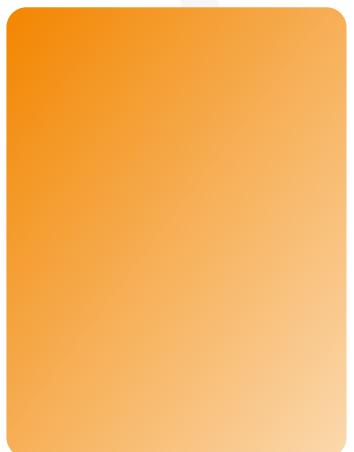


VBS Gateway

The screenshot shows the VBS Gateway application window. At the top, there are tabs for Active Entities, Mappings, Settings, and Log. Below the tabs, there are several categories with counts: Unmapped (0), Life Form (2), Ground (0), Air (0), Marine (0), Munitions (0), and Other (2). Buttons for 'Set all ON' and 'Set all OFF' are available for the Other category. A summary section shows 'Total entities' (2) with counts for Local (1) and Remote (1). On the right side of the header, there are icons for STATUS OFF, CGI, D5, RPR1, and RPR2. The main content area displays a table of entities with columns for Type, Ownership, Fuzzy, Remote Category, Remote Type, VBS Type, URN, Location, Speed (m/s), Altitude ASL (m), Damage (%), and Side. Two entries are listed:

Type	Ownership	Fuzzy	Remote Category	Remote Type	VBS Type	URN	Location	Speed (m/s)	Altitude ASL (m)	Damage (%)	Side
Group	Local	Original	5029	3 1 25 13 80 0.0	vbs2_us_af_fighter_pilot_d_beretta9	999978.69;1000025.19	0.00 ms ⁻¹	32.86 m	0.00	Friendly	
Group	Remote	D5_3_1_14123_28246_1	Original	5029	vbs2_us_af_fighter_pilot_w_beretta9	1000038.46;999937.19	0.00 ms ⁻¹	32.86 m	0.00	Friendly	

At the bottom, there is a search bar and a page navigation section showing 1 of 1 per page 10.



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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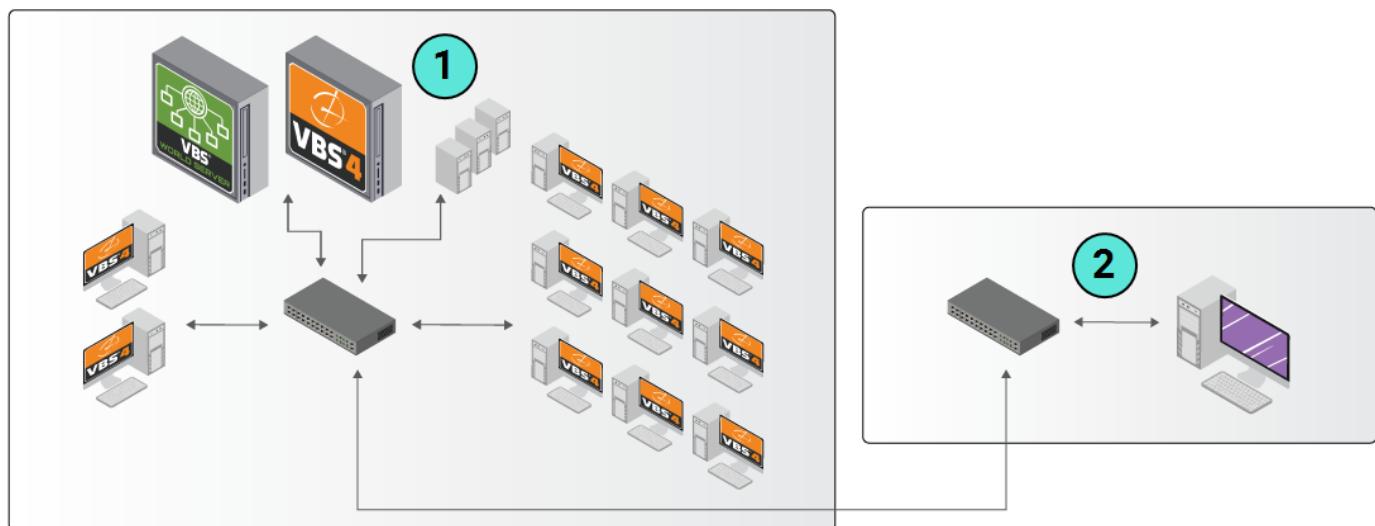
1. VBS Gateway Overview

VBS Gateway is the premier gateway for VBS4. VBS Gateway provides a DIS / HLA link between VBS4 and other simulations for distributed training exercises. VBS Gateway comes as standard with VBS4 and automatically connects to other VBS Gateway clients out of the box with no configuration changes.

VBS Gateway brings live loading, user-friendly configuration capabilities, a real-time user interface, and significant performance enhancements as the new VBS4 gateway system.

- Live entity editing.
- Higher frame rates for better visualization.
- User-friendly mapping of shared entities.
- Smoother transitions with dead reckoning.
- Filter and search functions with descriptive model names.
- Access to the UI through VBS4 or directly in a web browser.
- Actionable feedback for determining mapping errors.

Image-1: Simplified Gateway Network Diagrams for DIS and HLA Communications



- | | |
|---|-------------------------------------------------|
| 1 | Dedicated Server running VBS4 with VBS Gateway. |
| 2 | DIS / HLA-compliant simulation product. |

These topics in the VBS Gateway Manual provide the information required for the following roles:

Communications Administrator

The Communications Administrator is responsible for the setup, configuration, and monitoring of the communication between the linked simulation products and VBS4:

- [Configure VBS Gateway \(on page 30\)](#)
- [Communications Monitoring \(on page 82\)](#)

Simulation Administrator

The Simulation Administrator is responsible for the configuration, monitoring, and modification of the simulation object protocol models, ensuring that remote entities are represented appropriately in VBS4, and that VBS4 entities are communicated correctly to the other simulators:

- [Configure Simulation Modeling \(on page 56\)](#)
- [Simulation Monitoring \(on page 69\)](#)

The Simulation Administrator should review the [Mapping Tables \(on the next page\)](#) to understand how VBS Gateway maps local and remote entities.

All roles should refer to [Launching VBS Gateway \(on page 14\)](#) and [VBS Gateway UI \(on page 19\)](#) to perform their functions and may need to refer to [VBS Gateway Advanced Configuration \(on page 84\)](#) to configure advanced settings and to troubleshoot VBS Gateway.

VBS Gateway supports the following protocols:

- DIS v4-v7
- HLA FOMs including RPR1 and RPR2

NOTE

RTIs supports multiple HLA API versions (1.3, 1516, 1516e, and 1516-dlc), Java and C++, and several C++ compiler versions. Simulators can pick any combination while still being able to connect to each other.

VBS Gateway uses 1516e (HLA Evolved API).

VBS Gateway supports the following HLA Run Time Infrastructures (RTIs):

- MÄK RTI version 4.5

Compatible with MSVC 14.0 or 15.0

For more information, see <https://www.mak.com/mak-one/tools/mak-rti>.

- Pitch pRTI Free version 5.3.2.1

Compatible with MSVC 14.0 or 15.0

For more information, see <http://www.pitchtechnologies.com/products/perti/>.

2. Mapping Tables

VBS Gateway uses incoming and outgoing mapping tables to match enumerations to VBS4 models.

The screenshot shows the 'Mappings' tab selected in the VBS Gateway interface. The 'Outgoing' tab is active, displaying a table of mappings. The table columns include Type, Direction, Fuzzy, Remote Type, VBS Model, VBS Description, VBS Category, and a Filter column with an edit icon. There are four rows of mappings:

Type	Direction	Fuzzy	Remote Type	VBS Model	VBS Description	VBS Category	Filter
Vehicle	Incoming	Original	SISO 1.1.6.1.2.1.2	vbs_af_army_m1114_des_x	M1114 HMMWV	AF Army Wheeled - Desert	
Human	Incoming	Original	SISO 3.1.225.12.35.0.0	vbs2_us_mc_mgunner_w_m249_dim	Automatic Rifleman - M249 / Dim Trace	US USMC Woodland	
Vehicle	Outgoing	Original	SISO 1.1.6.1.2.1.2	vbs_af_army_m1114_des_x	M1114 HMMWV	AF Army Wheeled - Desert	
Human	Outgoing	Original	SISO 3.1.225.12.35.0.0	vbs_us_mc_machinegunner_des_m_medium_mtw_none_m249	Automatic Rifleman - M249	US USMC Desert	

Click the **Edit** icon for any row on the Mappings page to bring up the Mapping Dialog.



The screenshot shows the 'Mapping' dialog window. The 'Outgoing' tab is selected, displaying a table with one row. The 'Incoming' tab is also visible at the bottom.

VBS Type	VBS Model	VBS Description
Vehicle	vbs2_us_army_m224_static_w	Locally managed VBS entities using this model name will send the Outgoing Remote Type to connected simulations.

The 'Incoming' tab shows a message: "No Mapping".

The outgoing mappings enable you to map multiple VBS4 models to the same enumeration class for transmission to other simulation products.

The incoming mappings enable you to map multiple enumeration classes to the same VBS4 model for display in your instance of VBS4.

All mappings use the standard hierarchy of SISO enumeration categories for the DIS and HLA (RPR1 and RPR2) protocols to define the entity class:

- Kind
- Domain
- Country
- Category
- Subcategory
- Specific
- Extra

VBS Gateway predefines thousands of outgoing entity mappings from VBS4 object models. For more information and to modify mappings, see [Configure Simulation Modeling \(on page 56\)](#).

VBS Gateway enables the transfer of mapping tables between VBS Gateway instances. For more information, see [Export / Import Mapping Files \(on page 59\)](#).

VBS Gateway uses SISO-compliant enumerations by default. Import VBS to VBS version mappings if required. For more information, see [Export / Import Mapping Files \(on page 59\)](#).

VBS4 includes the following databases for import in:

`\VBS_Installation\Components\Gateway\`

- `VBS_to_SISO.dbo` - SISO-compliant enumerations for most models, with some duplicates as necessary (default database).
- `VBS_to_VBS_version.dbo` - A set of mappings for VBS4 models in the specified *version* that are not SISO-compliant.

2.1 Munitions Mappings

Many munitions exist in the simulation for a short amount of time. To make it possible to edit these munitions, the amount of time munitions remain displayed on the Active Entities page after destruction (through impact, detonation, or elapsed lifespan) can be set with the Munitions UI Lifetime option in the [GUI \(on page 32\)](#) part of the General Settings section of the [VBS Gateway UI \(on page 19\)](#). The default duration is 10 seconds.



TIP

Unique entities (one of each class, if multiple ones of the same class are present), including munitions, can also be tracked in the **Mission Mappings** category of the **Mappings** tab, even after the munitions cease to exist in the simulation. For more information, see [Mappings Page \(on page 22\)](#).

Munitions may also be mapped from the [Entity Details Dialog \(on page 79\)](#). The Munitions Mapping tab displays the munitions equipped by the unit.

Click the **Edit** icon to open the [Mapping Dialog \(on page 23\)](#) and edit incoming and outgoing mappings.



How munitions display varies by ammunition type and ownership:

- Local Mapped Ballistics are not tracked for location and speed, and are displayed in the Active Entities page for the set duration after destruction.
- Local Mapped Usable ammunition, such as grenades, is tracked until detonation and remains displayed for the set duration after detonation.
- Local Unmapped Usable ammunition and Ballistics behave the same as mapped Useable ammunition and Ballistics but display in the Unmapped section.
- Remote Mapped Ballistics are not tracked, and display in the Unmapped section instead of Munitions. They remain displayed for the set duration after destruction.
- Remote Mapped Usable ammunition is tracked until detonation and remains displayed for the set duration after detonation.

Remote unmapped entities do not appear in the simulation, by default. If the **Show Unknown Entities** setting is enabled (see [Configure General Settings \(on page 31\)](#)), unmapped remote munitions display as follows:

- Remote Unmapped Ballistics are not tracked, and display in the Unmapped section and remain displayed for the set duration after destruction.

- Remote Unmapped Usable ammunition is tracked until detonation and disappears from the Active Entities immediately upon destruction.

Munitions that detonate into smaller munitions, such as flechette rounds, are displayed normally. However, subsequent munitions spawned from the original are displayed as local, even if the parent is remote.

3. 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 to add `-gateway` to the Dedicated Server service. For more information, see the VBS World Server manual.

3.1 Scenario Preparation with VBS Gateway

Prior to running a combined simulation exercise, configure the VBS Gateway options (see [Configure VBS Gateway \(on page 30\)](#)), and Entity Mappings (see [Configure Simulation Modeling \(on page 56\)](#)) 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 in the VBS4 Administrator Manual.

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 \(on page 30\)](#) and [Configure Simulation Modeling \(on page 56\)](#).

3.2 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 \(on page 17\)](#)
- [Connection Multiple VBS4 Instances \(on page 18\)](#)

3.2.1 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 to add `-gateway` to the Dedicated Server service. For more information, see the VBS World Server manual.

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 \(on page 19\)](#).

3.2.2 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 \(on the next page\)](#).

3.2.3 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 \(on the next page\)](#).

4. VBS Gateway UI

Access VBS Gateway directly on the computer hosting the network mission, or on an Admin client connected to a Dedicated Server, using VBS Editor in Execute or Assess Mode.

Expand the **Tools** menu and select either:

- **Show Gateway GUI in VBS**
- **Show Gateway GUI in Browser**

WARNING

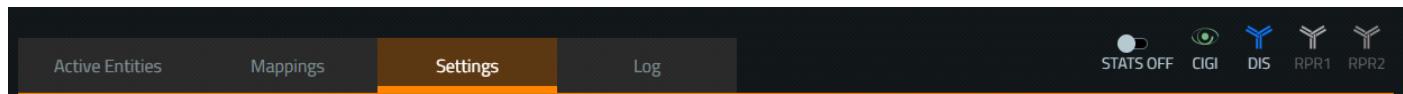
VBS Gateway supports Google Chrome, and should also work in Microsoft Edge and Mozilla Firefox.

NOTE

For a mission hosted on a Dedicated Server the option is:

- **Show server Gateway GUI in Browser**

Manage VBS Gateway and monitor the communications status through the header..



The header provides access to the following pages:

- [Active Entities Page \(on the next page\)](#)
- [Mappings Page \(on page 22\)](#)
- [Settings Page \(on page 28\)](#)
- [VBS Gateway Logging \(on page 87\)](#)

The Active Entities and Mappings pages both provide access to the [Mapping Dialog \(on page 23\)](#) to enable the creation and modification of model mappings.

The Active Entities and Mappings pages use table formats with [Content Sorting and Filtering \(on page 24\)](#) to enable the identification of specific content.

Communication Administrators use the header to monitor the communication status of this instance of VBS4.

VBS Gateway also outputs log messages to files and to a command line console. To configure that log output, see [VBS Gateway Logging \(on page 87\)](#).

In the event that communications are not functioning correctly, refer to [Configure VBS Gateway \(on page 30\)](#) or [Communications Monitoring \(on page 82\)](#) and review your configuration.

4.1 Active Entities Page

Click **Active Entities** in the header to open the Active Entities page, which displays the active simulation objects in the current session with the option to add new object mappings or to modify existing ones.

Type	Ownership	Fuzzy	Remote Category Remote Type	VBS Type	URN	Location	Speed (m·s ⁻¹)	Altitude ASL (m)	Damage (%)	Side	+ Filter
	Local	Original	SISO 3 1 225 13 80 0 0	vbs2_us_af_fighterpilot_d_berettam9 US USAF Desert - Fighter Pilot - Beretta M9	999978.69:1000025.19	0.00 m·s ⁻¹ 32.98 m	0.00	Friendly			
	Local	Original	SISO	vbs2_m1_abrams_mcr Objects - Accessories - MCR Mine Roller	1000047.13:999912.77	0.00 m·s ⁻¹ 33.08 m	0.00	Friendly			
	Remote DIS_1_3030_6059_2	Fuzzy	SISO Fuzzy: 1 2 225 2 4 1 0 (Original: 1 2 225 2 0 0 0)	vbs_us_af_a10a_gry_agm65_hydra_x US USAF Air - A-10A - GAU-8 - Hydra - AGM-65	1000031.28:999921.10	0.00 m·s ⁻¹ 32.94 m	0.00	Friendly			
	Remote DIS_1_3030_6059_1	Original	SISO 3 1 225 13 80 0 0	vbs2_us_af_fighterpilot_w_berettam9 US USAF Woodland - Fighter Pilot - Beretta M9	1000038.46:999937.19	0.00 m·s ⁻¹ 32.98 m	0.00	Friendly			
	Remote DIS_1_3030_6059_4	Fuzzy	SISO Fuzzy: 1 1 225 1 1 1 1 0 (Original: 1 1 225 1 0 0 0)	vbs2_us_army_m1a2_d_mcr_x US Army Tracked - Desert - M1A2 - MCR	1000043.70:999909.89	0.00 m·s ⁻¹ 33.00 m	0.00	Friendly			
	Remote DIS_1_3030_6059_3	Fuzzy	SISO Fuzzy: 3 1 1 1 1 3 0 0 0 (Original: 3 1 1 1 1 0 0 0)	vbs2_af_ana_grenadier_w_m16_m203 AF Army - Woodland - Grenadier - M16/M203	1000019.52:999931.38	0.00 m·s ⁻¹ 32.99 m	0.00	Friendly			

For the information on what is displayed in the Active Entities table, see [Active Entities Sorting and Filtering \(on page 24\)](#).

Simulation Administrators use the Active Entities page to monitor the active simulation objects, and to create and modify mappings as required in the [Mapping Dialog \(on page 23\)](#).

For more information, see [Simulation Monitoring \(on page 69\)](#).

4.1.1 Unit Details Panel

Highlight any entity on the Active Entities page and click the **Details** icon to see more information about the attributes and of that entity. The Munitions Mapping tab enables you to review and modify the mappings for the munitions equipped by the unit.



vbs2_us_army_rifleman_ocp_m_medium_iotv_none_m4cco X

Object Attributes	Munitions Mapping
ID:	[4 : 712]
URN:	
Side:	Friendly
Controller:	Local AI
Speed:	0.00 ms ⁻¹
Heading:	34.41 °
Latitude:	999670.3594935486
Longitude:	1000028.887380488
Stance:	None
Primary Weapon Posture:	None
Secondary Weapon Posture:	None
Damage:	0.00 %

For more information, see [Entity Details Dialog \(on page 79\)](#).

4.2 Mappings Page

Click **Mappings** to open the Mappings page, which displays the object mapping configurations for all known simulation objects.

Type	Direction	Fuzzy	Remote Type	VBS Model	VBS Description	VBS Category	Filter
	Incoming	Original	SISO 1 1 1 6 1 2 1 2	vbs_af_army_m1114_des_x	M1114 HMMWV	AF Army Wheeled - Desert	
	Incoming	Original	SISO 3 1 2 2 5 1 2 3 9 0 0	vbs2_us_mc_gunner_w_m249_dim	Automatic Rifleman - M249 / Dim Trace	US USMC Woodland	
	Outgoing	Original	SISO 1 1 1 6 1 2 1 2	vbs_af_army_m1114_des_x	M1114 HMMWV	AF Army Wheeled - Desert	
	Outgoing	Original	SISO 3 1 2 2 5 1 2 3 9 0 0	vbs_us_mc_machinegunner_des_m_medium_mbw_none_m249	Automatic Rifleman - M249	US USMC Desert	

The Mappings page displays **Incoming Unmapped**, **Outgoing Unmapped**, **Outgoing**, **Incoming** and **Mission Mappings** entity mappings:

- **Incoming Unmapped** entities are remote entities that are missing a VBS model assignment.
- **Outgoing Unmapped** entities are local entities that are missing either a Remote Type / Remote Type (Fuzzy) model assignment.
- **Outgoing** entities are local and managed by your VBS4 instance.
- **Incoming** entities are remote and managed by another VBS4 instance or simulation product.

Mission Mappings entities are all the unique entities (one of each class, if multiple ones of the same class are present) that have appeared so far in the simulation, during mission execution.

After a certain amount of time, entities that physically appear in the simulation then disappear (this happens for active entities, tracked on the [Active Entities Page \(on page 20\)](#)). However, they are also logged as **Mission Mappings** and can be tracked, even after they cease to exist in the simulation.

TIP

Use **Mission Mappings** to track munitions, which physically exist in the simulation for a very short amount of time. For more information, see [Munitions Mappings \(on page 12\)](#).

For information on what is displayed in the Mappings table, see [Mappings Sorting and Filtering \(on page 26\)](#).

The default number of entities shown per page is 10, this number can be changed with the **per page** dialog box at the bottom of the page.

Simulation Administrators use the Mappings page to access the [Mapping Dialog \(below\)](#) and create initial object mappings for incoming and outgoing simulation objects prior to combined simulation exercises.

For more information, see [Configure Simulation Modeling \(on page 56\)](#).

In addition, Simulation Administrators can update the VBS Gateway database and mappings with external content:

- Update the VBS Gateway database with the content of the running VBS4 instance with the **Scan Content** and **Scan Configs** functions.

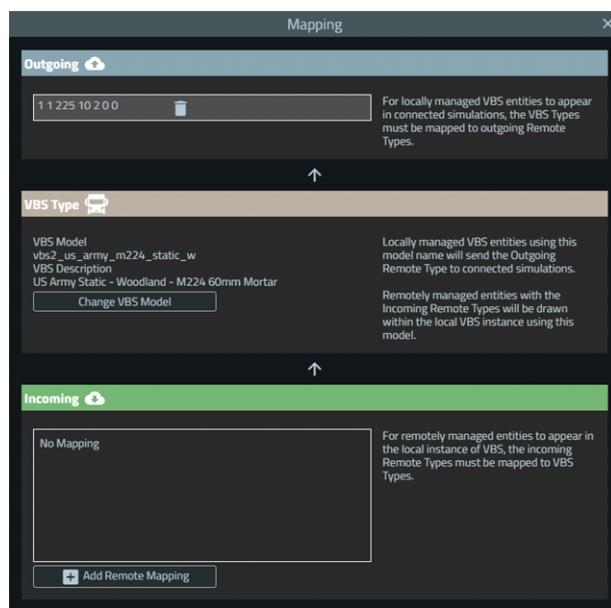
For more information, see [Import VBS4 Entities \(on page 57\)](#).

- Mappings can also be shared between LVC format and VBS Gateway instances using the **Export** and **Import Mappings** functions.

For more information, see [Export / Import Mapping Files \(on page 59\)](#).

4.2.1 Mapping Dialog

The Mappings Dialog is the central point for all model mapping creation and editing.



The page enables both incoming mappings to and outgoing mappings from a VBS4 model.

Simulation Administrators access the Modify Mappings page to make any changes to model mappings.

For more information, see [Configure Simulation Modeling \(on page 56\)](#) and [Simulation Monitoring \(on page 69\)](#).

4.3 Content Sorting and Filtering

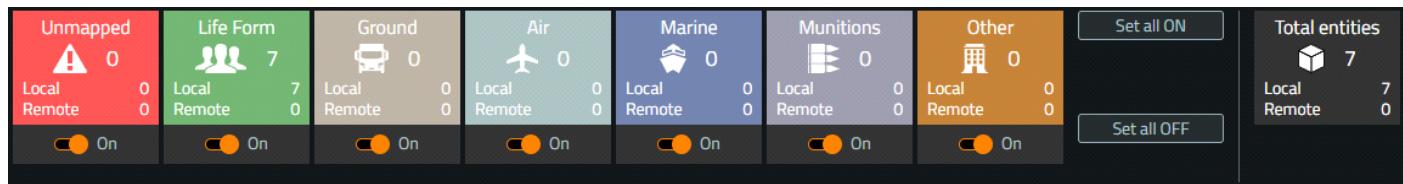
The Active Entities and Mappings pages and most input panels use column sorting and filters to enable the identification of specific content.

The Entity Category buttons on the Active Entities and Mappings page enable you to filter the table to display only the selected entity or mapping types, as well as displaying how many entities of that type are currently active.

- [Active Entities Sorting and Filtering \(below\)](#)
- [Mappings Sorting and Filtering \(on page 26\)](#)

4.3.1 Active Entities Sorting and Filtering

The Entity Category buttons for the Active Entities page are:



All entity-information columns enable either alphabetic or numeric sorting by clicking column heading.

Click **+ Filter** to display column filters.

Type	Ownership	Fuzzy	Remote Category Remote Type	VBS Type	URN	Location	Speed (ms ⁻¹) Altitude ASL (m)	Damage (%)	Side	+ Filter
										Apply

All entity-information columns use filters that vary according to the type of content:

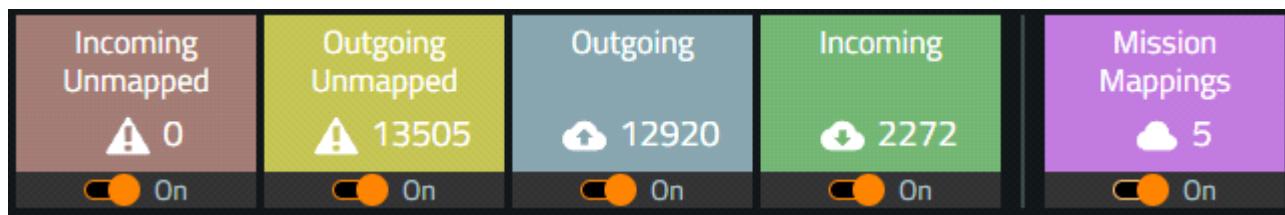
- Category columns such as **Type**, **Ownership**, **Fuzzy**, and **Side** use category selection filters.
- String columns such as **VBS Type** and **Remote Category / Remote Type** use dynamic search input filters.
- Numeric columns such as **Location** and **Speed** use Min and Max input filters.

Column	Description
Type	Entity type. Can be: <ul style="list-style-type: none"> • No Filter (no entity type filter is applied) • Unmapped • Life Form • Ground • Air • Marine • Munitions • Other

Column	Description
Ownership	Entity ownership. Indicates if the entity is local or remote. Also, shows the script reference name for the entity, if one exists. The script reference name can be used to identify the entity for script calls. For remote entities, script reference names are automatically generated based on the adapter and source application.
	<p> EXAMPLE</p> <p>DIS_1_152_303_17. The script reference name for local and remote entities can be edited from the Entity Details dialog (see Entity Details Dialog (on page 79)) and in Execute mode for local entities.</p>
	Can be: <ul style="list-style-type: none"> • No Filter (no entity-ownership filter applied) • Local (the entity is local and managed by the local VBS4 instance) • Remote (the entity is remote and managed by either a remote VBS4 instance or another simulation product)
Fuzzy	Shows Original for original mappings, and Fuzzy for fuzzy / closest match ones (for more information, see Fuzzy Mapping (on page 36)). Can be: <ul style="list-style-type: none"> • No Filter (no mapping filter is applied) • Fuzzy (fuzzy mapping is applied) • Original (exact mapping is applied)
Remote Category / Type	Specifies the standard and enumeration for this entity. Fuzzy mappings (see Fuzzy Mapping (on page 36)) appear in bold.
VBS Type	VBS class name of the entity.
URN	Marking set for this entity. This is displayed on the side vehicles, in the editor, and on remote servers. This field is blank if no URN has been set for an entity.
Location	Current map coordinates of the entity. The units used are internal to VBS4.
Speed / Altitude	The first number indicates current speed of the entity in meters per second. The second number indicates the current altitude in meters.
Damage	Percentage of maximum damage the entity has taken.
Side	Side the entity belongs to. Can be: <ul style="list-style-type: none"> • No Filter (no side filter is applied) • Opposing (OPFOR side only) • Friendly (BLUFOR side only) • Neutral (neutral side only) • Other (any other side)

4.3.2 Mappings Sorting and Filtering

The Entity Category buttons for the Mappings page are:



All entity-information columns enable either alphabetic or numeric sorting by clicking column heading.

Click **+ Filter** to display column filters.



All entity-information columns use filters that vary according to the type of content:

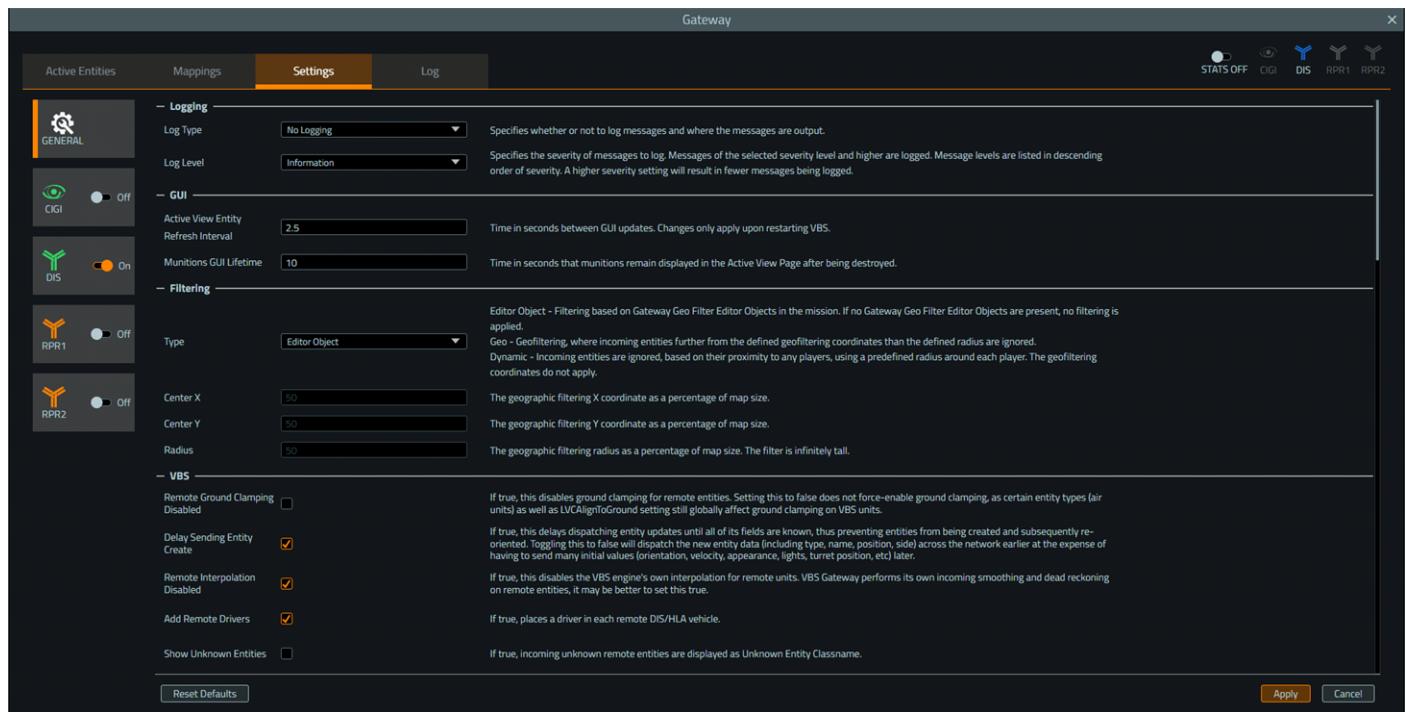
- Category columns such as **Type**, **Direction**, and **Fuzzy** use category selection filters.
- String columns such as **Remote Type**, **VBS Model**, **VBS Description**, and **VBS Category** use dynamic search input filters.

Column	Description
Type	Entity type. Can be: <ul style="list-style-type: none"> • No Filter (no entity type filter is applied) • Unmapped • Life Form • Ground • Air • Marine • Munitions • Other
Direction	Entity transmission direction. Can be: <ul style="list-style-type: none"> • No Filter (no transmission-direction filter is applied) • Outgoing (the entity is sent from the local VBS4 instance) • Incoming (the entity is remote and is received from either a remote VBS4 instance or another simulation product) • Outgoing Unmapped (the entity is unmapped and sent from the local VBS4 instance) • Incoming Unmapped (the entity is remote, unmapped, and received from either a remote VBS4 instance or another simulation product)

Column	Description
Fuzzy	Original / fuzzy match used in entity mapping (see Fuzzy Mapping (on page 36)). Can be: <ul style="list-style-type: none">• No Filter (no original / fuzzy mapping filter is applied)• Fuzzy (fuzzy mapping is applied)• Original (original mapping is applied)
Remote Type	Shows the script reference name (if one exists) for the entity on the remote VBS4 instance or other simulation product. The script reference name can be used to identify the entity for script calls. For remote entities, script reference names are automatically generated based on the adapter and source application.
<div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> EXAMPLE<p>DIS_1_152_303_17. The script reference name for local and remote entities can be edited from the Entity Details dialog (see Entity Details Dialog (on page 79)) and in Execute mode for local entities.</p></div>	
VBS Model	VBS class name of the entity.
VBS Description	VBS description of the entity (the name of the entity, as it appears in various parts of the VBS4 UI - for example, see Adding Units and Adding Vehicles in the VBS4 Editor Manual).
VBS Category	VBS category (one level above VBS Description) of the entity (the category of the entity, as it appears in various parts of the VBS4 UI - for example, see Adding Units and Adding Vehicles in the VBS4 Editor Manual).

4.4 Settings Page

Click **Settings** in the header to open the Settings page, which displays the adapter configurations and simulation entity behavior settings.



- Communications Administrators use Settings to modify communications protocol settings. For more information, see [Communications Monitoring \(on page 82\)](#).
- Simulation Administrators use Settings to modify simulation entity appearance settings. For more information, see [Modify the Simulation Settings \(on page 78\)](#).

4.5 External Entities in VBS4

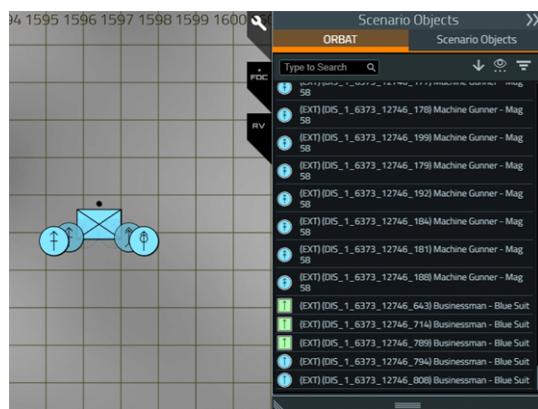
When VBS4 operates as part of a combined simulation, there are additional entities present in VBS4 that are controlled by the other simulation products.

To highlight these external entities in the RTE, their appearance is different:

- In the 2D view, interoperable entities use a lighter color than the equivalent VBS4 entity.
- In the Object Tree, their names contain an (**EXT**) prefix.

NOTE

VBS4 controlled units cannot enter externally controlled vehicles.



5. Configure VBS Gateway

The Communications Administrator configures VBS Gateway for DIS and HLA communication with other simulation products.

Follow these steps:

1. Start VBS4 with VBS Gateway enabled. See [Launching VBS Gateway \(on page 14\)](#).
2. Open the VBS Gateway user interface.
3. Click **Settings** in the header to open the [Settings Page \(on page 28\)](#).
4. Use the buttons on the left to view the applicable settings or to enable or disable the adapter.
 - [Configure General Settings \(on the next page\)](#)
 - [Configure DIS Adapter \(on page 40\)](#)
 - [Configure RPR1 and RPR2 Adapters \(on page 46\)](#)
5. Click **Apply** to use the new values and set those values in the VBS Gateway configuration file.

VBS Gateway is ready to use.

Before you start your network mission, you should verify that the shared entities for your exercise are mapped.

For more information, see [Configure Simulation Modeling \(on page 56\)](#).

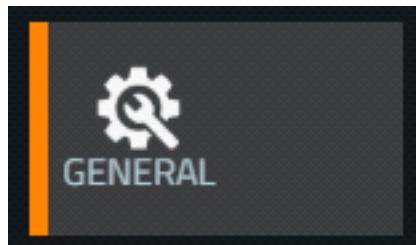
When you start your network mission, VBS Gateway transmits and receives messages with other simulation clients in the same network and exercise and updates the VBS Gateway User Interface displaying information about the shared simulation entities.

If your exercise requires use of MÄK RTI, see [Install and Configure MÄK RTI \(on page 52\)](#).

If your exercise requires use of Pitch RTI , see [Install and Configure Pitch pRTI \(on page 54\)](#).

5.1 Configure General Settings

Click **General** to configure VBS Gateway UI and Log settings and the behavior of models.



The General settings are split into the following sections:

- [Logging \(on the next page\)](#)
- [GUI \(on the next page\)](#)
- [Filtering \(on page 33\)](#)
- [VBS \(on page 34\)](#)
- [Fuzzy Mapping \(on page 36\)](#)
- [Dead Reckoning - Outgoing \(on page 37\)](#)
- [Dead Reckoning - Incoming \(on page 39\)](#)

After making any settings changes, click **Apply**.

5.1.1 Logging

Edit the **Logging** settings to control logging behavior.

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 (on page 88).</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. The levels of message severity are as follows:</p> <ul style="list-style-type: none">• Critical• Error• Warning• Information• Debug

5.1.2 GUI

Edit the **GUI** settings to modify how information is displayed on the Active Entities page.

GUI Settings	Description
Active View Entity Refresh Interval	<p>Time in seconds between GUI updates. Changes only apply after restarting VBS4. The value should be set between 0.1 - 10 seconds. If the value is set outside the range, after VBS restarts, the value resets to the default of 2.5 seconds.</p>
Munitions GUI Lifetime	<p>Time in seconds that munitions remain displayed in the Active View Page after being destroyed. The value should be set between 0 - 86400 seconds. If the value is set outside the range, after VBS restarts, the value resets to the default of 10 seconds.</p>

5.1.3 Filtering

Edit the **Filtering** settings to specify the region within which to process and render incoming entities in VBS4. When specified, any incoming entities outside of the set filtering range are ignored.

Geofiltering is supported as a circular region around a fixed point. X,Y determines where on the map to place the center.

Dynamic filtering uses fixed radii around each player.

NOTE

The Filtering settings only apply to combined simulation scenarios using DIS and HLA.

Filtering Settings	Description
Type	<p>Select the filtering type:</p> <ul style="list-style-type: none">• Editor Object - Geofiltering with the Gateway Geo Filter Editor Object. Use this filtering type, if you want to designate areas on the map to filter specific entities, based on their type. For more information, see Configure Gateway Geofiltering (on page 49). <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><p>NOTE</p><p>It is currently not possible to use the Gateway Geo Filter Editor Object with HLA (RPR2 adapter).</p></div> <ul style="list-style-type: none">• Geo - Geofiltering, where incoming entities further from the defined geofiltering coordinates than the defined radius are ignored.• Dynamic - Incoming entities are ignored, based on their proximity to any players, using a predefined radius around each player. The geofiltering coordinates do not apply.
Center X	<p>Geo only: The X-coordinate for geofiltering as a percentage of the map size. For example, 25 is the X-coordinate 25% of the way across the map from West to East.</p>
Center Y	<p>Geo only: The Y-coordinate for geofiltering as a percentage of the map size. For example, 25 is the Y-coordinate 25% of the way up the map from South to North.</p>
Radius	<p>The filtering radius in meters. The filter does not take the Z-coordinate into account.</p>

5.1.4 VBS

Edit the **VBS** settings to modify the behavior of remote entities in VBS4, and Gateway connectivity.

VBS Settings	Description
Remote Ground Clamping Disabled	Select to disable ground clamping for remote entities. Deselecting this does not force-enable ground clamping, as certain entity types (air units) as well as the LVCAAlignToGround setting still globally affect ground clamping on VBS4 units.
Delay Sending Entity Create	Select to delay dispatching entity updates until all its fields are known, thus preventing entities from being created and subsequently re-oriented. Deselect to dispatch the new entity data (including type, name, position, side) across the network earlier at the expense of sending many initial values (orientation, velocity, appearance, lights, turret position, and so on) later.
Remote Interpolation Disabled	If enabled, this disables engine interpolation for remote units. VBS Gateway performs its own incoming smoothing and dead reckoning on remote entities, the preferred value is 1 - true.
Add Remote Drivers	Select to place a visible driver in remote DIS / HLA vehicles.
<div style="border: 1px solid #0070C0; padding: 10px;"> i NOTE Other vehicle-crew members (including those units that enter the vehicle), besides the driver (if Add Remote Drivers is enabled), are not transmitted through VBS Gateway. </div>	
Show Unknown Entities	Select to display incoming unknown remote entities using the Unknown Entity Classname setting.
Unknown Entity Classname	The VBS4 model to use for unknown incoming entities. Only used if Show Unknown Entities is enabled. Defaults to <code>vbs2_visual_arrow_red</code> .
Broadcast Unknown Entity Types	Select to broadcast unmapped local entity types using the Unknown Entity Type setting.
Unknown Entity Type	The type enumeration to use for outgoing unmapped local entities.

VBS Settings	Description
Enable Connectivity on VBS Multiplayer Client	Select to enable Gateway DIS / HLA connectivity when running as a multiplayer client. By default, only servers / dedicated servers can use Gateway DIS / HLA connectivity.
	<div style="border: 2px solid red; padding: 10px;"><p> WARNING Enabling this may cause entity duplication if another client or the server is also running VBS Gateway within the same DIS exercise or HLA federation.</p></div>
Remote Entity Creation Time Limit Per Frame	Specifies the maximum time (in milliseconds) per frame allotted to create remote units in the local VBS4 instance.
	<div style="border: 2px solid red; padding: 10px;"><p> WARNING Setting this too high may severely impact frame rate when encountering large numbers of new units, but setting too low may result in noticeable delays before remote units become visible.</p></div>
Incoming Datum ID	Datum ID for VBS4 script commands received using SetData PDUs. Only variable datums with this ID are executed locally as script commands. See VBS Gateway Script Commands (on page 91) for more information.
Default Outgoing Datum ID	Datum ID for VBS4 script commands sent using SetData PDUs. This default ID is used when one is not provided by Gateway_SendCommand (on page 91) .
Filter Stance Zero	Select to disable the simulation of remote infantry with stance zero. Some simulations use stance zero for walking or crawling. Other simulations use stance zero for crew in vehicles. Those simulations are not compatible with each other.
Apply Center Offset	Select to enable the entity center to be offset, to match the DIS standard for the entity position sent through VBS Gateway.
Send Outgoing Animations	Select to enable the transmission of outgoing animation states for articulated vehicle parts.
	<div style="border: 2px solid #0070C0; padding: 10px;"><p> NOTE To configure which vehicle parts can be transmitted, see Configure Transmittable Vehicle Animations (on page 65).</p></div>
	<div style="border: 2px solid red; padding: 10px;"><p> WARNING Some complex entity animations are not transmitted over VBS Gateway and are not visible on other computers in the scenario.</p></div>

VBS Settings	Description
Receive Incoming Animations	<p>Select to enable the reception of incoming animation states for articulated vehicle parts.</p> <p>NOTE To configure which vehicle parts can be transmitted, see Configure Transmittable Vehicle Animations (on page 65).</p> <p>WARNING Some complex entity animations are not transmitted over VBS Gateway and are not visible on other computers in the scenario.</p>

5.1.5 Fuzzy Mapping

Edit the **Fuzzy Mapping** settings to allow incoming entities of various types to be mapped to the their closest matches.

VBS Gateway removes the Extra, Specific, and Subcategory fields from the unmatched enumeration, in that order, to find the closest match.

Entities matched through this method appear in the Fuzzy column, and in the bold and italics in the Remote Category / Remote Type column of the Active Entities page. If Fuzzy Mapping fails to find a match, the entity appears as Incoming Unmapped. For more information, see [Simulation Monitoring \(on page 69\)](#).

Fuzzy Mapping Settings	Description
Lifeform	If enabled, VBS Gateway attempts to find the closet matches for unmapped incoming lifeform entities.
Ground	If enabled, VBS Gateway attempts to find the closet matches for unmapped incoming ground entities.
Air	If enabled, VBS Gateway attempts to find the closet matches for unmapped incoming air entities.
Marine	If enabled, VBS Gateway attempts to find the closet matches for unmapped incoming marine entities.
Munition	If enabled, VBS Gateway attempts to find the closet matches for unmapped incoming munition entities.
Other	If enabled, VBS Gateway attempts to find the closet matches for unmapped incoming other entities.

5.1.6 Dead Reckoning - Outgoing

Edit the **Dead Reckoning - Outgoing** settings to specify how the simulation should handle the movement of entities between communication updates.

NOTE

The Dead Reckoning - Outgoing settings only apply to combined simulation scenarios using DIS and HLA.

Dead Reckoning - Outgoing Settings	Description
Algorithm for Lifeforms	Dead reckoning algorithm for lifeforms and platforms for outgoing spatial updates - see Dead-Reckoning Algorithms (on the next page) .
Algorithm for Platforms	
Absolute Position Send Threshold	<p>Before dispatching spatial updates for local entities, the outgoing spatial is checked against the entity's preferred dead reckoning algorithm and is sent only if the distance (in meters) of the dead-reckoned result exceeds either:</p> <ul style="list-style-type: none">• This value• Its bounding box dimensions multiplied by its relative position threshold (whichever is smaller). <p>This value corresponds to absolute distance. Lowering this value reduces the dead-reckoning error at the expense of sending more frequent spatial updates.</p>
Relative Position Send Threshold	<p>Before dispatching spatial updates for local entities, the outgoing spatial is checked against the entity's preferred dead reckoning algorithm and is only sent if the distance (in meters) of the dead-reckoned result exceeds either:</p> <ul style="list-style-type: none">• This value (times the entity's bounding box)• The absolute position threshold <p>This value corresponds to the relative size of the entity (1.0 = diameter of the bounding box for a given entity, 0.5 = half the distance).</p> <p>This is useful for smaller entities (such as infantry) where small errors during movement are noticeable.</p> <p>Lowering this value reduces the dead-reckoning error at the expense of sending more frequent spatial updates.</p>

Dead Reckoning - Outgoing Settings	Description
Relative Velocity Send Threshold	Before dispatching spatial updates for local entities, the outgoing velocity is checked against the dead reckoning algorithm set for an entity to determine if the velocity change differs by more than this percentage. This value corresponds to the previous relative velocity of the entity (a value of 0.5 denotes a velocity difference that is half of previously-published velocity).
Dampen Acceleration	This normalizes outgoing acceleration changes to reduce wild swings and oscillations due to quick acceleration changes, resulting in smoother dead reckoning on smooth curves (such as a circle).
Rotation Send Threshold	Before dispatching spatial updates for local entities, the outgoing spatial is checked against the preferred dead reckoning algorithm set for an entity and is only sent if the orientation (degrees) of the dead-reckoned result exceeds this value. Lowering this value reduces the dead-reckoning error at the expense of sending more frequent spatial updates.
Send Timeout	Defines the time (in seconds) before spatial updates of moving entities are dispatched automatically regardless of whether PositionSendThreshold or RotationSendThreshold are exceeded.

5.1.6.1 Dead-Reckoning Algorithms

Dead reckoning algorithm for lifeforms and platforms for outgoing spatial updates:

0. **Other** - Unknown, treated as Static.

 **NOTE**

Algorithm 0 is not currently supported.

1. **Static** - Non-moving Entity.
2. **FPW** - Constant velocity / low acceleration linear motion entity.
3. **RPW** - Constant velocity / low acceleration linear motion entity with extrapolation of orientation.
4. **RVW** - High speed or maneuvering entity with extrapolation of orientation.
5. **FVW** - High speed or maneuvering entity.
6. **FPB** - Similar to FPW except in body coordinates.
7. **RPB** - Similar to RPW except in body coordinates.

8. **RVB** - Similar to RVW except in body coordinates.

9. **FVB** - Similar to FVW except in body coordinates.

NOTE

This is a preferred algorithm, not a forced one. For example, moving entities cannot transmit as static entities.

Enumerated names for the dead reckoning algorithm are formed by a combination of letter codes.

The following letter codes are available:

- **F** - Fixed orientation; angular velocity not used.
- **R** - Rotating; orientation extrapolated using angular velocity.
- **P** - Position extrapolated using linear velocity; acceleration not used.
- **V** - Velocity and position extrapolated using velocity and acceleration (not supported for lifeforms).
- **W** - Linear velocity and acceleration provided in world coordinates.
- **B** - Linear velocity and acceleration provided in body coordinates.

5.1.7 Dead Reckoning - Incoming

Edit the **Dead Reckoning - Incoming** settings to specify how the simulation should handle the movement of entities between communication updates.

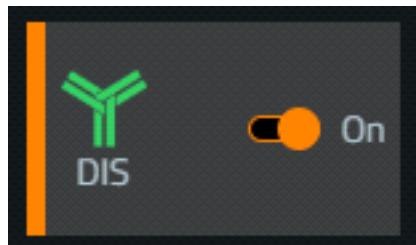
NOTE

The Dead Reckoning - Incoming settings only apply to combined simulation scenarios using DIS and HLA.

Dead Reckoning - Incoming Settings	Description
Smoothing Window	Defines the time period (in seconds) to perform interpolation between spatial updates. Higher values provide better smoothing results at the expense of perceived movement lag.
Smoothing Limit	Defines the maximum distance (in meters) between spatial updates where interpolation is performed. This is useful for the initial positioning of newly-created units.

5.2 Configure DIS Adapter

Click **DIS** to configure communication with DIS-compliant simulation products.



The DIS Settings are split into the following sections:

- General Settings (on the next page)
- ID Filtering Settings (on page 42)
- Units Settings (on page 42)
- Debug Settings (on page 43)
- Connection Settings (on page 43)

After making any settings changes, click **Apply**.

To enable or disable DIS communication, use the **DIS ON / OFF** button.

For a list of DIS PDUs supported in VBS Gateway, see [Supported DIS PDUs \(on page 93\)](#).

5.2.1 General Settings

Edit the **General** settings to configure the general DIS settings.

General Settings	Description
Version	Specifies the DIS standard version. VBS Gateway supports versions 4-7.
Allow Loopback Messages	Select to receive loopback messages in the event that more than one client is running on the same computer. Turn off for better performance.
Use Absolute Timestamps	If selected, absolute timestamps are synchronized to Coordinated Universal Time (UT) through Network Time Protocol (NTP), which allows timestamps to be compared with timestamps from other simulations to determine packet order. If not selected, relative timestamps are used and packet order can not be compared between simulations.
Site ID	Defines the DIS Site ID. Auto resolves to whichever site ID is currently generating DIS traffic at the time of connection.
Application ID	Each VBS Gateway client requires a unique application ID. VBS Gateway ignores incoming traffic generated by a remote client with the same application ID. Use auto to generate an unused application ID.

5.2.2 ID Filtering Settings

Edit the **ID Filtering** settings to configure the whitelisting and / or blacklisting of connected applications.

General Settings	Description
Exercise ID	Defines the exercise ID. VBS Gateway ignores DIS traffic that uses a different exercise ID.
Filtering Type	Allows you to use whitelists and blacklists, to enable entities from applications with whitelisted application IDs to appear in the simulation, and, conversely, to disable entities from applications with blacklisted application IDs from appearing in the simulation. Can be: <ul style="list-style-type: none">• None• Whitelist• Blacklist To add an application ID to the whitelist / blacklist, click Add Application ID , then enter the Application ID and Alias , and click OK . To delete an application ID from the whitelist / blacklist, click the Trash icon in the application ID row. 

5.2.3 Units Settings

Edit the **Unit** settings to configure updates.

Units Settings	Description
Vertical Offset	Adds this value (in meters) to the height of all outgoing VBS4 entities, while the height of all incoming DIS entities is reduced by this value to match. This value can be negative.
Delete Timeout	Maximum time interval (in seconds) between remote updates before an incoming entity is deleted in the local instance.

5.2.4 Debug Settings

Edit the **Debug** setting to control the debug output.

Debug Settings	Description
Debug Output	Select to send DIS adapter debug messages to the console. Turn off for better performance.

5.2.5 Connection Settings

Edit the **Connection** settings configure the connection to the computer or computers running the remote simulation.

Connection Settings	Description
Send Address	Defines the IP address of a remote computer or group of computers participating in an exercise. Can be unicast, multicast, or a broadcast address.
<div style="border: 2px solid red; padding: 10px; margin: 10px 0;"> WARNING To ensure VBS Radio communication over VBS Gateway, in cases where the computers are located on different sub-nets, specify a direct IP address. Also, see Configure DIS in the VBS Radio Manual.</div>	
Send Port	Defines the port used by remote computers to listen for DIS PDUs.
Receive Address	Defines the local IP address to use to listen for DIS PDUs. Also used to send out DIS PDUs. Can be a specific local interface or all local interfaces.
Receive Port	Defines the local port to use to listen for DIS PDUs.
Heartbeat Interval	Specifies the maximum time interval (in seconds) between outgoing updates for each active local entity to ensure that they remain active on remote systems.

Connection Settings	Description																																																
Time to Live	<p>Time To Live attribute of DIS PDUs.</p> <ul style="list-style-type: none"> • 0 is restricted to the same host. • 1 is restricted to the same subnet. • 32 is restricted to the same site. • 64 is restricted to the same region. • 128 is restricted to the same continent. • 255 is unrestricted. <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"> <p>NOTE</p> <p>This option only applies to multicast addresses.</p> </div>																																																
Entity Filtering	<p>Sets whether or not specific entity types are broadcast and handled by this adapter.</p> <ul style="list-style-type: none"> • Publish When selected, entities of this type are broadcast to other instances on the network. When not selected, packets for this entity type are not broadcast. • Subscribe When selected, incoming packets for this entity type are handled as normal. When not selected, incoming packets for this entity type are ignored. <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Entity Filtering</th> <th style="text-align: center;">Publish</th> <th style="text-align: center;">Subscribe</th> </tr> </thead> <tbody> <tr><td>Physical Entity</td><td style="text-align: center;"><input checked="" type="checkbox"/></td><td style="text-align: center;"><input checked="" type="checkbox"/></td></tr> <tr><td>Platform</td><td style="text-align: center;"><input checked="" type="checkbox"/></td><td style="text-align: center;"><input checked="" type="checkbox"/></td></tr> <tr><td>Aircraft</td><td style="text-align: center;"><input checked="" type="checkbox"/></td><td style="text-align: center;"><input checked="" type="checkbox"/></td></tr> <tr><td>Ground Vehicle</td><td style="text-align: center;"><input checked="" type="checkbox"/></td><td style="text-align: center;"><input checked="" type="checkbox"/></td></tr> <tr><td>Amphibious Vehicle</td><td style="text-align: center;"><input checked="" type="checkbox"/></td><td style="text-align: center;"><input checked="" type="checkbox"/></td></tr> <tr><td>Surface Vessel</td><td style="text-align: center;"><input checked="" type="checkbox"/></td><td style="text-align: center;"><input checked="" type="checkbox"/></td></tr> <tr><td>Submersible Vessel</td><td style="text-align: center;"><input checked="" type="checkbox"/></td><td style="text-align: center;"><input checked="" type="checkbox"/></td></tr> <tr><td>Multi-domain</td><td style="text-align: center;"><input checked="" type="checkbox"/></td><td style="text-align: center;"><input checked="" type="checkbox"/></td></tr> <tr><td>Spacecraft</td><td style="text-align: center;"><input checked="" type="checkbox"/></td><td style="text-align: center;"><input checked="" type="checkbox"/></td></tr> <tr><td>Human</td><td style="text-align: center;"><input checked="" type="checkbox"/></td><td style="text-align: center;"><input checked="" type="checkbox"/></td></tr> <tr><td>Nonhuman</td><td style="text-align: center;"><input checked="" type="checkbox"/></td><td style="text-align: center;"><input checked="" type="checkbox"/></td></tr> <tr><td>Munition</td><td style="text-align: center;"><input checked="" type="checkbox"/></td><td style="text-align: center;"><input checked="" type="checkbox"/></td></tr> <tr><td>Cultural Feature</td><td style="text-align: center;"><input checked="" type="checkbox"/></td><td style="text-align: center;"><input checked="" type="checkbox"/></td></tr> <tr><td>Designator</td><td style="text-align: center;"><input checked="" type="checkbox"/></td><td style="text-align: center;"><input checked="" type="checkbox"/></td></tr> <tr><td>Radar</td><td style="text-align: center;"><input checked="" type="checkbox"/></td><td style="text-align: center;"><input checked="" type="checkbox"/></td></tr> </tbody> </table> </div> <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"> <p>NOTE</p> <p>Deselecting Physical Entity deselects all entity types except Designator, but this change is not reflected in the UI.</p> <p>Deselecting Platform deselects all vehicle types (Aircraft, Ground, Amphibious, Ship, Submersible, Multi-Domain, Spacecraft). Because the DIS adapter treats Cultural Features as vehicles, they are also turned off by deselecting Platform. This change is not reflected in the UI.</p> </div>	Entity Filtering	Publish	Subscribe	Physical Entity	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Platform	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Aircraft	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Ground Vehicle	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Amphibious Vehicle	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Surface Vessel	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Submersible Vessel	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Multi-domain	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spacecraft	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Human	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Nonhuman	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Munition	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Cultural Feature	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Designator	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Radar	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
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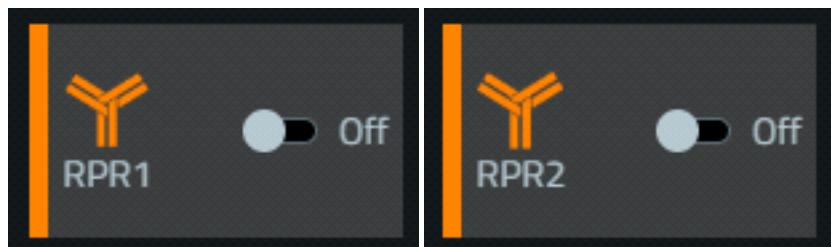
Connection Settings	Description
Interaction Filtering	Sets whether or not specific interaction types are broadcast and handled by this adapter. <ul style="list-style-type: none">• Publish: When selected, interactions of this type are broadcast to other instances on the network. When not selected, packets for this interaction type are not broadcast.• Subscribe: When selected, incoming packets for this interaction type are handled as normal. When not selected, incoming packets for this interaction type are ignored.

 **NOTE**

Most weapons generate a PDU for both **Weapon Fire** and **Munition Detonation**.

5.3 Configure RPR1 and RPR2 Adapters

Click **RPR1** or **RPR2** to configure communication with HLA-compliant simulation products.



The HLA Settings are split into the following sections:

- [General Settings \(on the next page\)](#)
- [CRC Host Settings \(on the next page\)](#)
- [Federation Settings \(on page 48\)](#)

After making any settings changes, click **Apply**.

To enable or disable HLA communication, use the **RPR ON / OFF** button.

For a list of HLA FOM object classes and interactions supported in VBS Gateway, see [Supported HLA FOM Object Classes and Interactions \(on page 101\)](#).

5.3.1 General Settings

Edit the **General** settings to configure the general HLA settings.

Settings	Description
Use Absolute Timestamps	If selected, timestamps are synchronized to Coordinated Universal Time (UT) through Network Time Protocol (NTP), which allows timestamps to be compared with timestamps from other simulations to determine packet order. If not selected, relative timestamps are used and packet order can not be compared between simulations.
Site ID	For RPR, auto assigns the site ID based on the federate handle.
Application ID	In RPR, auto assigns the application ID based on the federate handle.
FDD File (RPR2 only)	FDD File to load. Auto attempts to resolve the FDD file based on the RTI driver profile.
Filtering Type	Allows you to use whitelists and blacklists, to enable entities from applications with whitelisted application IDs to appear in the simulation, and, conversely, to disable entities from applications with blacklisted application IDs from appearing in the simulation. Can be: <ul style="list-style-type: none"> • None • Whitelist • Blacklist To add an application ID to the whitelist / blacklist, click Add Application ID , then enter the Application ID and Alias , and click OK . To delete an application ID from the whitelist / blacklist, click the Trash icon in the application ID row. 

5.3.2 CRC Host Settings

Edit the **CRC Host** settings configure the connection to the computer hosting the Central RTI Component (CRC).

Settings	Description
Address	Defines the host that is running the CRC (Central RTI Component), hosting the federation that the client connects to.
Port	Defines the port of the CRC to connect to.

5.3.3 Federation Settings

Edit the **Federation** settings to identify the exercise and control the broadcast settings.

Federation Settings	Description
Federation Name	Defines the name of the shared exercise. VBS Gateway ignores HLA traffic that uses a different federation name.
Federate Name	Defines the unique identifier for the Federate. Use auto to generate an unused federate name.
Federate Type	The unique type for the Federate.
Federate Folder	Defines the path to the FOM (Federation Object Model). Supports relative paths, corresponding to the VBS4 installation folder.
Entity Filtering	Sets whether or not specific entity types are broadcast and handled by this adapter. <ul style="list-style-type: none"> Publish: When selected, entities of this type are broadcast to other instances on the network. When not selected, packets for this entity type are not broadcast. Subscribe: When selected, incoming packets for this entity type are handled as normal. When not selected, incoming packets for this entity type are ignored.
i	NOTE
Deselecting Physical Entity deselects all entity types except Designator , but this change is not reflected in the UI.	
Deselecting Platform deselects all vehicle types (Aircraft, Ground, Amphibious, Ship, Submersible, Multi-Domain, Spacecraft). Because the DIS adapter treats Cultural Features as vehicles, they are also turned off by deselecting Platform . This change is not reflected in the UI.	
Interaction Filtering	Sets whether or not specific interaction types are broadcast and handled by this adapter. <ul style="list-style-type: none"> Publish: When selected, interactions of this type are broadcast to other instances on the network. When not selected, packets for this interaction type are not broadcast. Subscribe: When selected, incoming packets for this interaction type are handled as normal. When not selected, incoming packets for this interaction type are ignored.
i	NOTE
Most weapons generate a PDU for both WeaponFire and MunitionDetonation .	

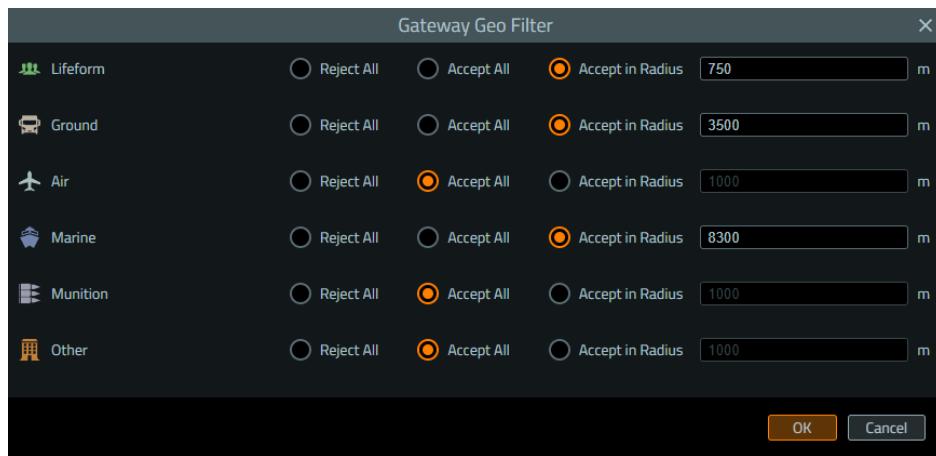
5.4 Configure Gateway Geofiltering

The Gateway Geo Filter Editor Object allows you apply geofiltering to entities, based on a map position and a radius (in meters).

NOTE

It is currently not possible to use the Gateway Geo Filter Editor Object with HLA (RPR2 adapter).

You can place multiple Gateway Geo Filter Editor Objects on the map to designate multiple areas for certain entities to be present in the simulation, and for other entities to be filtered out.



The filtering applies to the following entity types:

- **Lifeform** - Any human or animal entity.
- **Ground** - Any ground vehicle.
- **Air** - Any aircraft.
- **Marine** - Any watercraft.
- **Munition** - Certain types of munition.
- **Other** - Any other entity.

NOTE

The following considerations apply:

- To use the Gateway Geo Filter Editor Object, first make sure that the VBS Gateway **General > Filtering > Type** setting is set to **Editor Object**. For more information, see [Configure General Settings \(on page 31\)](#).
- **Munition** filtering applies to grenades and rockets, but not to rifle / handgun munitions. The munition needs to be a physical object, while rifle / handgun munitions are tracked under **Lifeform**. For example, if you set **Munition** to **Reject All**, and **Lifeform** to **Accept All**, and then fire a rifle, the munitions appear on the [Active Entities Page \(on page 20\)](#). It is currently not possible to filter out rifle / handgun munitions from affecting units in the scenario. For the rejection / acceptance filtering options, see step 3 of the procedure that follows.

Follow these steps:

1. In the Editor Objects List, select **Gateway Geo Filter**.
2. Double-click a location on the map to serve as the geofiltering position.

The Gateway Geofiltering dialog opens.

3. For each entity type, select the following:

- **Reject All** - All the entities of the given type do not appear in the simulation.
- **Accept All** - All the entities of the given type appear in the simulation.
- **Accept in Radius** - Only the entities of the given type, within the radius (in meters) from the geofiltering position of the Gateway Geo Filter Editor Object, appear in the simulation.

Set the radius value. The radius is visualized on the 2D Map and in 3D Camera View (see [Range Visualizations \(on the next page\)](#)).

NOTE

If the area set for this entity type is fully within an area set for the same entity type in another Gateway Geo Filter Editor Object, entities of this type are rendered according to the Gateway Geo Filter with the larger area.

If at least one Gateway Geo Filter Editor Object has **Accept All** selected for a certain entity type, all the entities of that type appear (are accepted) in the simulation, regardless of the settings for that entity type in any other Gateway Geo Filter Editor Objects.

4. Click **OK**.

The geofiltering is applied.

5.4.1 Range Visualizations

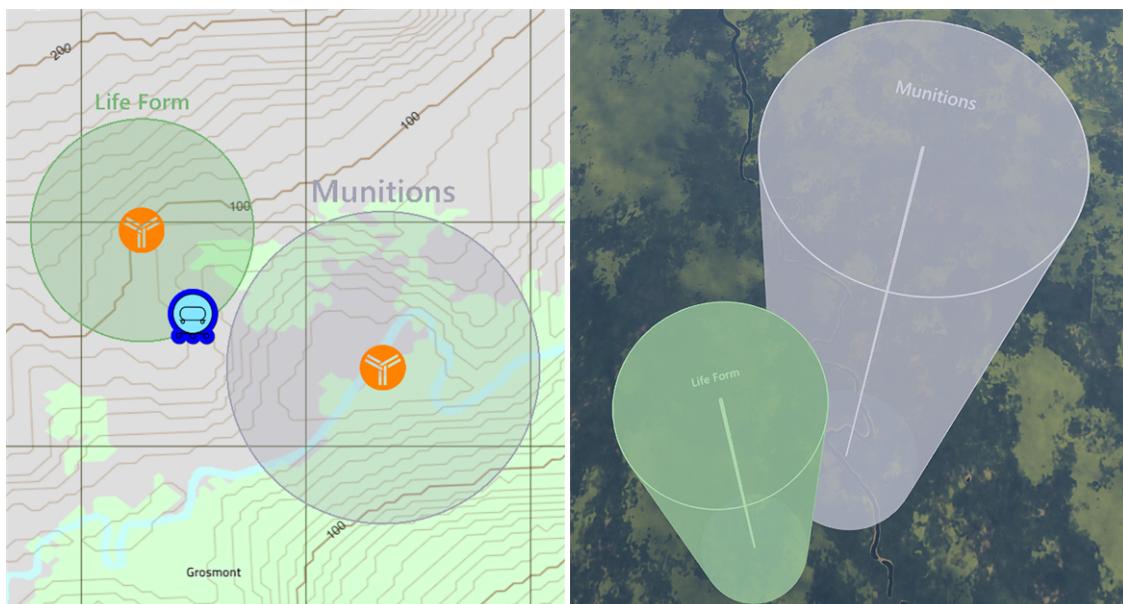
In VBS4, the radius of a VBS Gateway Geo Filter can be displayed as a range visualization.

NOTE

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

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

Image-2: 2D and 3D range visualization



NOTE

The following considerations apply:

- The colors of VBS Gateway Geo Filter range visualizations cannot be changed.
- VBS Gateway Geo Filter range visualizations are also visible in AAR (see After Action Review (AAR) in the VBS4 AAR Manual).

5.5 Install and Configure MÄK RTI

MÄK RTI exchanges data between federates in a simulation exercise in accordance to HLA standards.

MÄK RTI must be installed with specific options set correctly for use with VBS Gateway. Install MÄK RTI on all computers in the federation.

NOTE

VBS Gateway was tested and verified with MÄK RTI v4.5, compatible with MSVC 14.0 or 15.0.

WARNING

If you have both MÄK RTI and Pitch pRTI installed, using each of them directly after the installation may not be possible. To resolve this, the Microsoft Windows **PATH** system variable needs to be modified.

Incorrectly modifying the **PATH** system variable may result in some of your applications not working properly. Bohemia Interactive Simulations is not responsible for any damage caused by such modification, and recommends contacting your Microsoft Windows System Administrator to make the following changes:

To use MÄK RTI, make sure that in your Microsoft Windows **PATH** system variable, the strings **%MAK_RTIDIR%\bin** and **%MAK_RTIDIR%\lib\java**, representing MÄK RTI, appear before **%PRTI5_VCversion_64%** (*version* is the version number - for example, **%PRTI5_VC141_64%**), representing Pitch pRTI. To use Pitch pRTI, reverse the string order.

Follow these steps:

1. Run the MÄK RTI installer.
2. Accept the License Agreement and click **Next**.
3. Keep the default Destination Location and click **Next**.
4. Select Full installation and click **Next**.
5. Keep the default Start Menu Folder and click **Next**.
6. Confirm that **Make this RTI version the default** is selected, then select **For all users (change System Path)** and click **Next**.
7. Confirm that installation settings are correct and click **Install**.
8. Click **Finish**.
9. Restart the computer.

10. Make sure that the Java installed on the computer is up to date, and that the Microsoft Windows **System Variables** in **Environment Variables** are set up correctly.

MÄK RTI is correctly installed for use with VBS Gateway.

5.5.1 Sample use of MÄK RTI with VBS Gateway

Use MÄK RTI with VBS Gateway.

Follow these steps:

1. Run the MÄK RTI `rtiexec.exe` on the computer hosting the federation, located at:

`Start > MAK Technologies > MAK RTI 4.5 > rtiexec.exe`

i **NOTE**

Only one `rtiexec.exe` can run per port on a network. It may be necessary to change the port from the default.

2. Uncheck **Force Full Compliance**.

3. Start VBS4 with VBS Gateway on all the computers.

The Choose RTI Connection dialog opens when a Battlespace is hosted.

4. Select `rtiexec.exe` session you want to connect to, or use **+** icon to add it, if the one you want to connect to is not present in the list.

VBS Gateway connects to this RTI when RPR1 or RPR2 are active.

5.6 Install and Configure Pitch pRTI

Pitch pRTI exchanges data between federates in a simulation exercise in accordance to HLA standards. Install Pitch pRTI on all computers in the federation.

Pitch pRTI must be installed with specific options set correctly for use with VBS Gateway.

NOTE

VBS Gateway was tested and verified with Pitch pRTI Free version 5.3.2.1, compatible with MSVC 14.0 or 15.0.

WARNING

If you have both MÄK RTI and Pitch pRTI installed, using each of them directly after the installation may not be possible. To resolve this, the Microsoft Windows **PATH** system variable needs to be modified.

Incorrectly modifying the **PATH** system variable may result in some of your applications not working properly. Bohemia Interactive Simulations is not responsible for any damage caused by such modification, and recommends contacting your Microsoft Windows System Administrator to make the following changes:

To use MÄK RTI, make sure that in your Microsoft Windows **PATH** system variable, the strings **%MAK_RTIDIR%\bin** and **%MAK_RTIDIR%\lib\java**, representing MÄK RTI, appear before **%PRTI5_VCversion_64%** (*version* is the version number - for example, **%PRTI5_VC141_64%**), representing Pitch pRTI. To use Pitch pRTI, reverse the string order.

Follow these steps:

1. Run the Pitch pRTI installer.
2. Click **Next**.
3. Accept the License Agreement and click **Next**.
4. Use the default directory and click **Next**.
5. Verify that the following items are selected for installation and click **Next**.
 - Central RTI Component (CRC)
 - Local RTI Component (LRC)
 - Web View Server Application
6. Select shortcut options at user discretion and click **Next**.
7. For C++ Library Path select **Visual C++ 14.0 or 15.0** and click **Next**.
8. Select Additional Tasks at user discretion and click **Next**.

9. Give a name to the CRC or use the default name and click **Next**.
10. Click **Finish**.
11. Make sure that the Java installed on the computer is up to date, and that the Microsoft Windows **System Variables** in **Environment Variables** are set up correctly.

Pitch pRTI is correctly installed for use with VBS Gateway.

5.6.1 Sample Use of Pitch pRTI with VBS Gateway

Use Pitch pRTI with VBS Gateway.

Follow these steps:

1. Run the Pitch pRTI Free on the computer hosting the federation.
2. Navigate to **Settings > Change Settings**.
The pRTI CRC Settings Editor dialog opens.
3. Open the **Monitor** tab, and toggle the **Accept federates with mismatching RTI version** option on.
4. Start VBS4 with VBS Gateway on all the computers.
5. Set the correct CRC Host [Address \(on page 47\)](#) in VBS Gateway on each computer you want to connect to the federation

Pitch pRTI is ready to use with VBS Gateway.

6. Configure Simulation Modeling

Prior to a combined simulation exercise, the Simulation Administrator configures entity maps for all the simulation objects expected in the exercise.

VBS Gateway predefines thousands of incoming and outgoing SISO enumeration mappings.

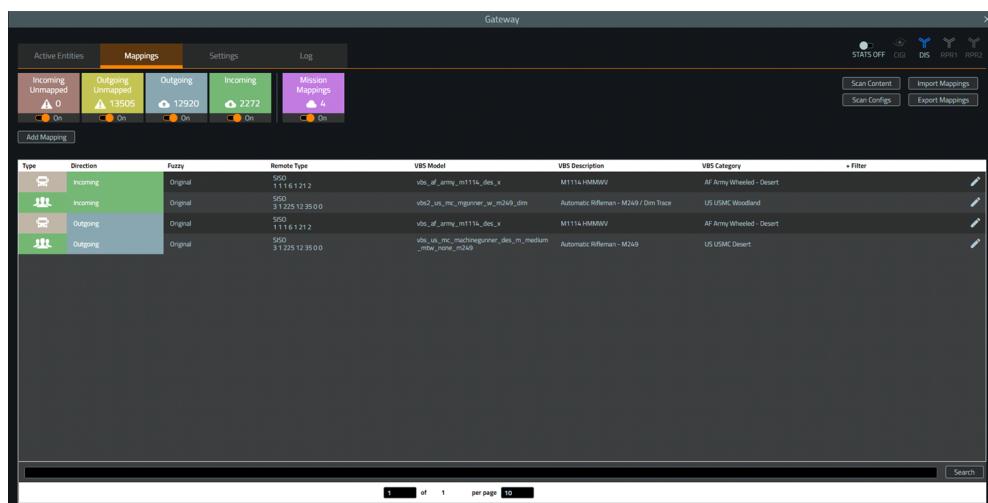
NOTE

VBS Gateway used SISO-REF-010-2015 v21 as a mapping reference for the enumerations during development. However, this does not guarantee a 1-1 mapping of VBS content as that specification does not include all the content in VBS.

Prerequisites:

1. [Launching VBS Gateway \(on page 14\)](#).
2. Open the VBS Gateway UI and select the **Mappings** tab.

In the [Mappings Page \(on page 22\)](#), review and edit existing mappings, and create new mappings.



Update the VBS Gateway database and entity mappings.

- See [Import VBS4 Entities \(on the next page\)](#)
- See [Export / Import Mapping Files \(on page 59\)](#)

Entities controlled remotely have an Entity Class and require a VBS4 model assignment.

- See [Edit Incoming Entities \(on page 62\)](#) and [Add Entity Mappings \(on page 60\)](#)

Entities controlled by your instance of VBS4 require an Entity Class mapping to transmit.

- See [Edit Outgoing Entities \(on page 63\)](#) and [Add Entity Mappings \(on page 60\)](#)

Configure vehicle animations to transmit over HLA / DIS.

- See [Configure Transmittable Vehicle Animations \(on page 65\)](#).

6.1 Import VBS4 Entities

The VBS Gateway database contains a default set of entities and mappings. You can update the database with the entities from your running VBS4 instance.

Follow these steps:

1. Open the [Mappings Page \(on page 22\)](#).
2. Click one of the following import options - see [Scanning Options \(below\)](#).

Filtered Content

VBS Gateway filters entities based on the values of the `scope` and `scopeGateway` configuration parameters, defined in the entity classes.

For more information, see Scope Parameters in [Introduction to Configuration](#) in the VBS Developer Reference.

6.1.1 Scanning Options

For the import, you can scan the content or the configuration.

Scan Content

VBS Gateway imports the content from VBS4 and updates the VBS Gateway database, adding new entities, and updating existing ones.

NOTE

The import process does not update any outgoing or incoming mappings. Mappings can only be added / updated by running **Scan Configs**.

WARNING

The import process takes several minutes. Do not close VBS Gateway or VBS4 until the import is complete.

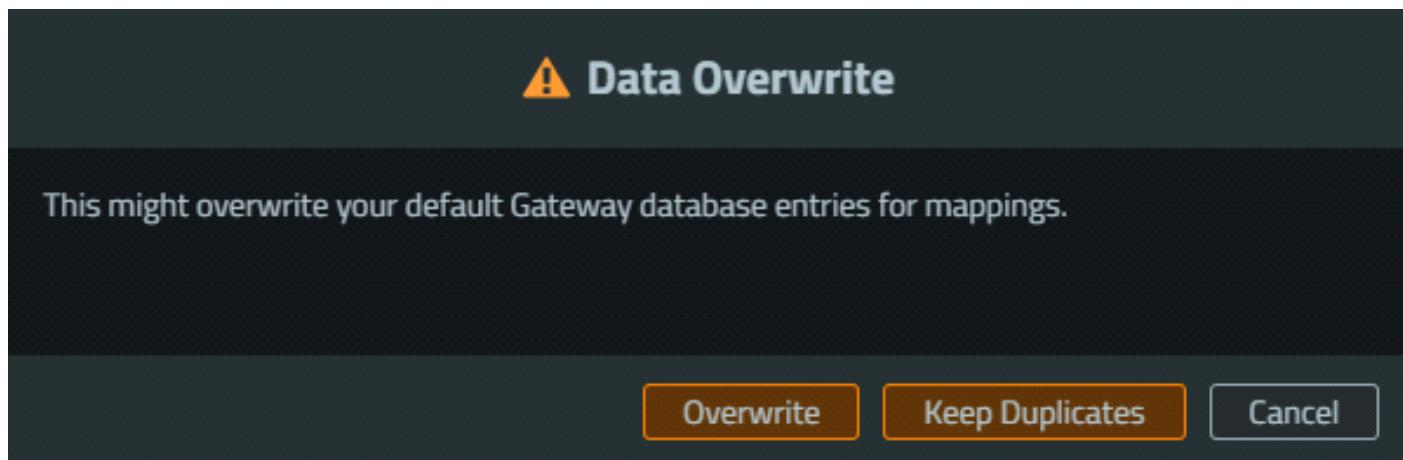
Scan Configs

Searches the Simulation Interoperability Standards Organization (SISO) enumeration in the model configuration files, which are automatically imported after the scan. The SISO is used for both outgoing and incoming mapping of each SISO-enumerated model.

NOTE

Only mappings of models which include the SISO enumeration in their configuration are added.

The Data Overwrite dialog opens.



Select one of the following options:

- **Overwrite** - Custom and old mappings are overwritten by mappings from the model configuration.
- **Keep Duplicates** - Only new mappings are added, and custom mappings are preserved.

After either of the options is selected, an automatic backup of the VBS Gateway database is created and stored in:

`\VBS_Installation\components\Gateway\EntityClasses_date_time.dbo`

When the configuration scan is completed, the data is committed to the database.

6.2 Export / Import Mapping Files

Share mapping configuration files between instances of VBS Gateway with the export function, and import external mappings.

To Export Mapping Files:

1. Open the [Mappings Page \(on page 22\)](#).
2. Click **Export Mappings**.
3. Input a file name.
4. Use the file type drop-down to select **.dbo** or **.csv**.
5. Click **Export**.

VBS Gateway creates the export file in:

\VBS_Installation\Components\Gateway

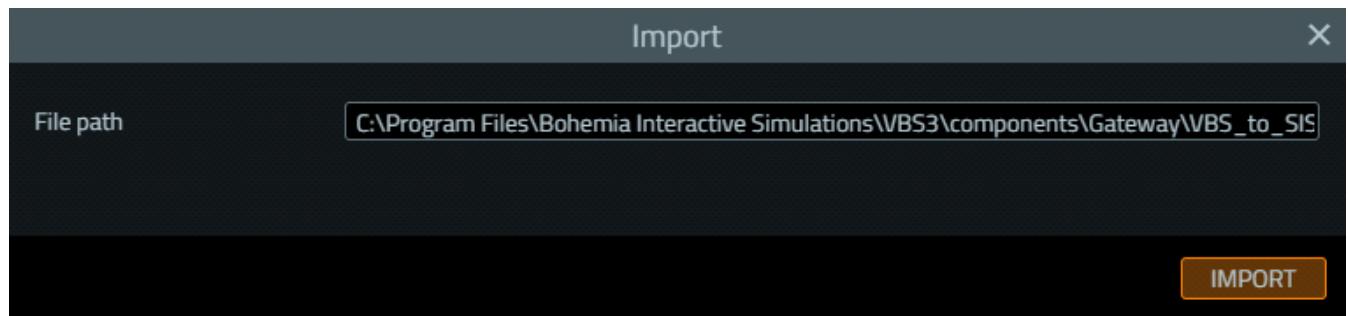
Use the exported file to transfer mappings to another instance of VBS Gateway with the Import function.

To Import Mapping Files:

1. Save your exported files to your hard drive.
2. Open the [Mappings Page \(on page 22\)](#).
3. Click **Import Mapping**.
4. Setup the correct path to your Gateway files, and click **Import**.

The default path is:

\VBS_Installation\Components\Gateway\Mappings_Name.dbo



VBS Gateway imports the file and updates the entity mappings.

VBS Gateway creates a backup of the existing file, **EntityClasses_timestamp.dbo**, and uses the imported file to replace **EntityClasses.dbo**.

NOTE

The update process may take several minutes.

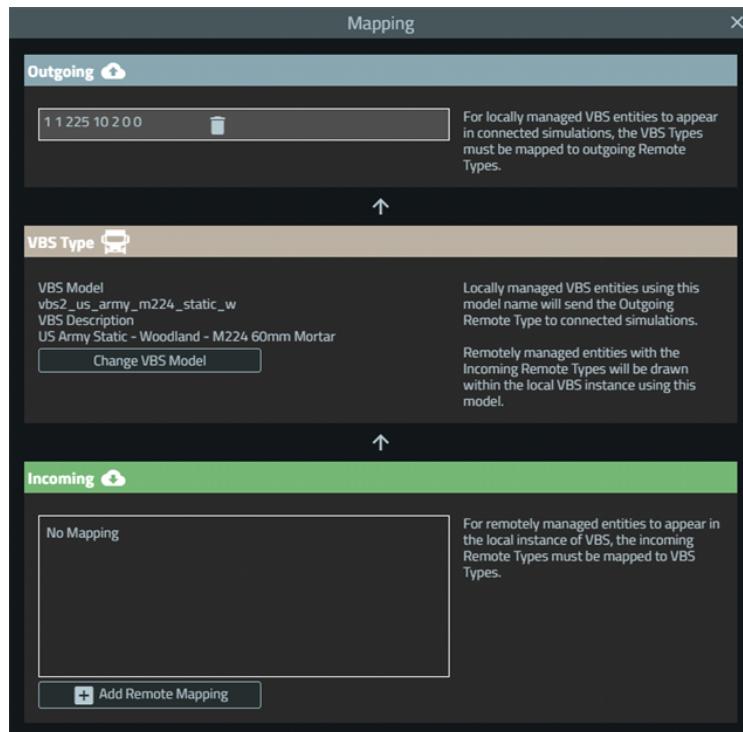
6.3 Add Entity Mappings

To create an incoming or outgoing mapping between an Entity Class and a VBS4 model, add an entity mapping.

Follow these steps:

1. Open the [Mappings Page \(on page 22\)](#).
2. Click **Add Mapping**.

The Mappings dialog opens.



3. Select the VBS Model to map:
 - a. Click **Change VBS Model**.
- The Select VBS Model page opens.
- b. Use the **Search** input and click **OK** to filter the list.
 - c. Select a model from the list and click **OK**.

WARNING

Do not select _base classes, for example `vbs_us_af_e3a_sentry_base_x`.

These classes are model templates that do not have mappable models associated with them. These classes will be filtered out of the list in a future release.

VBS Gateway updates the VBS Type section of the Mappings dialog.

4. To add a new incoming Entity Class:

- In the **Incoming** section, click **Add Remote Mapping**.

The Add Remote Mapping dialog opens.

- Do one of the following:

- Type the entity class enumeration in the input.
- Use the enumeration drop-downs for each enumeration category.

- Click **Add**.

VBS Gateway updates the Incoming section of the Mappings dialog.

 **NOTE**

VBS Gateway allows multiple incoming mappings to the same VBS4 model.

5. To add an outgoing mapping:

- In the **Outgoing** section, click **Add Remote Mapping**.

The Add Remote Mapping dialog opens.

 **NOTE**

Click the Trash icon to clear the existing entry if it is incorrect.

- Do one of the following:

- Type the entity class enumeration in the input.
- Use the enumeration drop-downs for each enumeration category.

- Click **Add**.

VBS Gateway updates the Outgoing section of the Mappings dialog.

 **NOTE**

VBS Gateway allows one outgoing mapping for each VBS model. Multiple models may use the same outgoing mapping.

6.4 Edit Incoming Entities

To change the VBS4 model assignment for a remote simulation entity, edit the incoming mapping.

Follow these steps:

1. Open the [Mappings Page \(on page 22\)](#) and use the type filters to only display **Incoming / Incoming Unmapped** mappings.
2. Use the **Search** input or the **+ Filter** to locate the model to edit.
3. Select the row to edit, and click the **Edit** icon



The [Mapping Dialog \(on page 23\)](#) opens.

4. To add additional incoming Entity Classes:
 - a. In the **Incoming** section, click **Add Remote Mapping**.
The Add Remote Mapping dialog opens.
 - b. Do one of the following:
 - Type the entity class enumeration in the input.
 - Use the enumeration drop-downs for each enumeration category.
 - c. Click **Add**.
5. To modify the VBS model to use:
 - a. Click **Change VBS Model**.
The Select VBS Model page opens.
 - b. Use the **Search** input and click **OK** to filter the list.
 - c. Select a model from the list and click **OK**.



WARNING

Do not select _base_ classes, for example vbs_us_af_e3a_sentry_base_x.

These classes are model templates that do not have mappable models associated with them. These classes will be filtered out of the list in a future release.

VBS Gateway updates the incoming entity mappings in the mapping tables.

6.5 Edit Outgoing Entities

To change the Entity Class transmitted for a VBS4 model, edit the outgoing mapping.

Follow these steps:

1. Open the [Mappings Page \(on page 22\)](#) and use the type filters to only display **Outgoing / Outgoing Unmapped** mappings.
2. Use the **Search** input or the **+ Filter** to locate the model to edit.
3. Select the row to edit, and click the **Edit** icon



The [Mapping Dialog \(on page 23\)](#) opens.

4. To edit the outgoing Entity Class:
 - a. In the **Outgoing** section, click the Trash icon to clear any existing entry.



- b. In the **Outgoing** section, click **Add Remote Mapping**.

The Add Remote Mapping dialog opens.

- c. Do one of the following:
 - Type the entity class enumeration in the input.
 - Use the enumeration drop-downs for each enumeration category.
- d. Click **Add**.

VBS Gateway updates the outgoing entity mapping in the mapping tables.

6.6 Delete Entity Mappings

Mappings can be deleted from the Mappings page.

Follow these steps:

1. Open the [Mappings Page \(on page 22\)](#)
2. **Optional:** Use the type filters, column filters, or Search to locate a specific entity.
3. Select the row with the mapping to delete, and click the **Edit** icon

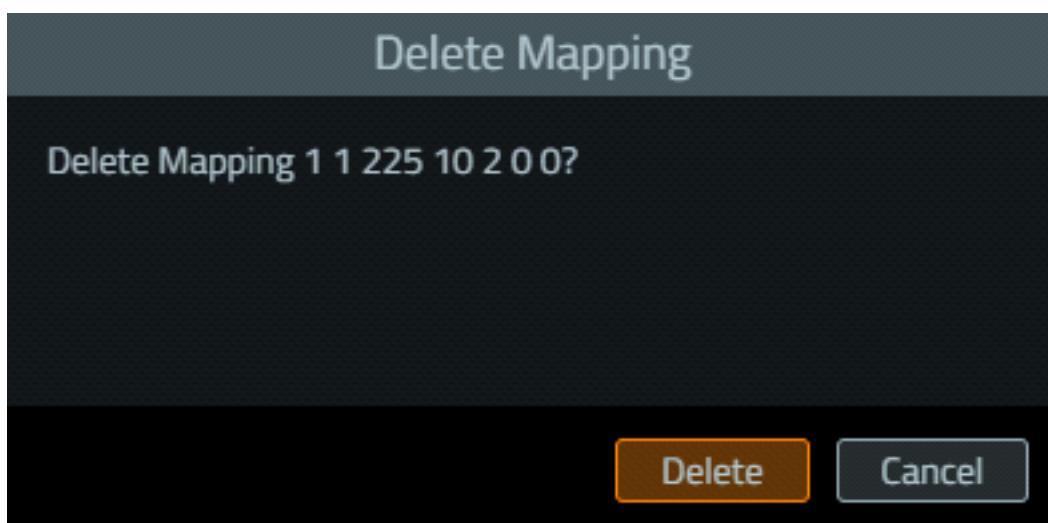


The [Mapping Dialog \(on page 23\)](#) opens.

4. For either the Outgoing or Incoming mappings, click the Trash Icon for the mapping to delete.



A confirmation dialog appears.



5. Click **Delete** to confirm.

The mapping is deleted.

6.7 Configure Transmittable Vehicle Animations

You can configure which vehicle animations can be transmitted by VBS Gateway over DIS / HLA.

NOTE

To enable sending / receiving these transmissions, see **Send Outgoing Animations** and **Receive Incoming Animations** in [Configure General Settings \(on page 31\)](#).

WARNING

Some complex entity animations are not transmitted over VBS Gateway and are not visible on other computers in the scenario.

Follow these steps:

1. Make sure that VBS4 is not running.
2. Open the file:

`\VBS_Installation\Components\Gateway\Animation_Mapping.xml`

NOTE

If the file does not exist, it needs to be created.

3. Define the vehicle animations to transmit, using the [XML Parameters \(on the next page\)](#):

```
<Mapping>
  <Vehicle>
    <Model>Vehicle_Model_Class_Name</Model>
    <Animations>
      <Animation>
        <SourceName>Animation_Source_Name</SourceName>
        <TypeClass>Articulated_Part_Type_Class</TypeClass>
        <TypeMetric>Articulated_Part_Type_Metric</TypeMetric>
        <ExternalInterval>
          <MinValue>Minimal_Animation_Phase</MinValue>
          <MaxValue>Maximal_Animation_Phase</MaxValue>
        </ExternalInterval>
      </Animation>
      ...
    </Animations>
  </Vehicle>
  ...
</Mapping>
```

4. Save `Animation_Mapping.xml`.**5. Start VBS4 with VBS Gateway.**

The vehicle animations can be transmitted over DIS / HLA.

XML Parameters	Description
Model String (Optional)	Class name of the vehicle model. NOTE If the parameter is left unspecified, the animations that are defined in the Vehicle parameter scope apply to all vehicles. All the scenario vehicles of the defined class transmit the defined animations.
SourceName String (Required)	Animation-source name. TIP You can get the list of available vehicle animations by using the getAnimations (https://sqf.bisimulations.com/display/SQF/getAnimations) SQF command, and then get the animation-source names by using the getAnimInfo (https://sqf.bisimulations.com/display/SQF/getAnimInfo) SQF command.
TypeClass Integer (Required)	Articulated part type class, which identifies the mapped animation. NOTE The value has to be in the SISO (Simulation Interoperability Standards Organization) standard, unique, and divisible by 32. Otherwise, Warning messages appear in the VBS Gateway log file (see VBS Gateway Logging (on page 87)).
TypeMetric Integer (Required)	Articulated part type metric. NOTE The value has to be in the SISO standard range of 1 - 31. Otherwise, Warning messages appear in the VBS Gateway log file (see VBS Gateway Logging (on page 87)).

XML Parameters	Description
ExternalInterval Struct (Optional)	<p>Controls the animation phases:</p> <ul style="list-style-type: none"> • MinValue (Float) - Minimal animation phase in the interval of 0 - 1, where 0 is the animation start and 1 is the animation end. Default value: 0 • MaxValue (Float) - Maximal animation phase in the interval of 0 - 1, where 0 is the animation start and 1 is the animation end. Default value: 1

NOTE

The following considerations apply:

- **MinValue** and **MaxValue** can be defined using values outside the 0 - 1 range, based on what any third-party simulation software connected through VBS Gateway might use. VBS4 automatically maps these values to the 0 - 1 range.
- You can reverse the animation by setting **MinValue** to be greater than **MaxValue**. For example, reversing the animation can be achieved by setting **MinValue** to 1 and **MaxValue** to 0.

Example transmittable animations configuration for vehicle classes [VBS2_CA_ARMY_LAV3_D_C2_X](#) and [VBS2_US_ARMY_M1114_D_X](#):

```

<Mapping>
  <Vehicle>
    <Model>VBS2_CA_ARMY_LAV3_D_C2_X</Model>
    <Animations>
      <Animation>
        <SourceName>ramp</SourceName>
        <TypeClass>9984</TypeClass>
        <TypeMetric>6</TypeMetric>
      </Animation>
    </Animations>
  </Vehicle>
  <Vehicle>
    <Model>VBS2_US_ARMY_M1114_D_X</Model>
    <Animations>
      <Animation>
        <SourceName>Door_1_1</SourceName>
        <TypeClass>10016</TypeClass>
        <TypeMetric>1</TypeMetric>
        <ExternalInterval>
          <MinValue>0</MinValue>
          <MaxValue>1</MaxValue>
        </ExternalInterval>
      </Animation>
    </Animations>
  </Vehicle>
</Mapping>

```

```
</ExternalInterval>
</Animation>
<Animation>
  <SourceName>Door_1_2</SourceName>
  <TypeClass>10048</TypeClass>
  <TypeMetric>1</TypeMetric>
  <ExternalInterval>
    <MinValue>0</MinValue>
    <MaxValue>1</MaxValue>
  </ExternalInterval>
</Animation>
</Animations>
</Vehicle>
</Mapping>
```

7. Simulation Monitoring

Simulation Administrators use the Active Entities page (see [Active Entities Page \(on page 20\)](#) in the VBS Gateway Manual) to monitor the entities in the current network scenario.

Unlike the [Active Entities Page \(on page 20\)](#), the [Mappings Page \(on page 22\)](#) (see the VBS Gateway Manual) allows you to update entity mappings for entities that have a short lifespan in the simulation (such as munitions), since they get logged and remain visible on the [Mappings Page \(on page 22\)](#), even after they physically disappear from the simulation.

For information on how to edit and fix mappings using the [Active Entities Page \(on page 20\)](#) or the [Mappings Page \(on page 22\)](#), see [Edit an Entity Mapping \(on page 72\)](#), [Detect and Fix Unmapped VBS Entities \(on page 74\)](#), and [Detect and Fix Remote Entities \(on page 77\)](#).

The screenshot shows the 'Active Entities' tab selected in the top navigation bar. Below it is a table with the following data:

Type	Ownership	Fuzzy	Remote Category Remote Type	VBS Type	URN	Location	Speed (m s ⁻¹) Altitude ASL (m)	Damage (%)	Side	Filter
	Local	Original	SISO 3 1 225 13 80 0 0	vbs2_us_af_fighterpilot_d_berettam9 US USAF Desert - Fighter Pilot - Beretta M9	999978.69 : 1000025.19	0.00 m s ⁻¹ 32.98 m	0.00	Friendly		
	Local	Original	SISO	vbs2_m1_abrams_mcr Objects - Accessories - MCR Mine Roller	1000047.13 : 999912.77	0.00 m s ⁻¹ 33.08 m	0.00	Friendly		
	Remote DIS_1_3030_6059_2	Fuzzy	SISO Fuzzy: 1 2 225 2 4 1 0 (original: 1 2 225 0 0 0)	vbs_us_af_a10a_gry_agm65_hydra_x US USAF Air - A-10A - GAU-8 - Hydra - AGM-65	1000031.28 : 999921.10	0.00 m s ⁻¹ 32.94 m	0.00	Friendly		
	Remote DIS_1_3030_6059_1	Original	SISO 3 1 225 13 80 0 0	vbs2_us_af_fighterpilot_w_berettam9 US USAF Woodland - Fighter Pilot - Beretta M9	100003846 : 999937.19	0.00 m s ⁻¹ 32.98 m	0.00	Friendly		
	Remote DIS_1_3030_6059_4	Fuzzy	SISO Fuzzy: 1 1 225 1 1 1 1 0 (original: 1 1 225 0 0 0)	vbs2_us_army_m1a2_d_mcr_x US Army Tracked - Desert - M1A2 - MCR	1000043.70 : 999909.89	0.00 m s ⁻¹ 33.00 m	0.00	Friendly		
	Remote DIS_1_3030_6059_3	Fuzzy	SISO Fuzzy: 3 1 1 1 1 0 0 0 (original: 3 1 1 1 1 0 0 0)	vbs2_af_an_a_grenadier_w_m16_m203 AF Army - Woodland - Grenadier - M16/M203	1000019.52 : 999931.38	0.00 m s ⁻¹ 32.99 m	0.00	Friendly		

At the bottom of the table, there is a pagination control showing '1 of 1 per page 10' and a 'Search' button.

VBS Gateway displays all currently active entities on this page in one of seven categories:

- **Unmapped** - Entities of any type that are currently unmapped.
- **Life Form** - Any human or animal entities.
- **Ground** - All ground vehicles.
- **Air** - All aircraft.
- **Marine** - All watercraft.
- **Munitions** - All munitions.
- **Other** - Any entities, such as cultural features, that do not fit the other categories.

Use the following features to sort, filter, and find entities in the Active Entities page:

- Use the **Search** bar to find specific entities or types of entities.
- Use the Entity Category **ON / OFF** buttons to filter which entity categories are displayed. These categories also indicate how many entities of that type are currently active.
- The default number of entities shown per page is 10. Use the **per page** dialog box at the bottom of the page to change the number of entities displayed.

Type	Ownership	Fuzzy	Remote Category Remote Type	VBS Type	URN	Location	Speed (m s ⁻¹)	Altitude ASL (m)	Damage (%)	Side	+ Filter
	Local	Original	SISO 3 1 225 13 80 0 0	vbs2_us_af_fighterpilot_d_berettam9 US USAF Desert - Fighter Pilot - Beretta M9	999978.69 : 1000025.19	0.00 m s ⁻¹ 32.98 m	0.00	Friendly			
	Local	Original	SISO	vbs2_m1_abrams_mcr Objects - Accessories - MCR Mine Roller	1000047.13 : 999912.77	0.00 m s ⁻¹ 33.08 m	0.00	Friendly			
	Remote DIS_1_3030_6059_2	Fuzzy	SISO Fuzzy: 1 2 225 2 4 1 0 (Original: 1 2 225 2 0 0 0)	vbs_us_af_a10a_gry_agm65_hydra_x US USAF Air - A-10A - GBU-8 - Hydra - AGM-65	1000031.28 : 999921.10	0.00 m s ⁻¹ 32.94 m	0.00	Friendly			
	Remote DIS_1_3030_6059_1	Original	SISO 3 1 225 13 80 0 0	vbs2_us_af_fighterpilot_w_berettam9 US USAF Woodland - Fighter Pilot - Beretta M9	1000038.46 : 999937.19	0.00 m s ⁻¹ 32.98 m	0.00	Friendly			
	Remote DIS_1_3030_6059_4	Fuzzy	SISO Fuzzy: 1 1 225 1 1 1 1 0 (Original: 1 1 225 1 0 0 0)	vbs2_us_army_m1a2_d_mcr_x US Army Tracked - Desert - M1A2 - MCR	1000043.70 : 999909.89	0.00 m s ⁻¹ 33.00 m	0.00	Friendly			
	Remote DIS_1_3030_6059_3	Fuzzy	SISO Fuzzy: 3 1 1 1 1 0 0 0 (Original: 3 1 1 1 0 0 0)	vbs2_af_ana_grenadier_w_m16_m203 Af Army - Woodland - Grenadier - M16/M203	1000019.52 : 999931.38	0.00 m s ⁻¹ 32.99 m	0.00	Friendly			

Information is displayed in the following columns on the Active Entities page.

All entity-information columns enable either alphabetic or numeric sorting by clicking column heading.

Click **+ Filter** to display column filters.

Type	Ownership	Fuzzy	Remote Category Remote Type	VBS Type	URN	Location	Speed (m s ⁻¹)	Altitude ASL (m)	Damage (%)	Side	+ Filter

All entity-information columns use filters that vary according to the type of content:

- Category columns such as **Type**, **Ownership**, **Fuzzy**, and **Side** use category selection filters.
- String columns such as **VBS Type** and **Remote Category / Remote Type** use dynamic search input filters.
- Numeric columns such as **Location** and **Speed** use Min and Max input filters.

Column	Description
Type	<p>Entity type. Can be:</p> <ul style="list-style-type: none"> • No Filter (no entity type filter is applied) • Unmapped • Life Form • Ground <ul style="list-style-type: none"> • Air • Marine • Munitions • Other
Ownership	<p>Entity ownership. Indicates if the entity is local or remote. Also, shows the script reference name for the entity, if one exists. The script reference name can be used to identify the entity for script calls. For remote entities, script reference names are automatically generated based on the adapter and source application.</p>
<div style="border: 1px solid #800000; padding: 5px;"> 📝 EXAMPLE <p>DIS_1_152_303_17. The script reference name for local and remote entities can be edited from the Entity Details dialog (see Entity Details Dialog (on page 79)) and in Execute mode for local entities.</p> </div>	
	<p>Can be:</p> <ul style="list-style-type: none"> • No Filter (no entity-ownership filter applied) • Local (the entity is local and managed by the local VBS4 instance) • Remote (the entity is remote and managed by either a remote VBS4 instance or another simulation product)
Fuzzy	<p>Shows Original for original mappings, and Fuzzy for fuzzy / closest match ones (for more information, see Fuzzy Mapping (on page 36)). Can be:</p> <ul style="list-style-type: none"> • No Filter (no mapping filter is applied) • Fuzzy (fuzzy mapping is applied) • Original (exact mapping is applied)
Remote Category / Type	<p>Specifies the standard and enumeration for this entity. Fuzzy mappings (see Fuzzy Mapping (on page 36)) appear in bold.</p>
VBS Type	VBS class name of the entity.
URN	Marking set for this entity. This is displayed on the side vehicles, in the editor, and on remote servers. This field is blank if no URN has been set for an entity.
Location	Current map coordinates of the entity. The units used are internal to VBS4.
Speed / Altitude	The first number indicates current speed of the entity in meters per second. The second number indicates the current altitude in meters.
Damage	Percentage of maximum damage the entity has taken.

Column	Description
Side	Side the entity belongs to. Can be: <ul style="list-style-type: none">• No Filter (no side filter is applied)• Opposing (OPFOR side only)• Friendly (BLUFOR side only)• Neutral (neutral side only)• Other (any other side)

Click the Details icon on any row to open the Entity Details dialog (see [Entity Details Dialog \(on page 79\)](#) in the VBS Gateway Manual) to see more detailed information about that entity.



Click the Edit icon on any row to open the [Mapping Dialog \(on page 23\)](#) to view and edit the mappings.



During a scenario, the following situations may require attention:

- An entity has an incorrect Entity Class or an incorrect VBS Class.
See [Edit an Entity Mapping \(below\)](#) to correct this error.
- An active VBS4 entity is not mapped.
See [Detect and Fix Unmapped VBS Entities \(on page 74\)](#) to correct this error.
- An active remote entity is not mapped.
See [Detect and Fix Remote Entities \(on page 77\)](#) to correct this error.
- The appearance and performance of incoming entities in VBS4 or of outgoing entities in the remote simulation is incorrect.
See [Modify the Simulation Settings \(on page 78\)](#) to correct this error.

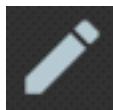
7.1 Edit an Entity Mapping

To change the mapping between an Entity Class and a VBS4 model, edit the entity mapping.

Follow these steps:

1. Open the Active Entities page or the Mappings page (see [Active Entities Page \(on page 20\)](#) or [Mappings Page \(on page 22\)](#) in the VBS Gateway Manual) and use the Category Filters, Search, or Column Filters to locate the mapping.

2. Select the row to edit, and click the **Edit** icon.



The Mapping dialog opens.

3. To change the **VBS Type** to map:

- a. Click **Change VBS Model**.

The Select VBS Model page opens.

- b. Use the **Search** input and click **OK** to filter the list.
- c. Select a model from the list and click **OK**.

VBS Gateway updates the VBS Type section of the Mapping dialog.

4. To change the **Incoming** mappings:

- a. To remove an incoming mapping, click the Trash Icon for the mapping to delete, and confirm.



- b. To add an incoming mapping, in the **Incoming** section, click **Add Remote Mapping**.

The Add Remote Mapping dialog opens.

- c. Do one of the following:

- Type the entity class enumeration in the input.
- Use the enumeration drop-downs for each enumeration category.

- d. Click **Add**.

VBS Gateway updates the Incoming section of the Mapping dialog.

 **NOTE**

VBS Gateway allows multiple incoming mappings to the same VBS model.

5. To add an **Outgoing** mapping:

- a. To remove the existing mapping, click the Trash Icon for the outgoing mapping, and confirm.



- b. To add a new outgoing mapping, in the **Outgoing** section, click **Add Remote Mapping**.

The Add Remote Mapping dialog opens.

- c. Do one of the following:

- Type the entity class enumeration in the input.
- Use the enumeration drop-downs for each enumeration category.

- d. Click **Add**.

VBS Gateway updates the Outgoing section of the Mapping dialog.

NOTE

VBS Gateway allows one outgoing mapping for each VBS model. Multiple models may use the same outgoing mapping.

6. Close the Mapping dialog.

VBS Gateway adds the entity mapping to the incoming and outgoing mapping tables.

7.2 Detect and Fix Unmapped VBS Entities

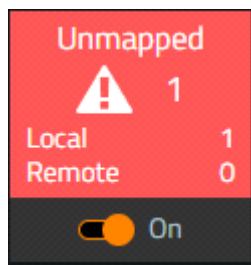
A VBS4 model may not have an outgoing mapping to broadcast to external simulations.

You can fix these outgoing mappings either using the Active Entities page or the Mappings page (see [Active Entities Page \(on page 20\)](#) or [Mappings Page \(on page 22\)](#) in the VBS Gateway Manual).

- [Using the Active Entities Page \(on the next page\)](#)
- [Using the Mappings Page \(on page 76\)](#)

7.2.1 Using the Active Entities Page

Use the Unmapped Category button on the Active Entities page.



To assign missing Entity Classes to VBS4 models, detect and fix unmapped entities.

Follow these steps:

1. Open the Active Entities page (see [Active Entities Page \(on page 20\)](#) in the VBS Gateway Manual) and use the filters to display only Unmapped entities.
2. Select an unmapped Local Ownership row, and click the **Edit** icon.



The Mapping dialog opens.

3. To edit the outgoing Entity Class:
 - a. In the **Outgoing** section, click **Add Remote Mapping**.
The Add Remote Mapping dialog opens.
 - b. Do one of the following:
 - Type the entity class enumeration in the input.
 - Use the enumeration drop-downs for each enumeration category.
 - c. Click **Add**.

4. Close the Mapping dialog.

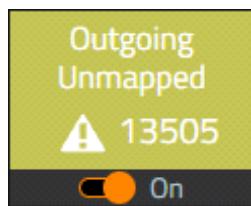
VBS Gateway updates the Active Entities page.

5. Repeat steps 2 through 4 for each *Unmapped* entity.

The outgoing mappings are fixed, using the Active Entities page.

7.2.2 Using the Mappings Page

Alternatively, use the Outgoing Unmapped Category button to fix the outgoing mappings.



To assign missing Entity Classes to VBS4 models, detect and fix unmapped entities.

Follow these steps:

1. Open the Mappings page and use the filters to display only Outgoing Unmapped entities.
2. Select a row for the Outgoing Unmapped entity, and click the **Edit** icon.



The Mapping dialog opens.

3. To edit the Entity Class:
 - a. In the **Outgoing** section, click **Add Remote Mapping**.

The Add Remote Mapping dialog opens.

- b. Do one of the following:
 - Type the entity class enumeration in the input.
 - Use the enumeration drop-downs for each enumeration category.
- c. Click **Add**.

4. Close the Mapping dialog.

VBS Gateway updates the Mappings page.

5. Repeat steps 2 through 4 for each *Outgoing Unmapped* entity.

The outgoing mappings are fixed, using the Mappings page.

7.3 Detect and Fix Remote Entities

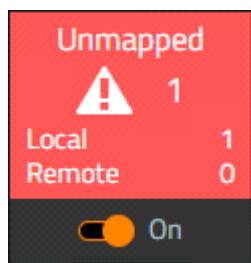
An entity in the remote simulation may not have a mapping in VBS4.

You can fix these incoming mappings either using the Active Entities page or the Mappings page (see [Active Entities Page \(on page 20\)](#) or [Mappings Page \(on page 22\)](#) in the VBS Gateway Manual).

- [Using the Active Entities Page \(below\)](#)
- [Using the Mappings Page \(on the next page\)](#)

7.3.1 Using the Active Entities Page

Use the Unmapped Category button on the Active Entities page.



To assign missing VBS4 models to Entity Classes, detect and fix unmapped VBS4 classes.

Follow these steps:

1. Open the Active Entities Page (see [Active Entities Page \(on page 20\)](#) in the VBS Gateway Manual) and use the filters to display only Unmapped entities.
2. Select an unmapped Remote Ownership row, and click the **Edit** icon.



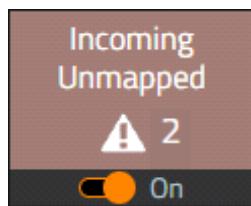
The Mapping dialog opens.

3. To modify the VBS4 model to use:
 - a. Click **Change VBS Model**.
The Select VBS Model page opens.
 - b. Use the **Search** input and click **OK** to filter the list.
 - c. Select a model from the list and click **OK**.
4. Close the Mapping dialog.
VBS Gateway updates the Active Entities page.
5. Repeat steps 2 through 4 for each *Unmapped* entity.

The incoming mappings are fixed, using the Active Entities page.

7.3.2 Using the Mappings Page

Alternatively, use the Incoming Unmapped Category to fix the incoming mappings.



To assign missing VBS4 models to Entity Classes, detect and fix unmapped VBS4 classes.

Follow these steps:

1. Open the Mappings page and use the filters to display only Incoming Unmapped entities.
2. Select a row for the Unmapped entity, and click the **Edit** icon.



The Mapping dialog opens.

3. To modify the VBS4 model to use:
 - a. Click **Change VBS Model**.The Select VBS Model page opens.
 - b. Use the **Search** input and click **OK** to filter the list.
 - c. Select a model from the list and click **OK**.
4. Close the Mapping dialog.
5. Repeat steps 2 through 4 for each *Incoming Unmapped* entity.

The incoming mappings are fixed, updating the Mappings page.

7.4 Modify the Simulation Settings

To control the appearance and performance of incoming remote entities in VBS4 and outgoing VBS4 entities in the remote simulation, modify the entity settings.

- Open the **Settings** page and review the Dead Reckoning and Filtering settings.

For more information, see [Configure General Settings \(on page 31\)](#).

NOTE

Changing settings restarts the VBS Gateway adapter. If a mission is running, remote entities disappear and then reappear.

7.5 Entity Details Dialog

The Entity Details Dialog displays attributes, status, and settings for the selected entity (unit or vehicle).

The panel consists of the following tabs:

- [Object Attributes \(on the next page\)](#)
- [Munitions Mapping \(on page 81\)](#)



7.5.1 Object Attributes

The Object Attributes panel provides the following information:

Object Attribute	Type	Description
Heading	Both	The dialog heading displays the script reference name for the entity. The script reference name can be used to identify the entity for script calls. For remote entities, script reference names are automatically generated based on the adapter and source application. The generated name can be edited here. Example: DIS_1_152_303_17
ID	Both	Indicates the application that is generating the entity and an identifying enumeration for the entity.
URN	Both	The marking set for this entity. This is displayed on the side of vehicles, in the editor, and on remote servers. This field is blank if no URN has been set for an entity.
Side	Both	The side the entity belongs to.
Controller	Both	If the entity is local, shows if entity is AI or player controlled. For remote entities, shows that the entity is remote but does not indicate AI or player control.
Manned	Vehicle	Shows current number of personnel aboard and maximum personnel capacity.
Speed	Both	The current speed of the entity in meters per second.
Heading	Both	The current direction of the entity.
Latitude / Longitude	Both	The current coordinates of entity. The units used are internal to VBS4.
Stance	Unit	Indicates the stance the entity is currently in.
Primary / Secondary Weapon Posture	Unit	Indicates if the weapon is deployed, raised, or stowed.
Damage	Both	The percentage of maximum damage the entity has taken.
Powered	Vehicle	Indicates whether the entity has power.
Mobility Kill	Vehicle	Indicates whether the entity is immobilized.
Firepower Kill	Vehicle	Indicates whether the entity weapons are disabled.
Catastrophic Kill	Vehicle	Indicates whether the entity is completely destroyed.
Smoking	Vehicle	Indicates whether entity damage is causing smoke.
Flaming	Vehicle	Indicates whether entity damage is causing fire.

7.5.2 Munitions Mapping

The Munitions Mapping tab displays the default types of munitions used by the entity.

vbs2_us_army_rifleman_ocp_m_medium_iotv_none_m4cco				X
Object Attributes	Munitions Mapping			
Name	Category	Description	+ Filter	
vbs2_ammo_g_m67_frag	Munition	m67 Frag		
vbs2_ammo_b_556x45_ball	Munition	5.56x45mm		

1 of 1 per page 10

 **NOTE**

This table may include some VBS4 internal munition types that are not valid for normal use.

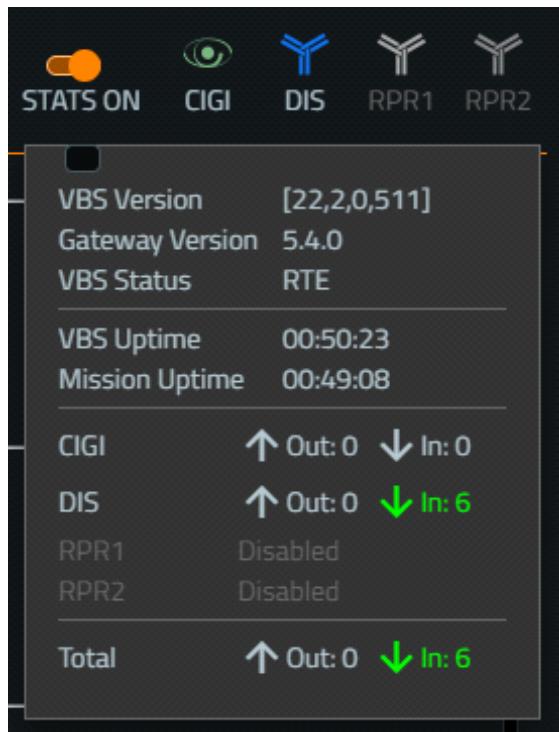
To edit any of these mappings, select the munition and click the **Edit** icon to open the [Mapping Dialog \(on page 23\)](#) for the munition.



8. Communications Monitoring

Communication Administrators use the UI Header to monitor the communications status of VBS Gateway and the Settings page (see [Settings Page \(on page 28\)](#) in the VBS Gateway Manual) to modify communications parameters as required.

Click **Stats On** to view the current status.



VBS Version	The version of the VBS4 instance.
Gateway Version	The version of VBS Gateway.
VBS Status	The current status of the VBS4 instance.
VBS Uptime	Displays how long the current VBS4 instance has been running.
Mission Uptime	Displays how long the network mission has been running.
Adapter Indicator	Description
Transmitting	Indicates whether VBS4 is transmitting messages to the network: <ul style="list-style-type: none">Grey - VBS Gateway is not transmitting messages.Green - VBS Gateway is currently transmitting messages. The frequency of blinks corresponds to the current traffic load.
	Out: The number of messages received per second.

Receiving

Indicates whether VBS4 is receiving messages from the network:

- **Grey** - VBS Gateway is not receiving messages.
- **Green** - VBS Gateway is currently receiving messages.

The frequency of blinks corresponds to the current traffic load.

In: The number of messages sent per second.

In any situation where VBS Gateway is not receiving or sending during the mission, verify the communications settings.

- Open the Settings page (see [Settings Page \(on page 28\)](#) in the VBS Gateway Manual) and review the appropriate settings for that protocol.

For more information, see [Configure VBS Gateway \(on page 30\)](#).

NOTE

Changing settings restarts the VBS Gateway adapter. If a mission is running, remote entities disappear and then reappear.

9. 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 \(on page 87\)](#)
- [VBS Gateway Troubleshooting \(on page 90\)](#)
- [VBS Gateway Script Commands \(on page 91\)](#)

9.1 VBS Gateway Configuration File

The base configuration set during [Configure VBS Gateway \(on page 30\)](#) 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 87) .
<code><Networking></code>	Contains the communications protocol settings defined during initial setup. For more information, see Configure VBS Gateway (on page 30) .
<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 (on page 30) .
<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 (on page 30) .
<code><Filtering></code>	Contains the Geofilter settings defined during initial setup. For more information, see Configure VBS Gateway (on page 30) .

9.1.1 VBS Gateway UI Settings

Modify parameters in the `<GUI>` tag of the configuration file to change the VBS Gateway UI settings.

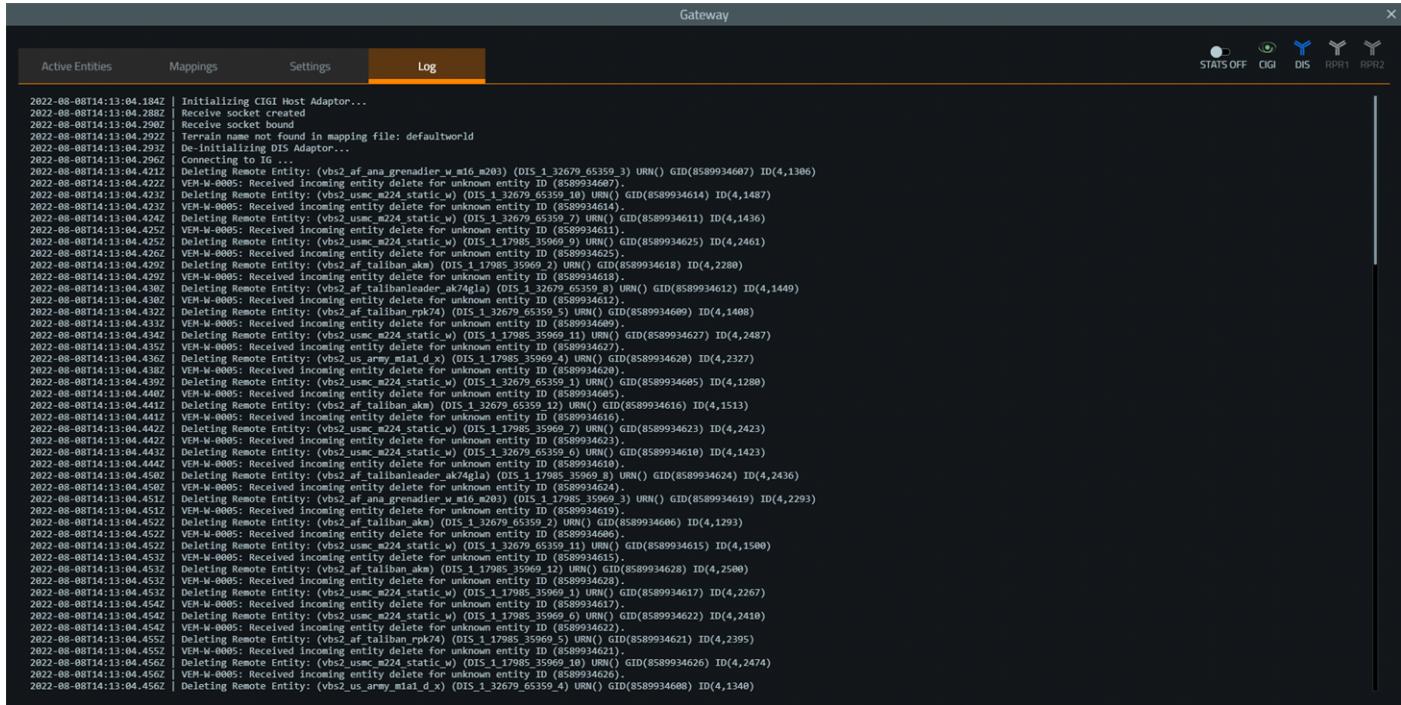
Parameter	Description
<code><Enabled></code>	If false (0), the UI service does not initialize with the Gateway plugin. Only change this value to 0 - false for debugging purposes. Default: 1 - true

Parameter	Description
<code><EntitiesRefreshInterval></code>	<p>Specifies the interval between Active Entities tab auto-updates.</p> <p>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.</p> <p>If no messages are sent or transmitted within this period, the arrow indicators in the UI header change to red.</p>

9.2 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.



```

Gateway

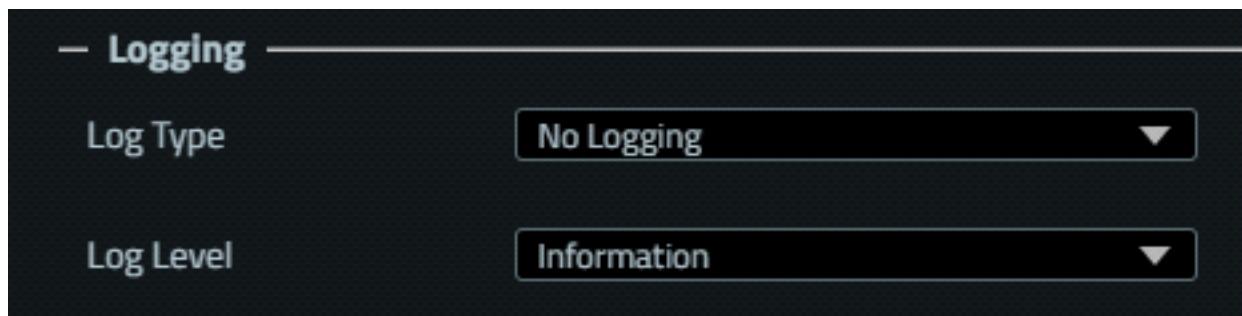
Active Entities Mappings Settings Log

2022-08-08T14:13:04.184Z | Initializing CGI Host Adapter...
2022-08-08T14:13:04.288Z | Receive socket created
2022-08-08T14:13:04.290Z | Receive socket bound
2022-08-08T14:13:04.291Z | Remote 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_m16_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(8589934610) ID(4,1423)
2022-08-08T14:13:04.444Z | VEM-W-0005: Received incoming entity delete for unknown entity ID (8589934610).
2022-08-08T14:13:04.450Z | Deleting Remote Entity: (vbz2_af_talibaneader_ak7agle) (DIS_1_17985_35969_9) URN() GID(8589934624) ID(4,2436)
2022-08-08T14:13:04.451Z | 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)
2022-08-08T14:13:04.452Z | 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_32679_65359_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_m161_d_x) (DIS_1_32679_65359_4) URN() GID(8589934608) ID(4,1348)

```

9.2.1 Log Settings

The Log settings are found in the General section of the [Settings Page \(on page 28\)](#).



General Settings	Description						
Log Type	<p>Specifies whether or not to log messages.</p> <p>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 (below).</p>						
Log Level	<p>Specifies the severity of messages to log.</p> <p>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							

9.2.2 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.

9.2.2.1 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>

9.3 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 \(on page 87\)](#).

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.

9.4 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>

10. Supported DIS PDUs

VBS Gateway supports the following Distributed Interactive Simulation (DIS) Protocol Data Units (PDUs).

- [Entity State \(below\)](#)
- [Designator \(on the next page\)](#)
- [Fire \(on the next page\)](#)
- [Detonation \(on page 95\)](#)
- [Electromagnetic Emission \(on page 96\)](#)
- [IFF \(on page 99\)](#)

10.1 Entity State

The following Entity State PDU parameters are supported:

Parameter	Supported?	Additional Information
Entity ID Record	Yes	
Force Identification	Yes	Maps to one of the VBS4 Sides (BLUFOR, OPFOR, Civilian, Independent). Cannot be changed.
Number of Articulation Parameters	Yes	
Entity Type Record	Yes	Entity is recreated on change.
Alternative Entity Type Record	No	The value of Entity Type Record (above) is sent out.
Entity Linear Velocity	Yes	
Entity Location	Yes	
Entity Orientation	Yes	
Entity Appearance	Partial	<p>General supported values:</p> <ul style="list-style-type: none"> • Entity Mobility Kill • Entity Fire Power • Entity Damage • Entity Smoke • Entity Lights • Entity Flaming Effect <p>Vehicle supported values:</p> <ul style="list-style-type: none"> • Power-plant Status <p>Lifeform supported values:</p> <ul style="list-style-type: none"> • Lifeform State • Weapon 1 • Weapon 2 <p>Other values are unsupported.</p>
Dead Reckoning Parameters	Yes	

Parameter	Supported?	Additional Information
Entity Marking	Yes	Only ASCII is supported. Only some VBS4 models support it.
Entity Capabilities	No	
Articulation Parameter	Partial	Works if Send Outgoing Animations (on page 35) or Receive Incoming Animations (on page 36) is on and if the animations are mapped (only animations supported by VBS4 can be mapped). Otherwise, only works for turrets. Only Articulated Parts are supported (Attached Parts are not).

10.2 Designator

The following Designator PDU parameters are supported:

Parameter	Supported?	Additional Information
Designating Entity ID	Yes	
Code Name	Yes	
Designated Entity ID	Yes	
Designator Code	Yes	
Designator Power	Yes	
Designator Wavelength	Yes	
Designator Spot with Respect to Designated Entity	Yes	
Designator Spot Location	Yes	
Dead Reckoning Algorithm	No	
Padding	No	
Entity Linear Acceleration	Yes	

10.3 Fire

The following Fire PDU parameters are supported:

Parameter	Sub-Parameter	Supported?	Additional Information
Firing Entity ID		Yes	
Target Entity ID		Yes	

Parameter	Sub-Parameter	Supported?	Additional Information
Munition ID		Yes	
Event Identifier		Yes	
Fire Mission Index		No	
Location in World		Yes	
Burst Descriptor	Munition Record	Yes	
	Warhead	No	
	Fuse	No	
	Quantity	No	Each round is a separate event. Set to 1 for outgoing events.
	Rate	No	Set to 1 for outgoing events.
Velocity		Yes	
Range		No	

10.4 Detonation

The following Detonation PDU parameters are supported:

Parameter	Sub-Parameter	Supported?	Additional Information
Firing Entity Identification		Yes	
Target Entity Identification		Yes	
Munition Identification		Yes	
Event Identification		Yes	
Velocity		Yes	
Location in World		Yes	
Burst Descriptor	Munition Record	Yes	
	Warhead	No	
	Fuse	No	
	Quantity	No	Each round is a separate event. Set to 1 for outgoing events.
	Rate	No	Set to 1 for outgoing entities.

Parameter	Sub-Parameter	Supported?	Additional Information
Location in Entity Coordinates		Yes	
Detonation Result		Yes	
Number of Articulation Parameters		No	
Padding		No	
Articulation Parameters		No	

10.5 Electromagnetic Emission

The following Electromagnetic Emission (EE) PDU parameters are supported:

Parameter	Sub-Parameter	Supported?	Additional Information
Emitting Entity ID		Yes	
Event ID		Yes	Outgoing - ID starts at 0 and is incremented at each event, the ID is unique just for EE PDUs, not for other global events.
State Update Indicator		No	Outgoing contains 0.
Number of Systems (N)		Partial	Outgoing contains 1 emitter system. Incoming systems are filtered according to the "Acquisition / Detection (5)" Emitter Function.
Padding		Yes	Part of the message.
Emitter System Data (N emitter systems, where $i = 1$ to N)			
System $\#i$ > System Data Length		Yes	Automatically calculated with a non-zero size.
System $\#i$ > Number of Beams (M_i)		Yes	Outgoing contains always 1 beam. Incoming can have more than 1 beam, but the beam with the strongest power is used.

Parameter	Sub-Parameter	Supported?	Additional Information
System $\#_i$ > Emitter System	Emitter Name	No	Outgoing contains "Unknown (0)".
	Emitter Function	Partial	Outgoing contains "Acquisition / Detection (5)". Incoming systems are filtered according to "Acquisition / Detection (5)".
	Emitter ID Number	No	Outgoing contains 0.
System $\#_i$ > Location		No	Outgoing contains [0, 0, 0].
Beam Data for each Emitter System (M_i beams, where $j = 1$ to M_i)			
System $\#_i$ > Beam $\#_j$ > Beam Data Length		Yes	Automatically calculated with a non-zero size.
System $\#_i$ > Beam $\#_j$ > Beam ID Number		No	Outgoing contains 0.
System $\#_i$ > Beam $\#_j$ > Beam Parameter Index		No	Outgoing contains 0.

Parameter	Sub-Parameter	Supported?	Additional Information
System #i > Beam #j> Fundamental Parameter Data	Frequency	No	Outgoing contains 0.
	Frequency Range	No	Outgoing contains 0.
	Effective Radiated Power	Yes	Outgoing is set according to the Range radar setting (see Electronic Warfare in the VBS4 Editor Manual). Incoming sets the value to the Range radar setting.
			<p>NOTE</p> <p>This sub-parameter contains power (in dBm), but the radar settings in VBS4 use a range (in meters). Therefore, the power value is converted to a range one.</p>
	Pulse Repetition Frequency	No	Outgoing contains 0.
	Pulse Width	No	Outgoing contains 0.
	Beam Azimuth Center	Partial	Outgoing is set to 0. Incoming is ignored.
	Beam Azimuth Sweep	Partial	Outgoing is set to π . Incoming is ignored.
System #i > Beam #j > Beam Function	Beam Elevation Center	Partial	Outgoing is set to 0. Incoming is ignored.
	Beam Elevation Sweep	Partial	Outgoing set to $\pi/2$. Incoming is ignored
System #i > Beam #j > Beam Function	Beam Sweep Sync	Partial	Outgoing is set according to the Sweep Duration radar setting (see Electronic Warfare in the VBS4 Editor Manual). Incoming sets the value to the Sweep Duration radar setting.
		No	Outgoing contains "Other (0)".

Parameter	Sub-Parameter	Supported?	Additional Information
System # <i>i</i> > Beam # <i>j</i> > Number of Targets		No	Outgoing contains 0.
System # <i>i</i> > Beam # <i>j</i> > Number of Targets (<i>P_{ij}</i>)		No	Outgoing contains 0.
System # <i>i</i> > Beam # <i>j</i> > High Density Track / Jam		No	Outgoing contains 0.
Padding		Yes	Part of the message.
System # <i>i</i> > Beam # <i>j</i> > Jamming Mode Sequence		No	Outgoing contains 0.
Track / Jam Data for each beam (<i>P_{ij}</i> targets)			
Track / Jam Data		No	There are always 0 targets. Therefore, this parameter is not used.

10.6 IFF

The following IFF PDU parameters are supported:

Parameter	Sub-Parameter	Supported?	Additional Information
Emitting Entity ID		Yes	
Event ID		Yes	
Relative Antenna Location		No	
System ID		No	Outgoing system type - 1 (Mark X / XII / ATCRBS Transponder). Outgoing system name - 7 (Generic Mark X / XII / ATCRBS / Mode S).
System Designator		No	
System-Specific Data		No	

Parameter	Sub-Parameter	Supported?	Additional Information
Fundamental Operational Data	System Status	Partial	Only Modes 1, 2, 3A, and C Altitude are supported.
	Information Layers	Partial	Only Layer 1 is supported.
	Modifier Record	No	
	Mode 1	Partial	Only the Code record is supported.
	Mode 2	Partial	Only the Code record is supported.
	Mode 3	Partial	Only the Code record is supported.
	Mode 4	No	
	Mode 5	Partial	Only Mode C Altitude is supported.
	Mode S	No	

11. Supported HLA FOM Object Classes and Interactions

VBS Gateway supports the following High Level Architecture (HLA) for Real-time Platform Reference Federation Object Model (RPR FOM) version 2.0 (RPR2) object classes and interactions.

- [BaseEntity \(below\)](#)
- [BaseEntity > PhysicalEntity \(below\)](#)
- [PhysicalEntity > Platform \(on the next page\)](#)
- [PhysicalEntity > Lifeform \(on page 103\)](#)
- [EmbeddedSystem \(on page 104\)](#)
- [EmbeddedSystem > Designator \(on page 104\)](#)
- [EmbeddedSystem > IFF > NatIFF \(on page 104\)](#)
- [EmbeddedSystem > IFF > NatIFF > NatIFFTransponder \(on page 106\)](#)
- [WeaponFire \(on page 106\)](#)
- [MunitionDetonation \(on page 107\)](#)

11.1 BaseEntity

The following BaseEntity object-class parameters are supported:

Parameter	Supported?	Additional Information
EntityType	Yes	
EntityIdentifier	Yes	
IsPartOf	No	
Spatial	Yes	
RelativeSpatial	No	

11.2 BaseEntity > PhysicalEntity

The following BaseEntity > PhysicalEntity object-class parameters are supported:

Parameter	Supported?	Additional Information
AcousticSignatureIndex	No	
AlternateEntityType	No	
ArticulatedParametersArray	Yes	

Parameter	Supported?	Additional Information
CamouflageType	No	
DamageState	Yes	
EngineSmokeOn	Yes	
FirePowerDisabled	Yes	
FlamesPresent	Yes	
ForcedIdentifier	Yes	
HasAmmunitionSupplyCap	No	
HasFuelSupplyCap	No	
HasRecoveryCap	No	
HasRepairCap	No	
Immobilized	Yes	
InfraredSignatureIndex	No	
IsConcealed	No	
LiveEntityMeasuredSpeed	No	
Marking	Yes	
PowerPlantOn	Yes	
PropulsionSystemsData	No	
RadarCrossSectionSignatureIndex	No	
SmokePlumePresent	Yes	
TentDeployed	No	
TrailingEffectsCode	No	
VectoringNozzleSystemData	No	

11.3 PhysicalEntity > Platform

The following PhysicalEntity > Platform object-class parameters are supported:

Parameter	Supported?	Additional Information
AfterburnerOn	No	
AntiCollisionLightsOn	No	
BlackOutBrakeLightsOn	Yes	

Parameter	Supported?	Additional Information
BlackOutLightsOn	Yes	
BrakeLightsOn	Yes	
FormationLightsOn	No	
HatchState	No	
HeadLightsOn	Yes	
InteriorLightsOn	No	
LandingLightsOn	Yes	Matches Convoy Lights in VBS4. For more information, see Vehicle Light Controls in the VBS4 Trainee Manual.
LauncherRaised	No	
NavigationLightsOn	No	
RampDeployed	No	
RunningLightsOn	Yes	
SpotLightsOn	No	
TailLightsOn	Yes	

11.4 PhysicalEntity > Lifeform

The following PhysicalEntity > Lifeform object-class parameters are supported:

Parameter	Supported?	Additional Information
FlashLightsOn	No	
StanceCode	Yes	Mapped to whatever the VBS4 animation system can handle.
PrimaryWeaponState	Yes	
SecondaryWeaponState	Yes	
ComplianceState	No	

11.5 EmbeddedSystem

The following EmbeddedSystem object-class parameters are supported:

Parameter	Supported?	Additional Information
EntityIdentifier	Yes	
HostObjectIdentifier	Yes	
RelativePosition	No	

11.6 EmbeddedSystem > Designator

The following EmbeddedSystem > Designator object-class parameters are supported:

Parameter	Supported?	Additional Information
CodeName	Yes	
DesignatedObjectIdentifier	Yes	
DesignatorCode	Yes	
DesignatorEmissionWavelength	Yes	
DesignatorOutputPower	Yes	
DesignatorSpotLocation	Yes	
DeadReckoningAlgorithm	No	
RelativeSpotLocation	Yes	
SpotLinearAccelerationVector	Yes	

11.7 EmbeddedSystem > IFF > NatoIFF

The following EmbeddedSystem > IFF > NatoIFF object-class parameters are supported:

Parameter	Supported?	Additional Information
AlternateMode4	No	
Mode1Enabled	Yes	
Mode1IsDamaged	No	
Mode1IsMalfunctioning	No	
Mode1IsOn	Yes	
Mode2Enabled	Yes	

Parameter	Supported?	Additional Information
Mode2IsDamaged	No	
Mode2IsMalfunctioning	No	
Mode2IsOn	Yes	
Mode3AEnabled	Yes	
Mode3AIsDamaged	No	
Mode3AIsMalfunctioning	No	
Mode3AIsOn	Yes	
Mode4Enabled	No	
Mode4IsDamaged	No	
Mode4IsMalfunctioning	No	
Mode4IsOn	No	
Mode4PseudoCrypto	No	
Mode4PseudoCryptoAvailable	No	
Mode5CEnabled	Yes	
Mode5CIsDamaged	No	
Mode5CIsMalfunctioning	No	
Mode5CIsOn	Yes	
ModeSEnabled	No	
ModeSIsDamaged	No	
ModeSIsMalfunctioning	No	
ModeSIsOn	No	
ModeSIsTcasI	No	

11.8 EmbeddedSystem > IFF > NatoIFF > NatoIFFTransponder

The following EmbeddedSystem > IFF > NatoIFF > NatoIFFTransponder object-class parameters are supported:

Parameter	Supported?	Additional Information
EmergencyOn	No	
IdentSquawkFlashOn	No	
Mode1Code	Yes	
Mode2Code	Yes	
Mode3ACode	Yes	
Mode5CAltitude	Yes	
Mode5CAltitudeAvailable	Yes	
StiOn	No	

11.9 WeaponFire

The following WeaponFire interaction parameters are supported:

Parameter	Supported?	Additional Information
EventIdentifier	Yes	
FireControlSolutionRange	No	
FireMissionIndex	No	
FiringLocation	Yes	
FiringObjectIdentifier	Yes	
FuseType	No	
InitialVelocityVector	Yes	
MunitionObjectIdentifier	Yes	
MunitionType	Yes	
QuantityFired	No	Each round is a separate event. Set to 1 for outgoing events.
RateOfFire	No	Set to 1 for outgoing events.
TargetObjectIdentifier	Yes	
WarheadType	No	

11.10 MunitionDetonation

The following MunitionDetonation interaction parameters are supported:

Parameter	Supported?	Additional Information
ArticulatedPartData	No	
DetonationLocation	Yes	
DetonationresultCode	Yes	
EventIdentifier	Yes	
FiringObjectIdentifier	Yes	
FinalVelocityVector	Yes	
FuseType	No	
MunitionObjectIdentifier	Yes	
MunitionType	Yes	
QuantityFired	No	Each round is a separate event. Set to 1 for outgoing events.
RateOfFire	No	Set to 1 for outgoing events.
RelativeDetonationLocation	Yes	
TargetObjectIdentifier	Yes	
WarheadType	No	