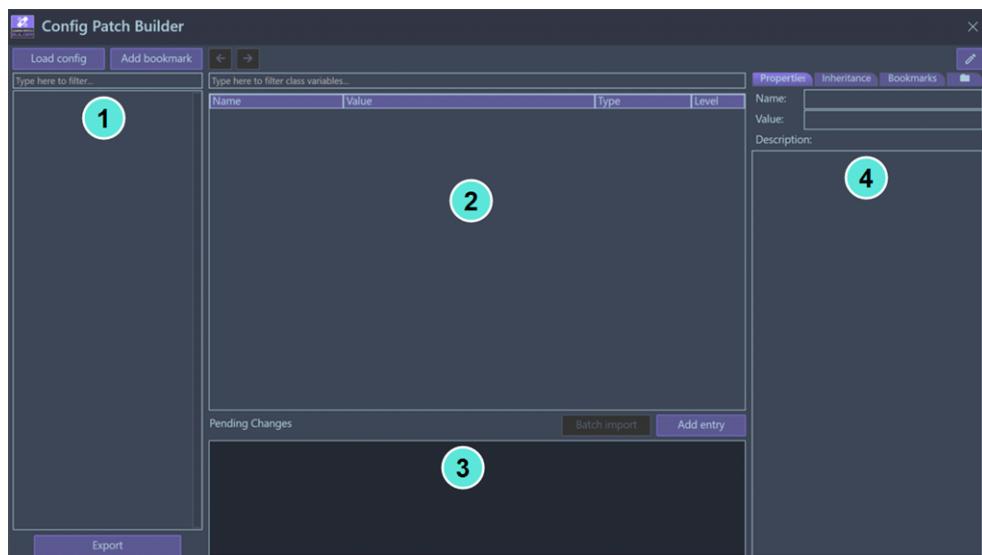
WARNING

If you apply a configuration patch file to VBS4, launch VBS4 and reload the CPB, it defaults to your previously made changes as part of the config cache. It no longer knows which changes were externally made, and which ones were default VBS4.

It is recommended that you export each patch also as a `.csv` file, so that you can re-load the patch into the CPB as a project at a later stage.

Be extremely careful that you keep track of your patch files, which changes they make, and which ones are currently applied and integrated into the currently loaded config cache. This has potential to cause extreme confusion, so work slowly and with great care.

Image-38: Config Patch Builder Layout



The CPB is divided into four windows.

1	Config Class Tree	Use to browse all available classes from the configuration cache. As you view different classes, the address bar above the Config Main View (below) window shows your current location and allows you to step back and forth (using the arrow buttons) between recently viewed classes.
2	Config Main View	<p>NOTE</p> <p>By default, the CPB only shows the classes that are white listed in the AllowedClasses.csv file, located in the settings folder, next to CPB.exe. Delete or edit this file to access further classes.</p>
3	Pending Changes	<p>Displays all the parameters and values present in the currently selected class. Here, you can also edit parameter values.</p> <p>At the bottom of this window is the Add Entry button, which allows you to add new parameters and classes to the currently selected configuration class (see Adding Entries (on page 441)).</p>
4	Context Information	<p>Shows all currently made changes to the config cache. Changed entries are listed in the Config Main View (above) window and are shown in red.</p> <p>You can click on an entry or class here to directly jump to that class again. This makes working with a large amount of changes manageable.</p>

Inheritance Level

The Inheritance Level shows from which base class a given parameter is inherited. Click the **Inheritance** tab in the [Context Information \(on the previous page\)](#) window to see the class name.

Type here to filter class variables...

Name	Value	Type	Level
side	1	number	0
icon	vbs2_icon_nato_bluefor_tank	string	0
threat	[1,1,0,5]	array	0
cost	3000000	number	0
driverAction	vbs_kmw_leopard1_driver_01_out	string	0
driverInAction	vbs_kmw_leopard1_driver_01_in	string	0
driverForceOptics	0	number	0
driverOpticsModel	\vbs2\vehicles\Land\Tracked\kmw_leopard1\data\optics\km	string	0
memoryPointDriverOptics	{Optic_Driver_pos}	array	0
viewDriverInExternal	0	number	0
lodTurnedIn	1100	number	0
lodTurnedOut	1200	number	0
lodOptics	1	number	0
forceHideGunner	1	number	0
castDriverShadow	0	number	0
castGunnerShadow	0	number	0
castCargoShadow	0	number	0
viewCargoShadow	0	number	0
viewDriverShadow	0	number	0
viewGunnerShadow	0	number	0
maxSpeed	65	number	0

Properties Inheritance Bookmarks

- 0: vbs_kmw_leopard1_base_x
- 1: vbs2_tank_9_x
- 2: vbs2_tank_8_x
- 3: vbs2_tank_7_x
- 4: vbs2_LandVehicles
- 5: vbs2_AllVehicles
- 6: AllVehicles
- 7: All

A parameter with level (number) 0 assigned is defined directly in the class. A parameter with level 1 is defined in the first parent class of the asset. A parameter with level 5 is defined in the 5th-level inheritance for the asset, and so on.

You can click on a class in the inheritance list to directly jump to its base class, which is highlighted in the [Config Class Tree \(on the previous page\)](#) window.

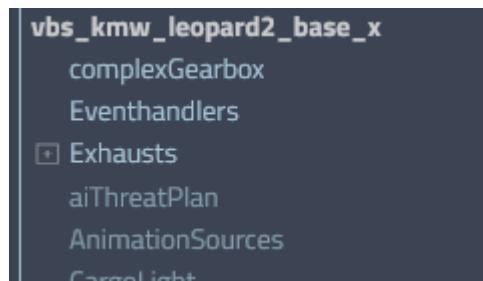
TIP

Work on base classes to ensure that all child classes receive the new values.

For example, instead of increasing the `enginePower` of a Desert Camouflaged M1A1 Tank and then making the same change to a Woodland Camouflaged M1A1 Tank, you can make this change only once to the base class that both the Desert and Woodland variants use.

Usually, this is the level 1, or rarely level 2, parent of a placeable asset from VBS Editor.

In the [Config Class Tree \(on the previous page\)](#) you see sub-classes that exist directly in a class highlighted. Classes shown in a darker tone only exist in the class using inheritance from other classes. They are not explicitly declared in the currently selected class. Hover the cursor over an inherited class to show the configuration path, where the sub-class originates.

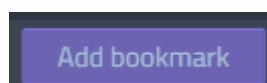


Bookmarks

Classes you frequently work with can be saved as bookmarks in the **Bookmarks** tab of the **Context Information** window.



To add a bookmark, navigate to the class you want to save, and click the **Add Bookmark** button at the top of the [Config Class Tree \(on page 437\)](#) window.



To skip to the bookmark, double-click the bookmark entry in the **Bookmarks** tab.

Applying Patches

Click **Export** to generate a patch as a **.pbo**. For more information, see [Export Changes \(on page 455\)](#).

Copy the **.pbo** to your VBS4 installation folder, and restart VBS4 to activate your changes (the CPB can do this automatically for you).

\VBS4_Installation\myData\Blue\content

Filtering

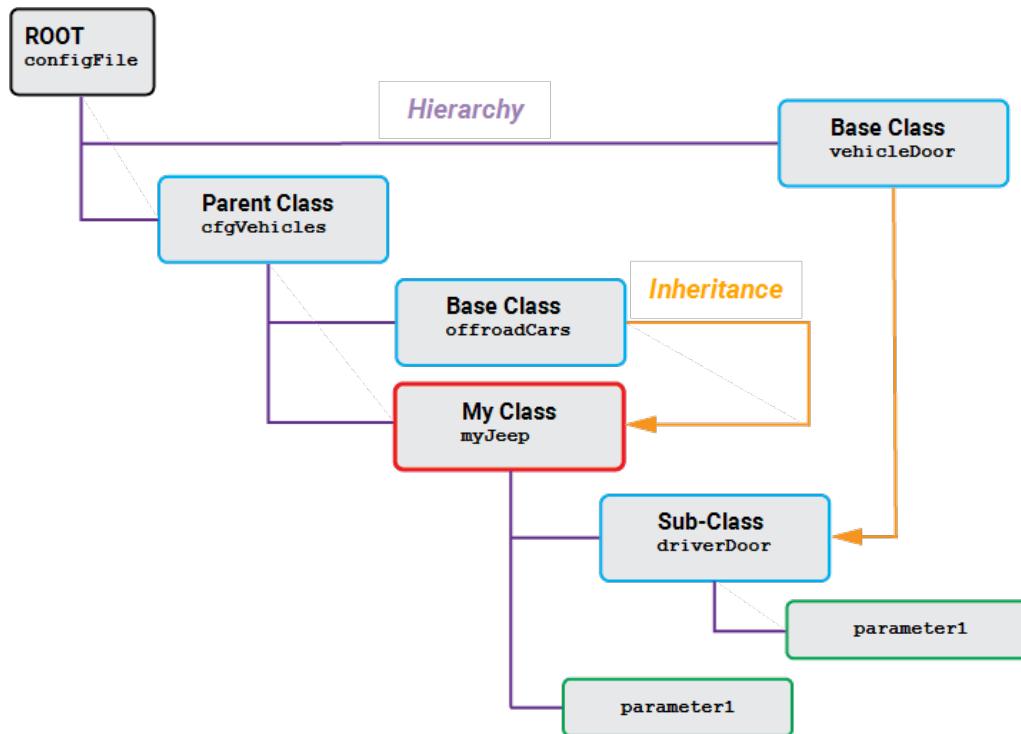
You can filter the shown items in the [Config Class Tree \(on page 437\)](#) by typing in the **Filter** box at the top, and pressing **Enter** on your keyboard to confirm. The same procedure applies to the filter of the [Config Main View \(on page 437\)](#), where it filters the shown parameters of the currently selected class.

To reset a filter, clear the text from the **Filter** box, and press **Enter** again.

m16		wea	
Name	Value	Name	Value
vbs_us_mc_riflemanMopp4_wdl		weapons	{vbs_xx_m16a2
vbs_us_mc_riflemanMoppAlpha_1		respawnWeapons	{vbs_xx_m16a2
vbs_us_mc_riflemanMoppAlpha_1		bonePrimaryWeapon	weapon
vbs2_af_ana_grenadier_w_m16		weaponBone	weapon
vbs2_af_ana_leader_w_m16		weaponSlots	1 + 4 +
vbs2_af_ana_rifleman_w_m16		transportMaxWeapons	1000000000
vbs2_af_borderPolice_d_m16		hideWeaponsDriver	1
vbs2_af_borderPolice_d_m16_m		hideWeaponsCargo	0
vbs2_af_borderPolice_leader_d_r			

12.2 Basic Workflow

The following diagram illustrates the basic CPB workflow.



Terminology

- Root class
- Parent class
- Base class
- Sub-class
- Parameter
- **Terms are relative**
 - Viewed class as origin

12.3 Editing Values

The most common use-case for the CPB is to make changes to existing values. This is done by clicking in the **Value** field of any currently shown configuration class, and typing in a new value.

Display Name	Type	Value	Type	Value
count	number	1001	number	0
ammo	string	bisim_ig_ammo_b_mgun_heavy	string	0
initSpeed	number	930	number	0
gameSpeed	string		string	1

Any changed value is indicated in **red** in the [Config Main View](#) (on page 437), while the change is also listed in the [Pending Changes](#) (on page 437) window.

Pending Changes	
<input type="checkbox"/> configfile >> CfgMagazines >> bisim_ig_mag_b_1000rnd_mgun_heavy	

```

count = 1001
initSpeed = 931
  
```

You can delete individual pending changes by selecting the **entry** in the [Pending Changes](#) (on page 437) window, and pressing **Delete** on your keyboard.

12.4 Adding Entries

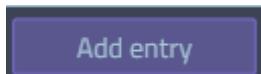
You can introduce new name-value pairs / parameters, and new classes using the [Config Patch Builder dialog \(below\)](#).

Adding Parameters / Name-Value Pairs

Use the following procedure to add a new parameters / name-value pairs.

Follow these steps:

1. Navigate to the **class** that you want to modify, and click **Add Entry**.



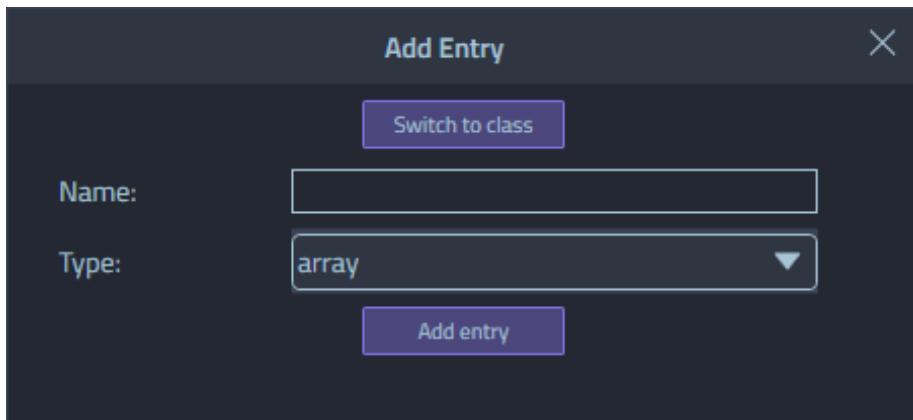
This opens the Config Patch Builder dialog, which asks you to input the name of your new parameter / name-value pair, and the data type (array, bool, number, or string).



TIP

Use **Switch to Class / Switch to Variable** to switch between adding classes / parameters or name-value pairs. To add a class, see [Adding Classes \(on page 443\)](#).

Image-39: Config Patch Builder dialog

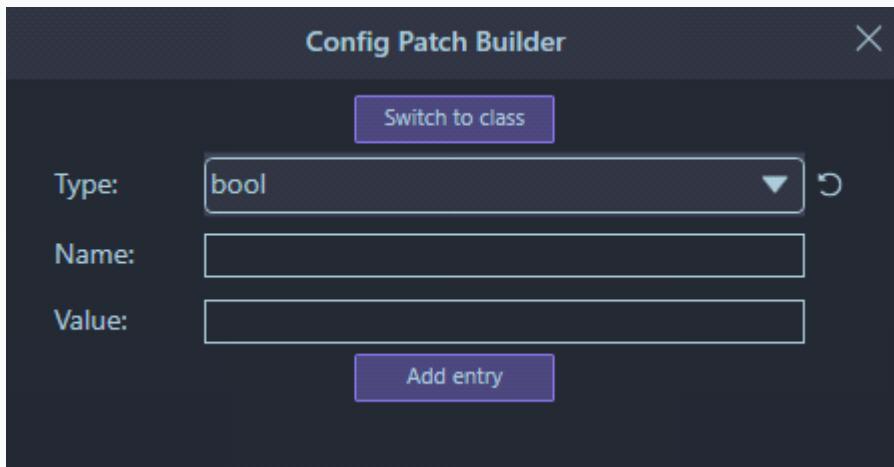


2. Click the **Down Arrow** to expand the **Type** drop-down, and select the parameter type.

3. Enter a **Name** for your parameter.

NOTE

If you select "bool", "number", or "string" as the parameter type, and want to add the parameters as a name-value pair, enter a value.



4. Click **Add Entry**.

The dialog closes and you see the new parameter / name-value pair added to the class at the top of the [Config Main View \(on page 437\)](#) window. Since this is a pending change, it is marked **red**.

Name	Value	Type	Level
ABC	0	array	0

It is also listed in the [Pending Changes \(on page 437\)](#) window.

Pending Changes	Batch im
configFile >> CfgVehicles >> VBS2_US_ARMY_M1A1_D_X ABC = {}	

5. If necessary, double-click the parameter **value** in the [Config Main View \(on page 437\)](#) and begin editing.

12.5 Adding Classes

You can also add entire new classes. These always consist of a pair: `name` and `base_class_path`.

The `name` you enter becomes the name of the class, while the `base_class_path` must consist of a configuration path of the exact class you wish to inherit from.

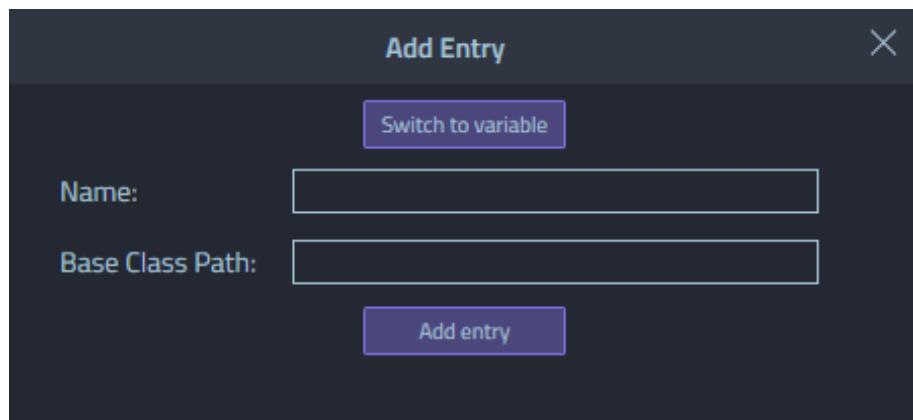
NOTE

Base class paths are valid under the following conditions:

- Leading to a class on the same level as you are currently working on.
- Leading to a class higher up in the hierarchy tree.
- Empty path.

Base class paths are not valid under the following conditions:

- Leading to a class on a deeper level than you are currently working on.
- Leading to a class leading across and then deeper into the hierarchy tree of another class (for example, from `CfgVehicles > MyCar` you cannot inherit from `CfgWeapons > MyGun`).

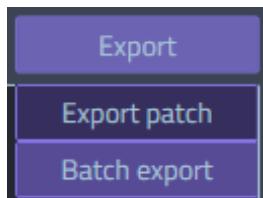


12.6 Exporting Changes

Once you have some changes ready, you can export them.

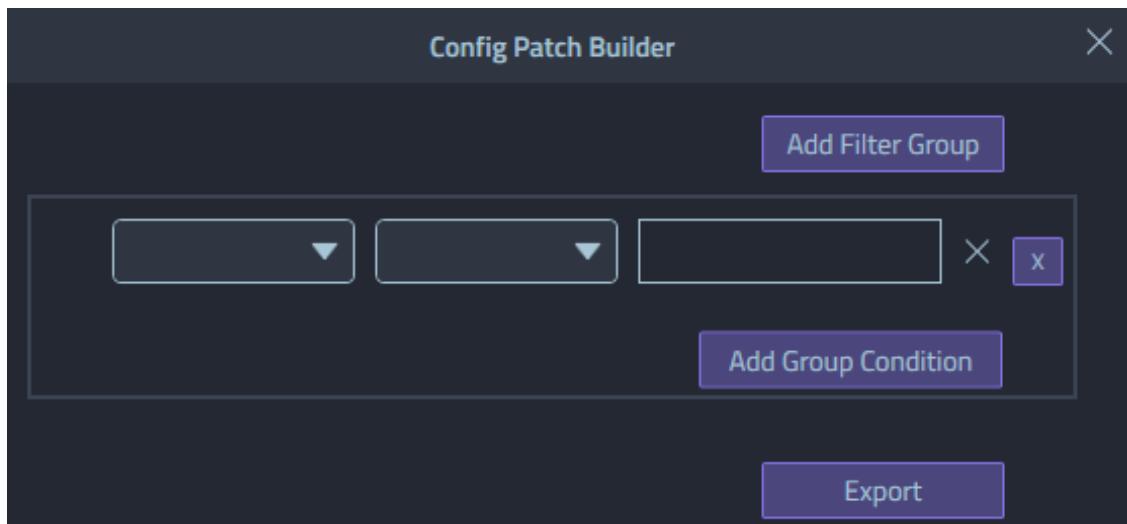
Follow these steps:

1. Click **Export** and select **Batch Export**.



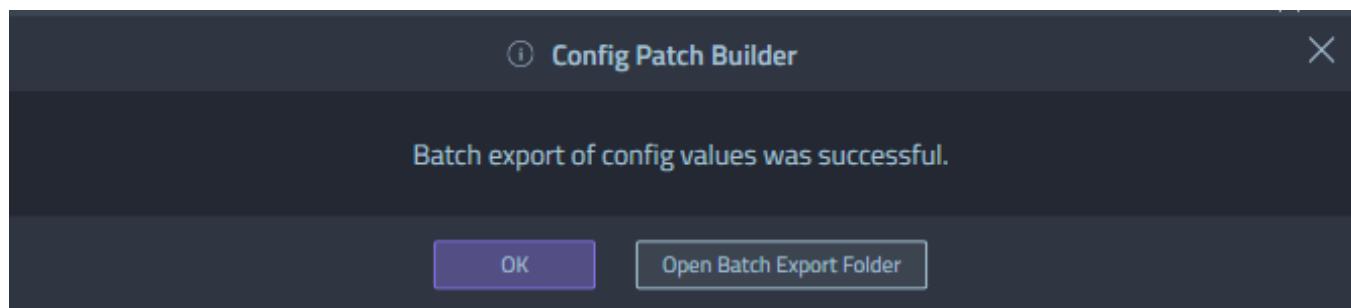
You see a filter dialog. This allows you filter all pending changes to only export those that you want to export to a **.csv** file (that is, only those that modify a specific parameter or base class).

2. If you want to export the entire contents of the [Pending Changes \(on page 437\)](#) window, leave the empty filter (default) dialog as it is.



3. Click **Export**.

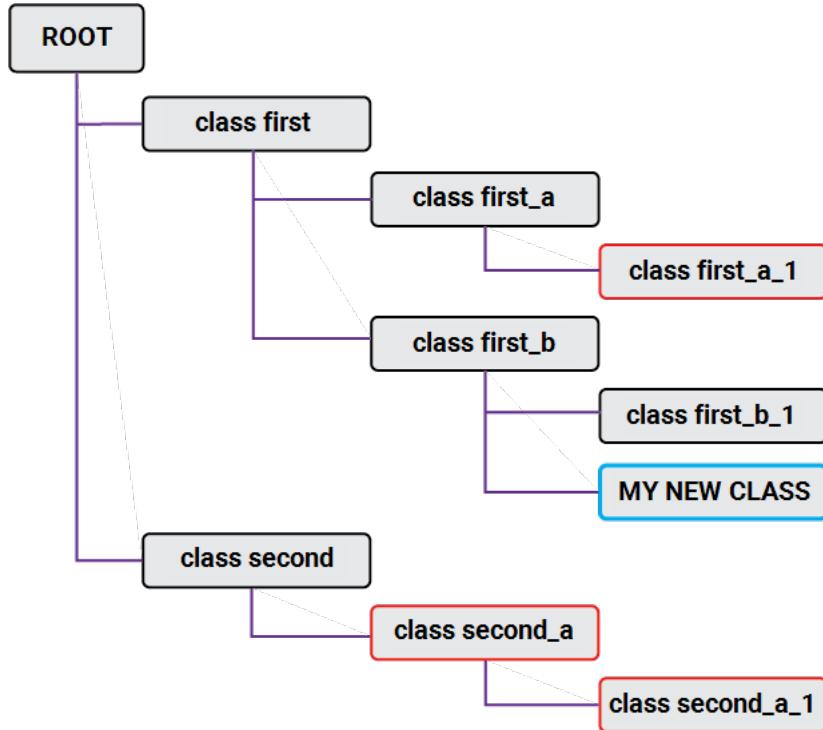
Once completed, a dialog informs you of the successful export.



TIP

A shortcut button (**Open Batch Export Folder**) lets you directly navigate to the output folder, which is a new folder called `\BatchExport\` in the main output folder that you selected for the CPB.

The following diagram illustrates how classes are added.

**WARNING**

The following considerations apply:

- Classes may not inherit from:
 - Sub-classes
 - Themselves
 - Non-existent classes
- Only direct ancestry is permitted.

12.7 CPB Batch Editing

A very powerful feature of the CPB is the batch import / export functionality. Through the abstraction of a **.csv** spreadsheet file, you can make bulk changes to configurations, using a very efficient workflow.

12.7.1 Batch Import

If you have a properly formatted **.csv** file, containing configuration parameters (see [CSV Export Syntax \(on page 450\)](#)), you can import it into the CPB, to your [Pending Changes \(on page 437\)](#) window.

Follow these steps:

1. Click **Batch Import**.



Batch import

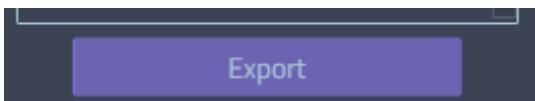
2. Select your **.csv** file and confirm.

The changes from the **.csv** file are now ported to the [Pending Changes \(on page 437\)](#) window.

12.7.2 Batch Export

All changes that are prepared in your [Pending Changes \(on page 437\)](#) window can be exported to a spreadsheet file (**.csv**). This enables you to load a great number of configuration parameter changes into an easily manageable format. You can also add more entries there, and then re-import the spreadsheet to the CPB.

To begin, click the **Export** button.

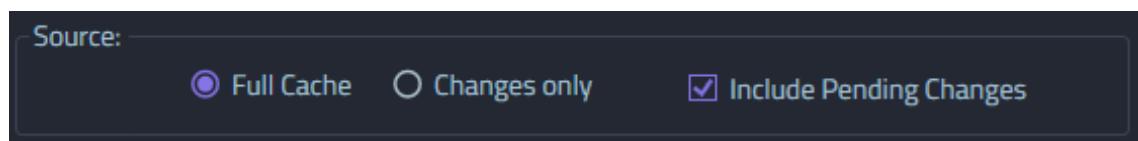


Export

A new window opens giving you control over the exact export you want to perform.

12.7.2.1 Source Selection

The CPB has two general sources of export:



Source	Description
Full Cache	Exports the entire configuration cache (including the option to also consider the changes that you made).
Changes Only	Exports only your changes made to the loaded cache file.

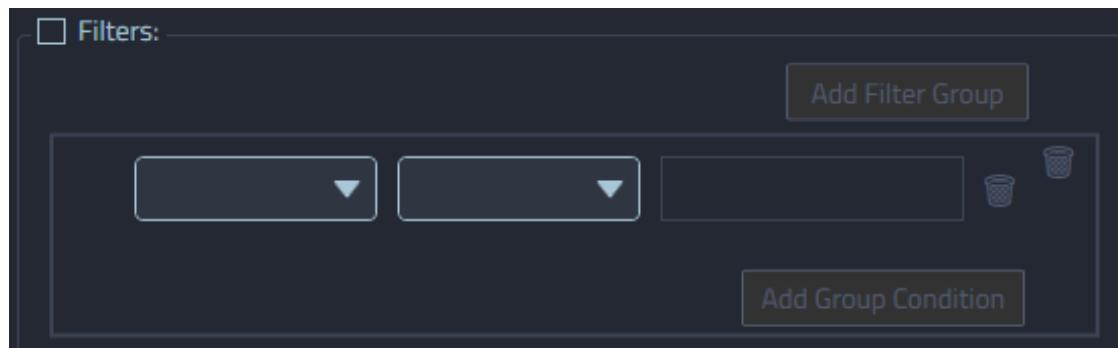
The source selector is very powerful, it allows you to use the CPB in multiple ways. The default setting in this menu is **Changes Only**. While the primary purpose of the CPB is to allow you to quickly and easily adjust entity simulation parameters, the source can also be selected to apply to the entire loaded cache (**Full Cache**). This can be useful when making a large batch of changes to classes by means of spreadsheet editing.

Alternatively, it can be used to take a quick inventory of specific assets with selected special parameters. For example, assembling a list of all the weapon classes that use a specific magazine type.

12.7.2.2 Export Filtering

With the source determined, you can then further restrict what the export file actually contains. If you wish to export the entire source, uncheck the filters, and proceed with the **Export** buttons.

Should you wish to only export certain parts of the cache, or your pending changes, activate the **Filters** section and begin setting up your filter conditions. Filters in the CPB work in groups. Each can contain multiple conditions.



Each filter group is considered as an "or" condition during export, meaning that you can target multiple specific areas with separate filter groups.

Each filter condition inside a group is considered as an "and" condition, meaning that in order for the group to allow an entry through the filter, all filter conditions must be met inside the group.

Example: A filter set up to only export the `count` parameter values for items that contain either `stanag` or `ak74` would be constructed as follows:

The screenshot shows the 'Filters' section of the VBS4 Config Patch Builder. It displays two filter groups. Each group consists of three fields: 'Class Name' dropdown, 'Contains' dropdown, and a text input field. There are also 'Parameter Name' dropdowns and 'Is Equal To' dropdowns next to the text inputs. Each group has a delete icon to its right. Below each group is a purple 'Add Group Condition' button. At the top right of the filters section is a purple 'Add Filter Group' button.

Class Name	Contains	stanag
Parameter Name	Is Equal To	count

Class Name	Contains	ak74
Parameter Name	Is Equal To	count

You can read the filter conditions shown here as follows.

Only export:

- Where the Class Name contains `stanag`.
- And, it must also match where:
 - The Parameter Name is equal to `count`.

Or:

- Where the Class Name contains `ak74`.
- And, it must also match where:
 - The Parameter Name is equal to `count`.

This filter, when used to export to `.csv`, results in a `.csv` file that lists all magazines with their `count` parameters, and corresponding values, in the following syntax:

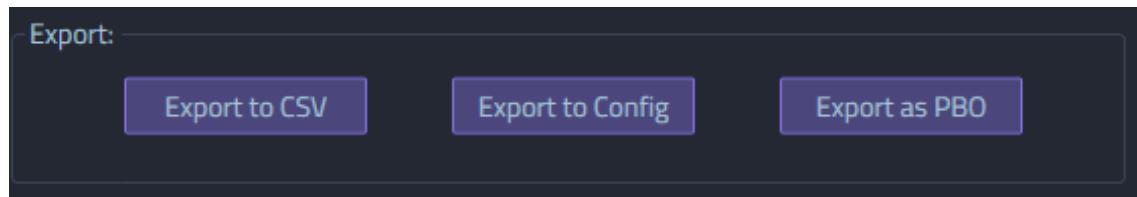
```
,ConfigFile >> CfgMagazines >> vbs2_mag_30rnd_545x39_Ball_ak74,count,30  
,ConfigFile >> CfgMagazines >> vbs2_mag_30rnd_545x39_Trace_ak74,count,30
```

This filter (when used to export to configuration or as a `.pbo`) results in a patch file that only updates the filtered magazines with the `count` value. Here it makes sense to enable **Include Pending Changes**, or to select **Changes Only**, since there is no need to change the original magazine values to remain at their original values using a patch file.

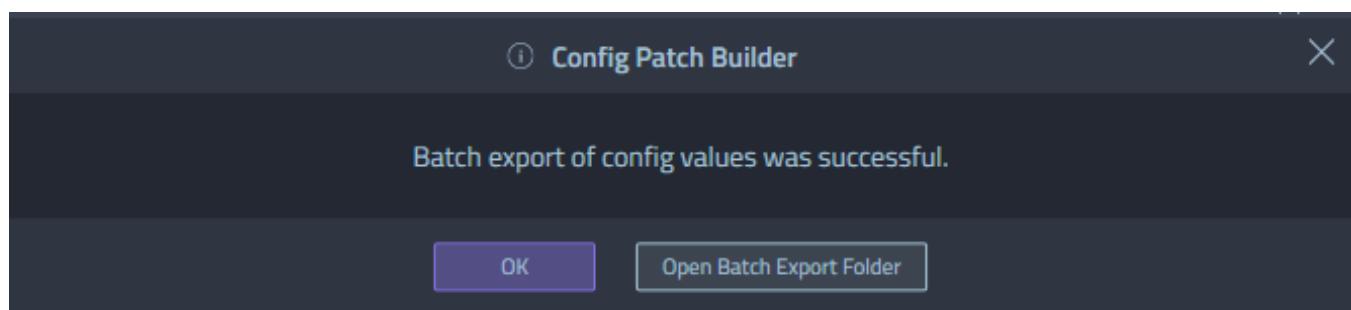
12.7.2.3 Export Modes

The CPB offers three separate export modes:

Export Mode	Description
Export to CSV	Generates a spreadsheet of your exported data.
Export to Config	Generates a <code>config.cpp</code> file that is able to apply your changes to VBS.
Export to PBO	Same as above, but with automatic <code>.pbo</code> packing and saving to VBS (this option requires you to set your VBS installation directory in the CPB settings).



Once completed, a message informs you of successful export. A shortcut button (**Open Batch Export Folder**) lets you directly navigate to the output folder.



12.7.2.4 CSV Export Syntax

The syntax follows a very simple **.csv** (Comma Separated Value) table syntax. The first line declares the cell types, with every other line being data that is to be imported and interpreted.

Syntax	Description
Entry Type	Controls whether the imported entry is a name-value pair (parameter), or imported as a class. When importing a name-value pair, this cell is left empty. For class name-base class pairs this cell contains the letter C .
Config Path	Controls the location of the name-value pair or class name to be created.
Name	Controls the name of the parameter or class to be added.
Value	Controls the value of the parameter to be added, or the name of the base class for a class addition.



EXAMPLE

```
EntryType,ConfigPath,Name,Value
,configFile >> CfgVehicles >>
vbs_nl_army_boxer_engineer_wdl_gmg_x,transportSoldier,8
,configFile >> CfgVehicles >>
vbs_nl_army_boxer_engineer_wdl_gmg_x,NewArray,{item1,item2,item3}
C,configFile >> CfgVehicles >>
vbs_nl_army_boxer_engineer_wdl_gmg_x , newClassWithoutBase,
C,configFile >> CfgVehicles >>
vbs_nl_army_boxer_engineer_wdl_gmg_x , newEventhandlers,configFile >>
CfgVehicles>>vbs_nl_army_boxer_engineer_wdl_gmg_x>>eventhandlers
,configFile >> CfgVehicles >>
vbs_nl_army_boxer_engineer_wdl_gmg_x >> newEventhandlers,newEntry,123
```

12.8 CPB Example - M1A1 Tank

Perform the following task. For the US Army Tracked - Desert M1A1 tank, make three changes:

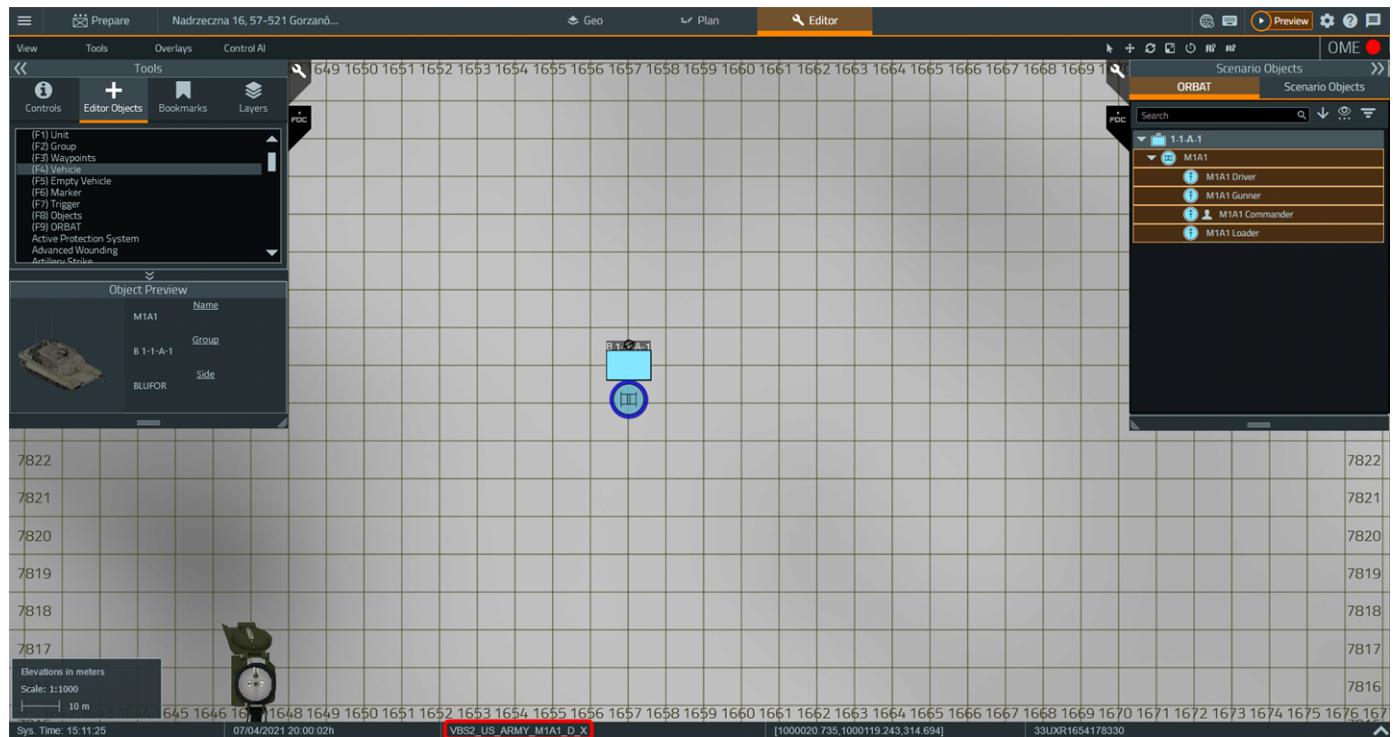
- Increase `enginePower`.
- Modify the `hiddenSelections` array values to contain an extra item.
- Introduce a new class called `newClassName`, with a base class using `turrets`.

First, you need to know the configuration class name of the asset that you wish to modify. If you are familiar with the asset, you probably have the class name readily available. If you are unsure about the exact asset class name, you can use the VBS Editor to help you find it.

Follow these steps:

1. Launch a Battlespace.
2. Enter the **VBS Editor**.
3. Place the **asset** you wish to edit (in this case, **US Army Tracked - Desert M1A1 tank**).
4. Select the **asset**.

In the bottom bar of the VBS Editor interface, you see the class name displayed. The selected asset is an M1A1 tank, with the class name `VBS2_US_ARMY_M1A1_D_X`.



TIP

Generally, all interactable assets such as vehicles, objects, houses, and characters fall into the **CfgVehicles** class configuration domain.

Weapon classes are part of **CfgWeapons**. Magazine classes are part of **CfgMagazines**. Ammunition classes are part of **CfgAmmo**.

12.8.1 Loading a Config Cache

The CPB functions using the VBS internally generated config cache. This is automatically created and updated every time you launch VBS.

Follow these steps:

1. Launch the CPB and click **Load Config**.

A blue rectangular button with a white border and rounded corners, containing the text "Load config" in white.

2. Navigate to the **cache** folder of your VBS4 installation, and select the **config.cache** file.

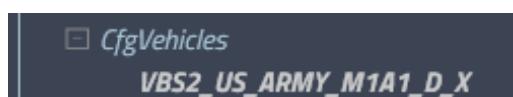
A dark grey rectangular box containing the text "\VBS4_Installation\cache\" in white.

12.8.2 Simple Search

Perform a simple search for the M1A1 tank.

Follow these steps:

1. In the **Config Class Tree** (on page 437), click **+** to unroll the **CfgVehicles** category, and wait for the caching to complete.
2. Enter the **class name** (or any part of it) into the **Filter** box at the top of the **Config Class Tree** (on page 437) window.
3. From there, select the correct class name in the list.

A screenshot of the Config Class Tree window. It shows a tree view with a single expanded node labeled "CfgVehicles". Below it, a list contains one item: "VBS2_US_ARMY_M1A1_D_X".

12.8.3 Manual Address Finding

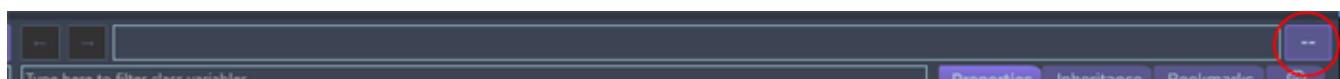
As an alternative to just browsing for the class, you can also enter an exact configuration path, and have the CPB resolve and load the class immediately.

Follow these steps:

1. Ensure that you have the manual address bar enabled (do this by clicking the **Edit** button at the top-right of the CPB interface).



It changes into a button showing --.



2. In the address bar, type:

```
configFile >> CfgVehicles >> VBS2_US_ARMY_M1A1_D_X
```

3. Press **Enter** to navigate directly to the entry.

i NOTE

The address bar also lets you copy SQF-formatted configuration paths that include quotation marks. Both of the following are valid inputs, and are accepted by the address bar.

```
configFile >> CfgVehicles >> VBS2_US_ARMY_M1A1_D_X  
configFile >> "CfgVehicles" >> "VBS2_US_ARMY_M1A1_D_X"
```

This simplifies working with SQF configuration paths and CPB.

12.8.4 Editing Values

With a class brought up in the [Config Main View \(on page 437\)](#) window, you can inspect its entire configuration class, including every inherited parameter.

If you want to make a vehicle engine more powerful, for example, you can either find the exact parameter name you are looking for, or use the search bar at the top of the [Config Main View \(on page 437\)](#) window.

Filtering for `engine` results in the following view. The parameter relevant for your intended change is the first one, `enginePower`.

The screenshot shows the 'Config Main View' window with the path 'configFile >> CfgVehicles >> VBS2_US_ARMY_M1A1_D_X'. The 'engine' class is selected. A table lists various engine parameters with their current values, types, and levels.

Name	Value	Type	Level
enginePower	1100	number	3
engineLosses	87	number	3
soundEngine	{\vbs2\vehicles\Land\Tracked\generaldy}	array	3
engineBrakeCoef	0.1	number	6
memoryPointsLeftEngineEffect		string	8
memoryPointsRightEngineEffect		string	8
leftEngineEffect	vbs2_fx_empty	string	8
rightEngineEffect	vbs2_fx_empty	string	8
engineer	0	number	10
soundEngineOnInt	{1,1}	array	10
soundEngineOffInt	{1,1}	array	10
soundEngineOnExt	{1,1}	array	10
soundEngineOffExt	{1,1}	array	10

Double-click the current value (1100), and change it to 2200. Your change is added to the [Pending Changes \(on page 437\)](#) window.

The screenshot shows the 'Pending Changes' window with one entry listed: 'enginePower = 2200'. The window includes buttons for 'Batch import', 'Add entry', and 'Export'.

Pending Changes
<input checked="" type="checkbox"/> configFile >> CfgVehicles >> VBS2_US_ARMY_M1A1_D_X enginePower = 2200

TIP

Every change you make to the entire configuration cache is listed in the [Pending Changes \(on page 437\)](#) window. You can click on entries here to quickly jump between them in order to bring up a specific class in the [Config Main View \(on page 437\)](#) window.

12.8.5 Deleting Pending Changes

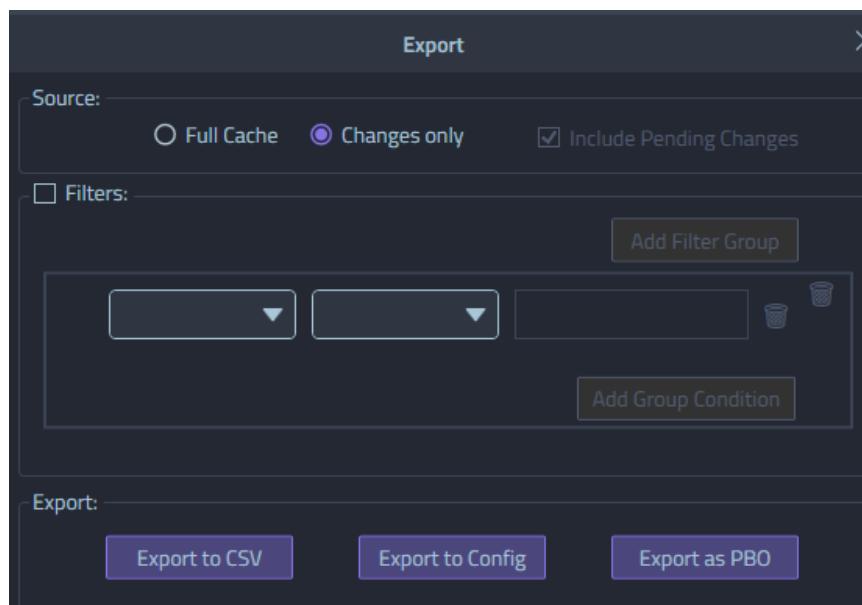
To delete a pending change, click the item in the [Pending Changes \(on page 437\)](#), and press **Delete** on your keyboard.

12.8.6 Export Changes

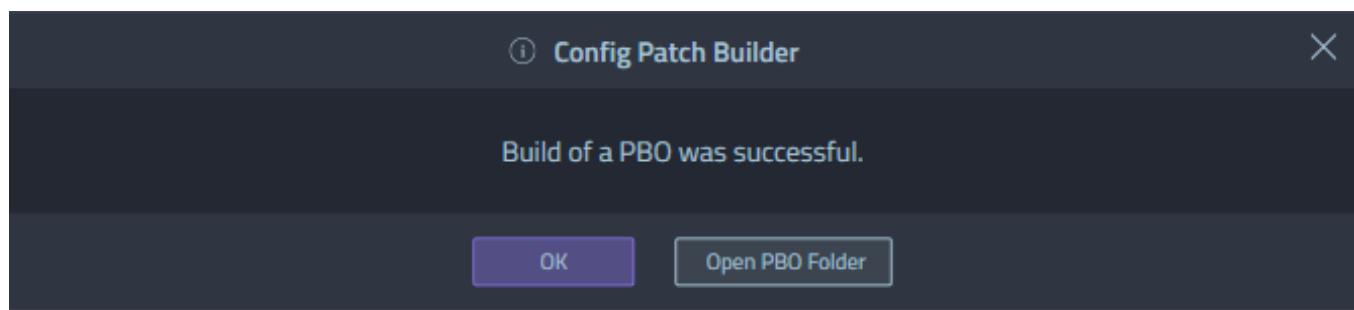
Once you have all of your configuration changes completed, you are ready to generate a patch file.

Follow these steps:

1. Click **Export**.
2. Select **Changes Only**.
3. Do not activate any filter.
4. Select **Export as PBO**.



This generates a time stamped folder that contains the configuration patch with your changes. It also automatically creates a **.pbo** file and saves it to your VBS4 installation, so that it is loaded the next time you start VBS.



Launch VBS4 to test the changes you made.

NOTE

Follow these steps:

1. Copy the generated **.pbo** file to:

```
\VBS4_Installation\myData\Blue\content\
```

This installs the patch for VBS4.

2. If VBS4 is currently running, restart it to refresh the config cache, and have the new changes from the file activate.

The CPB automatically generates patch files with a timestamp. While this avoids duplicate folders and files, it can lead to confusing file management.

To remedy this problem, you can rename the **.pbo** file from:

```
configpatch_20230821110615.pbo
```

To:

```
configpatch_m1a1engines.pbo
```

The name of the **.pbo** file is irrelevant for VBS to function. It is merely there to help you to organize your files efficiently.

12.8.7 Update the M1A1 Tank Using CSV

For more advanced users, you can save time and do the anticipated changes entirely using **.csv** files.

As a reminder, you intend to make the following changes:

- Increase **enginePower**.
- Modify the **hiddenSelections** array values to contain an extra item.
- Introduce a new class called **newClassName**, with a base class using **turrets**.

Constructing these changes using **.csv** requires the following file:

```
EntryType,ConfigPath,Name,Value
,ConfigFile >> CfgVehicles >>
VBS2_US_ARMY_M1A1_D_X,enginePower,2200
,ConfigFile >> CfgVehicles >>
VBS2_US_ARMY_M1A1_D_X,hiddenSelections,{swap_ext,swap_sprocket,thirdNewItem}
,CConfigFile >> CfgVehicles >>
```

```
VBS2_US_ARMY_M1A1_D_X,newClassName,ConfigFile >> CfgVehicles >>  
VBS2_US_ARMY_M1A1_D_X >> turrets
```

Follow these steps:

1. Create this file and call it **m1a1update.csv**, and save it to a location where you wish to keep your configuration patch **.csv** files (it is recommended to keep these files separate from the autogenerated **.csv** files that CPB can export).
2. Launch the CPB, and click **Batch Import**.

Batch import

3. Navigate to the location of your **.csv** files and select **m1a1update.csv**.

The changes are applied, and listed in the [Pending Changes \(on page 437\)](#) window.