

HX45M Bridge Laying



VBS4 24.1.1



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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. HX45M Bridge Laying (Land 155)

The HX45M vehicle simulates manual and Control AI-based (autonomous) Dry Support Bridge (DSB) laying capabilities.

There are two types of HX45M bridge-laying simulation:

Bridge-Laying Simulation	Description
AI Bridge Laying	All the bridge-laying crew members are Control AI.
Player Bridge Laying	All the bridge-laying crew members are player-controlled.

The general workflow of an HX45M bridge-laying scenario in VBS4 is:

- [Bridge Laying Preparation \(below\)](#)
- [Bridge Laying Execution \(on the next page\)](#)

1.1 Bridge Laying Preparation

As an administrator, use VBS Editor in Prepare mode to create an HX45M Bridge Laying Scenario.

Follow these steps:

1. Use VBS Editor to create a new Scenario, or edit an existing one.

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

2. VBS4 has vehicles with specific HX45M bridge-laying functionality:

Vehicle	Description
HX45M DSB	Bridge-builder vehicle with a crane.
HX77 ILHS - Loaded	Vehicle with support modules (bridge segments).
Haulmark 3axle - Loaded	Optional trailer, carrying support modules, that can be towed by the HX77 ILHS - Loaded vehicle.

For more information, see [Bridge Laying Convoy AI \(on page 11\)](#).

Add vehicles to the scenario.

For more information on placing vehicles, see Adding Vehicles in the VBS4 Editor Manual.

3. For **Player Bridge Laying**, place the bridge-laying vehicles and crews.

NOTE

Bridge-laying vehicles and crews do not need to be linked to form groups, and crews can start the scenario outside the vehicles.

4. For **AI Bridge Laying** do the following:

- a. Make sure that all crew members are in the bridge-laying vehicles (see the previous procedure step, and the difference between **(F4) Vehicle** and **(F5) Empty Vehicle** in the Editor Objects List).
- b. Make sure that all the vehicle crew members are controlled by **Control AI**. For more information, see the playability options in Edit Vehicle Options in the VBS4 Editor Manual.
- c. Link the bridge-laying vehicles into a group. For more information, see Creating and Adding to Groups with Links in the VBS4 Editor Manual.
- d. Add a bridge-laying [Deploy DSB Order \(on page 15\)](#) Waypoint.

For more information, see [Bridge Laying Convoy AI \(on page 11\)](#).

5. Preview and save the mission.

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

1.2 Bridge Laying Execution

Once the Bridge-Laying Scenario is prepared by the administrator, it can be executed.

Start the Scenario and open VBS Editor.

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

A typical Bridge Laying scenario has the following phases:

1. For **Player Bridge Laying**, if the crew members are not in the vehicles, they enter them, occupying the required driver positions.

Players use movement controls and 3D World Actions (see [Interact with Vehicles Interface \(IWF\) \(on page 18\)](#)) to enter the vehicles.

2. For **Player Bridge Laying**:

As drivers, drive the vehicles into position and / or unload the support modules cargo, and operate the HX45M crane to construct and deploy the bridge.

For more information, see:

- [Land Vehicle Controls \(on page 20\)](#).
- [Bridge Laying - HX45M \(on page 8\)](#).

Use radio communication. For more information, see VBS Radio Overview in the VBS Radio Manual.

3. For AI Bridge Laying:

If the [Bridge Laying Preparation \(on page 5\)](#) is done correctly and no bridge-laying errors appear during runtime, the bridge-laying vehicles:

- a. Drive to the [Deploy DSB Order \(on page 15\)](#) Waypoint.
- b. Park at their respective positions.
- c. The HX45M vehicle prepares the crane for construction.
- d. The HX45M vehicle constructs the bridge.
- e. The HX45M vehicle deploys the constructed bridge.

If the [Bridge Laying Preparation \(on page 5\)](#) is done incorrectly and some bridge-laying errors appear during runtime, as an administrator, return back to [Bridge Laying Preparation \(on page 5\)](#) and resolve the errors accordingly.

For more information, see [Bridge Laying Convoy AI \(on page 11\)](#).

2. Bridge Laying - HX45M

The HX45M vehicle allows you to build a Dry Support Bridge (DSB).

For autonomous Control AI bridge laying, see [Bridge Laying Convoy AI \(on page 11\)](#).

The following vehicle models are required:

- **HX45M DSB** - Bridge-builder vehicle with a crane.
- **HX77 ILHS - Loaded** - Vehicle with support modules (bridge segments).

In addition, the following optional objects can be used:

- **Haulmark 3axle - Loaded** - Optional trailer, carrying support modules, that can be towed by the **HX77 ILHS - Loaded** vehicle.

Follow these steps:

1. Park the **HX45M** where you want to build the bridge.

NOTE

The HX45M builds the bridge at the rear of the vehicle.

2. **HX77 and Haulmark** - Do one of the following:

- Park the HX77 and / or Haulmark close to the HX45M crane (max 20m).
- Use the [Demountable Rack Offload and Pickup System \(DROPS\) \(on page 21\)](#) to offload the HX77 and / or Haulmark flatrack cargo close to the HX45M crane (max 20m).

3. As the HX45M driver, open the Quick Menu (see [Quick Menu Actions \(on page 25\)](#)), and select **DEPLOY BRIDGE > PREPARE**.

3D green or red arrows appear, indicating the bridge start, end, and extension point.



The extension point is located at the front of the vehicle, indicating the position the HX45M should drive to prepare the crane for construction. There should be no obstacles in front of the HX45M (the arrow turns red otherwise).

4. Press **C / X** to increase / decrease the bridge size.

The bridge arrows turn green (if construction is possible) or red (if construction is impossible).

The number of support modules that appears on the screen, indicates the number of HX77 vehicles (and, if present, Haulmark trailers), required to build the bridge. The minimum number of support modules is 4, and the maximum is 6, which corresponds to the minimum and maximum bridge span of 22 - 46 meters.

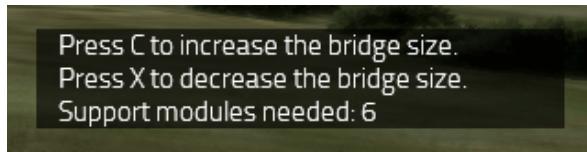


Image-1: Left to right: bridge extension-point, start, and end arrows



5. Open the Quick Menu, and select **DEPLOY BRIDGE > DEPLOY**.

The crane is prepared for construction.



To stow the crane, in the Quick Menu, select **DEPLOY BRIDGE > STOW**.

6. In the Quick Menu, select **DEPLOY BRIDGE > CONSTRUCT**.

⚠️ WARNING

If the **CONSTRUCT** option is disabled, it means that there are not enough support modules, and / or the support modules are positioned too far from the HX45M crane (all the HX77 and / or Haulmark flatrack cargo needs to be positioned within 20 meters from the crane).

Bridge construction begins.

✓ TIP

Since the bridge construction and deployment real-time simulation can take longer than an hour, you can speed up the animations by using the [fn_vbs_dsb_land_155_global_vars](https://sqf.bisimulations.com/display/SQF/fn_vbs_dsb_land_155_global_vars) (https://sqf.bisimulations.com/display/SQF/fn_vbs_dsb_land_155_global_vars) SQF function.

Bridge construction finishes, and the crane deploys the bridge in position.

Image-2: Finished DSB



3. Bridge Laying Convoy AI

You can lay a Dry Support Bridge (DSB) with a bridge-laying convoy in VBS, using the (F3) Waypoints Editor Object (see the VBS4 Editor Manual).

The bridge-laying convoy AI expands the Convoy AI (see the VBS4 Editor Manual) use case.

For manual bridge-laying trainee operation, see [Bridge Laying - HX45M \(on page 8\)](#).

The following vehicle models are required:

- **HX45M DSB** - Bridge-builder vehicle with a crane.
- **HX77 ILHS - Loaded** - Vehicle with support modules (bridge segments).

In addition, the following optional objects can be used:

- **Haulmark 3axle - Loaded** - Optional trailer, carrying support modules, that can be towed by the **HX77 ILHS - Loaded** vehicle.



TIP

For example, you can either use 6 **HX77 ILHS - Loaded** vehicles, or 3 **HX77 ILHS - Loaded** vehicles attached to 3 **Haulmark 3axle - Loaded** trailers - the number of support modules is the same in both cases.

The simulation has the following runtime phases:

- The HX45M and HX77 vehicles drive into position, designated by the Control AI.
- The HX45M vehicle starts the bridge construction.
- The HX45M vehicle deploys the constructed bridge.



WARNING

For autonomous DSB laying, the DSB construction and deployment area has to be spacious and clear of obstacles, due to vehicle maneuvering.

Follow these steps:

1. In the Editor (Prepare Mode), place one **HX45M DSB** and several **HX77 ILHS - Loaded** vehicles on the map, using **(F4) Vehicle** category in the Editor Objects List.

These vehicles are used for the bridge-laying convoy.

2. **Optional:** If you want to use Haulmark trailers with HX77 vehicles, do the following:

- a. Place one or more **Haulmark 3axle - Loaded** trailers, using the **(F8) Objects** category in the Editor Objects List, close to the **HX77 ILHS - Loaded** vehicles.
- b. Link the **Haulmark 3axle - Loaded** trailers to the **HX77 ILHS - Loaded** vehicles, using the **Trailer Hitch** option, as described in [Enabling Automatic Towing \(on page 28\)](#).

The Haulmark trailers are hitched to the HX77 vehicles.

3. To form the vehicles into a convoy, link the vehicles together, so that they are all in the same group (also, if necessary, add any other vehicles, such as security vehicles, from the **(F4) Vehicle** category to the convoy).

WARNING

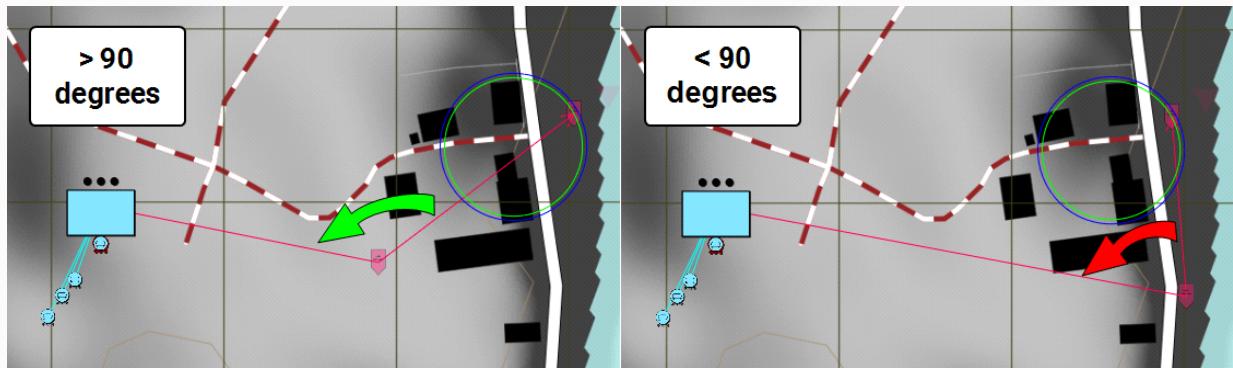
Vehicles with hitched trailers must not be group leaders.

4. Rotate and position the vehicles, as required.
5. (Optional) Create a convoy waypoint (see [Fully Autonomous Convoy in the VBS4 Editor Manual](#)), if you want the vehicles to first get to the location, where the bridge should be laid.
6. Create a bridge-laying waypoint (see [Waypoints in the VBS4 Editor Manual](#)) by right-clicking the bridge-laying convoy group marker, selecting **Orders > Assign New Waypoint**, and clicking a position on the map, where the bridge needs to be constructed and deployed.

WARNING

Using the 2D view, it is important to place the convoy and bridge-laying waypoints in such a way, that the turn angle between the convoy waypoint and the bridge-laying waypoint is not smaller than 90 degrees, to avoid situations, where the convoy vehicles (particularly, the **HX45M DSB** and **HX77 ILHS - Loaded** vehicles) have to travel backward from the convoy waypoint in the direction of the bridge-laying waypoint.

Image-3: Left to right: valid and invalid waypoint positioning



- Set the bridge-laying properties (see Deploy DSB Order (on page 15)) and click **OK**.

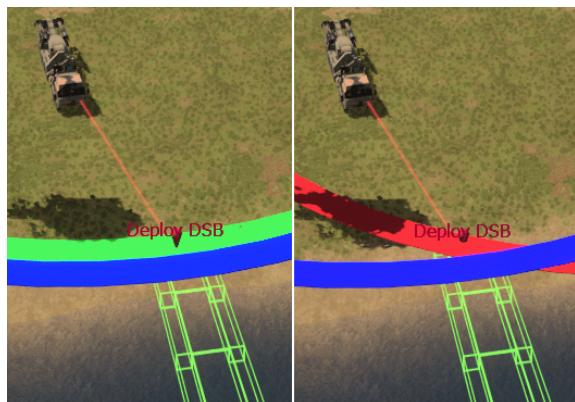
The Deploy DSB Order waypoint is created on the map.

The **Blue Circle** indicates the maneuvering space for the HX45M and HX77 vehicles.

The **Green Circle** indicates the harbor (parking space) for the HX45M and HX77 vehicles.

NOTE

If the offset between the **Blue Circle** (defined by the Deploy DSB Order waypoint) and the **Green Circle** (defined by the [Harbor Position \(on page 17\)](#)) is not big enough, so that the parked vehicles would interfere with construction maneuvering, the **Green Circle** turns red, and the error message [Invalid bridge placement \(on the next page\)](#) appears.

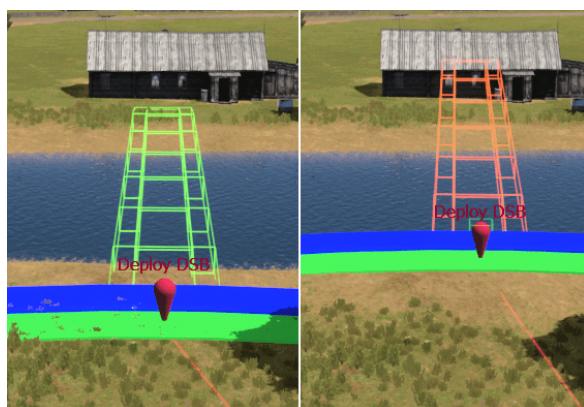


- Change the bridge deployment and construction waypoint position and / or its orientation, by rotating the waypoint.

The 3D bridge proxy appears in green / red, indicating whether they bridge can / cannot be constructed and deployed.

WARNING

If the red-bridge proxy error is not resolved, bridge-laying cannot be completed.



9. Preview the mission.
10. If any of the following runtime errors appear, fix them accordingly:

NOTE

The error messages only appear in the Editor (Execute Mode).

Error Message	Explanation and Resolution
Missing HX45 Vehicle	The HX45M bridge-builder vehicle, which operates the crane, is missing. Add the HX45M DSB vehicle to the mission.
Missing HX77 Vehicle(s)	There are not enough flatracks with cargo (modules), carried by the HX77 trucks and / or Haulmark trailers. Add more HX77 ILHS - Loaded and / or Haulmark 3axle - Loaded vehicles to the mission, until there are enough to Set the Bridge Length (in meters) . (on the next page)
Invalid bridge placement	The bridge and / or harbor cannot be placed at the specified position. Choose a different bridge deployment waypoint location and / or orientation and / or harbor position.

WARNING

If the runtime errors are not resolved, bridge-laying cannot be completed.

11. Preview the mission.

The bridge-laying convoy drives into position, starts the bridge construction, and deploys the bridge.

Image-4: Left to right: ongoing / complete bridge construction



4. Deploy DSB Order

Assigns a bridge-laying order to the HX45M vehicle, to deploy a Dry Support Bridge (DSB) at the given waypoint, as specified by the (F3) Waypoints Editor Object (see the VBS4 Editor Manual) on the map.

For more information, see [Bridge Laying Convoy AI \(on page 11\)](#).

Image-5: Deploy DSB Order settings



Follow these steps:

1. Select the **(F3) Waypoints** Editor Object in the Editor Objects List, and place it on the map.
2. In the **Behavior** list, select **Deploy DSB**.
3. Set the **Bridge Length** (in meters).

The following drop-down options are available:

- 46m (6 modules needed)
- 40m (5 modules needed)
- 34m (5 modules needed)
- 28m (4 modules needed)
- 22m (4 modules needed)

4. In **Variable Name**, enter the Order waypoint name, which can be used in SQF scripts.
5. Set the [Waypoint Completion Settings \(on the next page\)](#).
6. Click **Advanced** to set any [Advanced Settings \(on the next page\)](#). Click **OK** to confirm.
7. Click **OK** to confirm.

8. Once the Deploy DSB Order is configured, you must link it to the HX45M vehicle:

- a. Right-click the HX45M vehicle.
- b. Select **Orders > Assign Existing Waypoint**.
- c. Click the Deploy DSB Order.

The Deploy DSB Order is linked to the HX45M vehicle.

The Deploy DSB Order behavior is set up.

The HX45M and HX77 vehicles drive into position, and start constructing and deploying the bridge.

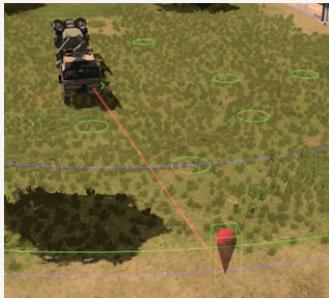
4.1 Waypoint Completion Settings

Set the Order waypoint completion settings:

Option	Description
Condition to Complete	Condition that needs to be fulfilled to complete the waypoint for the selected Order behavior.
Code on Completion	SQF code to execute on waypoint completion.

4.2 Advanced Settings

The Deploy DSB Order has the following advanced settings:

Setting	Description
Show Debug	Visualize the vehicle (HX45M and HX77) parking positions in 3D. To enable / disable, set this setting to <code>true</code> / <code>false</code> . 
Speed Up Animation	Speeds up the bridge-laying animations by about 4 times the normal animation speed. To enable / disable, set this setting to <code>true</code> / <code>false</code> .
Skip Vehicle Parking	Skips vehicle parking animations (vehicles are teleported to their parking positions). To enable / disable, set this setting to <code>true</code> / <code>false</code> .

Setting	Description
Harbor Position	Defines the center of the Harbor (parking space) ASL2 position for the HX45M and HX77 vehicles. The value can be specified as an ASL2 position or as the name of an Editor Object, whose position is used.

 **TIP**

You can use any Editor Object (for example, a Marker Arrow Editor Object) to indicate the center of the harbor area.

Follow these steps:

1. In the Editor Objects List, select **(F8) Objects**.
2. Click a position on the map, where you want to place the harbor area.
3. Select any of the **Marker Arrow** Editor Objects, in the **VBS Objects** category.
4. In **Name**, specify the harbor area name (for example, "harbor").
5. Specify the **Harbor Position**, using the [getPosASL2](https://sqf.bisimulations.com/display/SQF/getPosASL2) (https://sqf.bisimulations.com/display/SQF/getPosASL2) SQF command and the Marker Arrow Editor Object:

```
getPosASL2 harbor
```

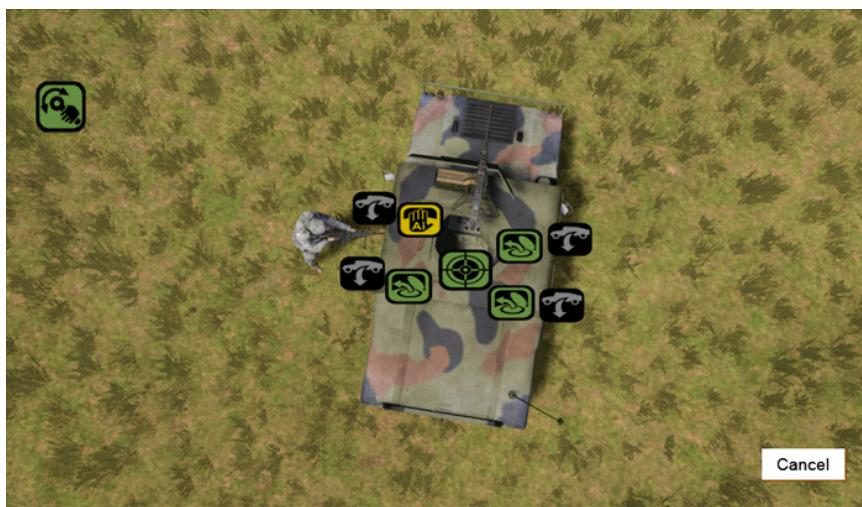
5. Interact with Vehicles Interface (IWF)

To open the Interact with Vehicle (IWF) interface, approach the vehicle and do one of the following:

- Use the **Interact** 3D World Action.
- Press **Interact with Vehicle (U)**.

The IWF view displays a top-down view of the vehicle with small icons representing positions in the vehicle and large icons representing vehicle functions.

Image-6: Interact with Vehicles (IWF) Interface



The position icon colors indicate the current availability of each vehicle position:

Position Icon	Description
	A green icon indicates that the position is empty and available for use.
	A yellow icon with AI indicates that an AI unit occupies the position and that it is available for use. If you select an AI occupied position, the AI either takes your previous position, moves to an empty position, or exits the vehicle.
	A red icon with Hu indicates that another player occupies the position and that it is not available for use. You can take the position if the player is dead.

Position Icon	Description
	<p>An icon with a cross marker indicates that a dead unit occupies the position.</p> <p>If you occupy the position, the body is placed in an empty position or outside the vehicle.</p> <p>If the dead unit is a player, you must use Vehicle Clearance to move the body before you can occupy the position.</p>
	<p>An icon with a padlock is locked by the administrator and not available for use.</p> <p>For more information, see Vehicle Management Actions in the VBS4 Instructor Manual.</p>
	<p>A greyed out position indicates that the position is unavailable because the player is not near the appropriate access point or does not have access from their current position due to compartment access restrictions.</p> <p>For more information, see Realistic Vehicle Entry in Simulation Settings in the VBS4 Administrator Manual.</p>

Perform any of the following actions in the IWV interface:

IWV Actions	Description
Click a vehicle position icon	<p>Occupy the position in the vehicle and access its controls.</p> <p>See Vehicle Positions and Vehicle Controls in the VBS4 Trainee Manual.</p>
Click a vehicle function icon	<p>Perform the vehicle function.</p> <p>See Vehicle Functions in the VBS4 Trainee Manual.</p>
Click Cancel , or press Interact with Vehicle (U) , or Esc	<p>Exit the IWV view.</p>
2 x U	<p>Quick Enter. If the Realistic Vehicle Entry simulation option is on (see Simulation Settings in the VBS4 Administrator Manual), vehicle compartments and ramps are taken into account, disabling quick vehicle entry if there are no available positions or access points, or if the ramp is closed.</p>
Mouse Wheel	<p>Zoom the IWV view.</p>
Hold LMB and drag	<p>Drag the IWV view.</p>
Hold RMB and drag	<p>Rotate the IWV view.</p>

NOTE

The available positions and functions vary according to the vehicle and your position in the vehicle.

6. Land Vehicle Controls

VBS4 includes a large number of land vehicles, including motorbikes, civilian, wheeled and tracked combat vehicles, and specialist construction vehicles.

Take direct movement control of land vehicles from the Driver position:



The following table lists the Land Vehicle Controls, defaults, and option names from the **Vehicle Controls** and **Infantry Controls** category filters in the Controls Settings in the VBS4 Administrator Manual:

Default Control	Description	Control Option Name
W	Forward	Car Forward
<div style="border: 1px solid #0070C0; padding: 5px;"><p>NOTE</p><p>W does not reach the maximum speed. Use Car Fast Forward.</p></div>		
S	Brake / Reverse	Car Back
A / Mouse Left	Turn Left	Car Left / Car More Left
D / Mouse Right	Turn Right	Car Right / Car More Right
Q	Slow Forward	Car Slow Forward
E / LShift + W	Fast Forward	Car Fast Forward / Vehicle Turbo + Car Forward
LMB	Horn	Fire

NOTE

For Microsoft Xbox land vehicle controls, see Microsoft Xbox Controls in the VBS4 Trainee Manual.

For Logitech 3D Extreme controls, see Controls Settings in the VBS4 Administrator Manual.

7. Demountable Rack Offload and Pickup System (DROPS)

VBS4 includes the British Demountable Rack Offload and Pickup System (DROPS). A similar system, known in the US as the Palletized Load System (PLS), is also available. Both systems use a retractable arm to load / unload FlatRacks.

Image-7: Loading a DROPS capable vehicle



Required Equipment

The following vehicles and FlatRacks are required for DROPS functionality to work:

A DROPS-capable vehicle, for example:

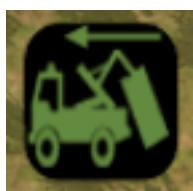
- **Vehicle > AU Army Wheeled - Desert**
 - **HX77 ILHS**
- **Vehicle > GB Army Wheeled (Desert or Woodland)**
 - **DROPS MMLC**
 - **DROPS MMLC - Up Armoured**
- **Vehicle > US Army Wheeled (Desert or Woodland)**
 - **M1075A1 HEMTT - PLS**
 - **M1075A1 HEMTT - PLS, Up Armored**

A DROPS FlatRack, for example:

- Objects > AU Army Wheeled - Woodland
 - Haulmark 3axle
- Objects > GB Objects
 - DROPS FlatRack (empty)
 - DROPS FlatRack - Ammo
 - DROPS FlatRack - MLRS ammo
 - DROPS FlatRack - MLRS ammo (empty)
 - DROPS FlatRack: Fuel tank
- Objects > US Army Wheeled - Woodland
 - PLS M1077 Pallet
 - PLS M1077 Pallet (Loaded)

To load a FlatRack onto the vehicle, follow these steps:

1. Maneuver the DROPS vehicle, so that the FlatRack is directly behind it.
2. Access the I WV interface, using one of the following methods:
 - Press **Interact with Vehicle (U)**.
 - In the Quick Menu (see [Quick Menu Actions \(on page 25\)](#)), select **VEHICLE > INTERACT**.
3. In the I WV interface, click the **Load DROPS** icon.



The vehicle arm extends and retrieves the FlatRack.

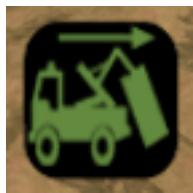
NOTE

This happens automatically, and may take a few seconds.

To unload the FlatRack from the vehicle, follow these steps:

1. Access the I WV interface, using one of the following methods:
 - Press **Interact with Vehicle (U)**.
 - In the Quick Menu, select **VEHICLE > INTERACT**.

2. In the IWV interface, click the **Unload DROPS** icon.

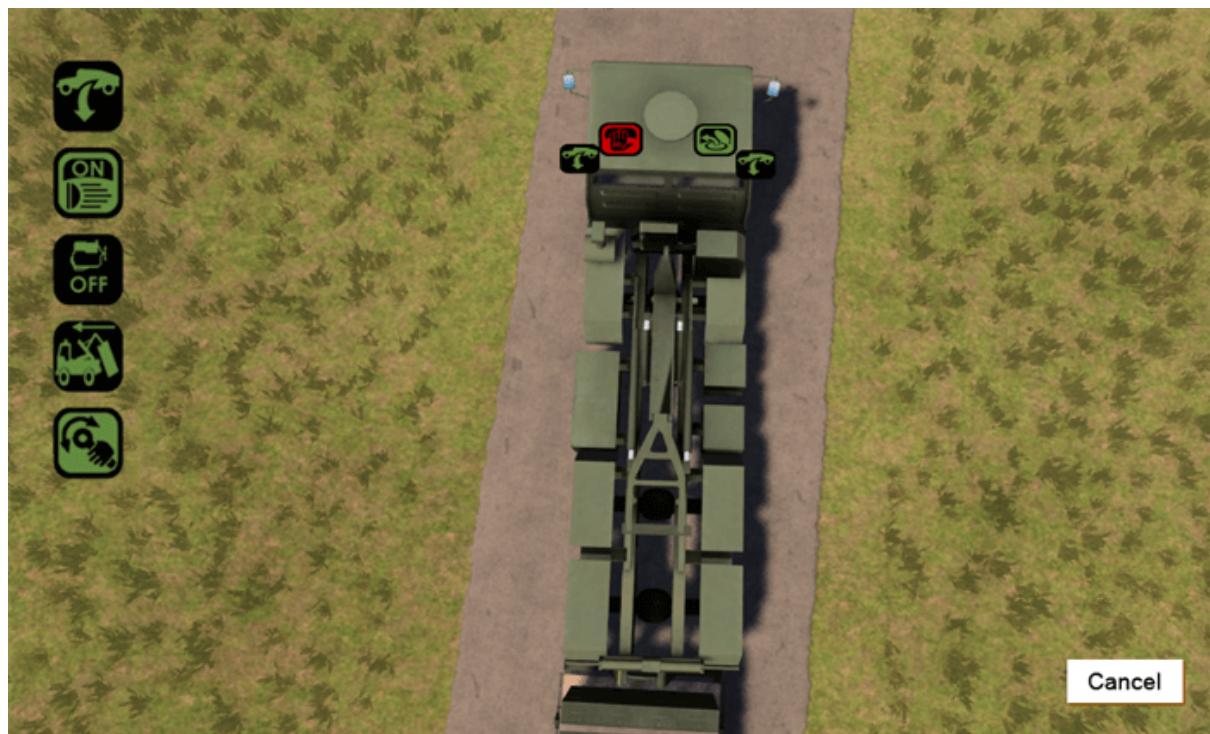


The vehicle unloads the FlatRack.

NOTE

This happens automatically, and may take a few seconds.

Image-8: IWV interface with Unload DROPS icon



NOTE

Administrators in Execute mode must use **Unlock Position** to be able to move FlatPacks around the map. Right-click the **FlatPack**, and select **Unlock Position** from the context menu. Left-click the **FlatPack**, and drag your mouse to move it around.

8. User Actions

User actions are available to interact with the VBS4 simulation environment and objects in it.

User actions are divided into:

- [3D World Actions \(below\)](#)
- [Quick Menu Actions \(on the next page\)](#)

8.1 3D World Actions

3D World Actions appear on objects in the 3D View of the VBS4 simulation.

Their appearance usually depends on proximity to the object and the view direction. This means that the majority of the 3D World Actions appear when standing next to an object and looking at it.



3D World Actions are often available for:

- Equipment and weapons.
- Other objects on the ground.
- Control stations, static weapons, vehicles, and their equipment.
- Specific equipment in your vehicle position.
- Terrain obstacles, such as ladders and gates.
- Other characters.

Follow these steps:

1. Approach the object you want to interact with.
The 3D World Actions appear.
2. Use the [3D World Action Controls \(on the next page\)](#).

A line points to the object to indicate that 3D World Actions are available.

8.1.1 3D World Action Controls

The following table lists the 3D World Action Controls, defaults, and option names from the Controls Settings (see Controls Settings in the VBS4 Administrator Manual):

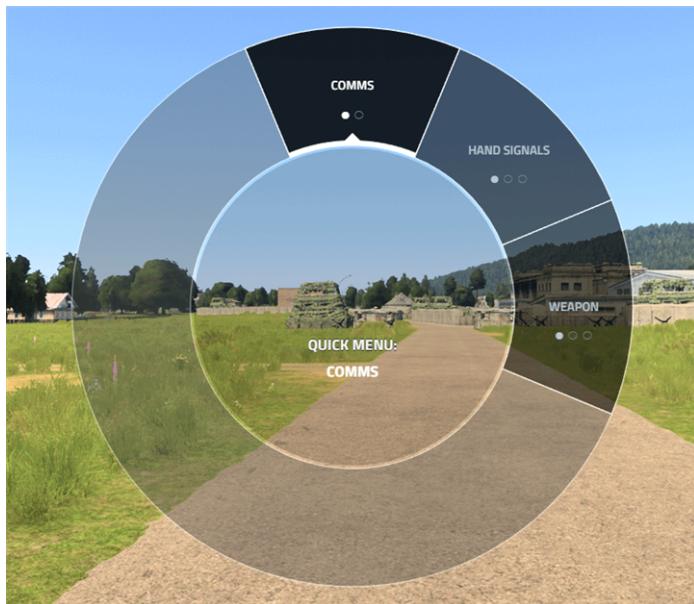
NOTE

For Microsoft Xbox 3D World Action controls, see Microsoft Xbox Controls in the VBS4 Trainee Manual.

Control Name	Default Control
Perform Action	Enter or Mouse Scroll Button
Previous Action	[or Mouse Scroll Wheel Up
Next Action] or Mouse Scroll Wheel Down

8.2 Quick Menu Actions

The Quick Menu provides access to additional functions, typically more complex personal movements than those found among 3D World Actions.



The following actions use the Quick Menu (for more information the topics in the VBS4 Trainee Manual):

- Hand Signals
- Weapon Handling
- Forms
- CBRN Suits and Gas Masks
- Swedish CBRN Protection
- Using VBS Radio
- Some vehicle equipment systems.

The Quick Menu consists of multiple levels of numbered menu options, some with multiple pages.

Follow these steps:

1. Press **Quick Menu (Left Windows)** to open the Quick Menu.
2. Use the [Quick Menu Controls \(below\)](#).
3. Click a Quick Menu option, press the appropriate number, or for highlighted options, press **Enter** to access the next menu level.
4. Repeat steps 2 and 3 to access the next menu level or to perform the specified option.

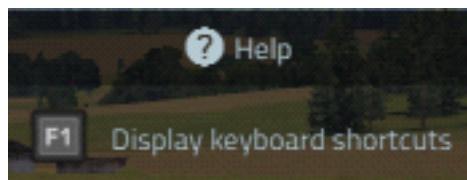
8.2.1 Quick Menu Controls

The following table lists the Quick Menu Controls, defaults, and option names from the Controls Settings (see Controls Settings in the VBS4 Administrator Manual):

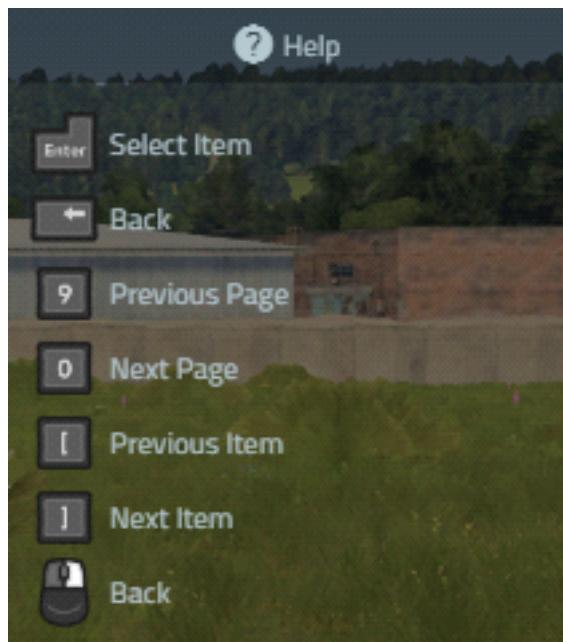
i NOTE

For Microsoft Xbox Quick Menu controls, see Microsoft Xbox Controls in the VBS4 Trainee Manual.

The Quick Menu Help shows when you open the Quick Menu.



Press **F1** to display the Quick Menu controls.



Quick Menu Control	Default Control	Control Option Name
Open / Close Quick Menu	<p>Left Windows</p> <p>Do one of the following:</p> <ul style="list-style-type: none"> • Tap the key to open it, and tap again to close it. • Hold the key to open the Quick Menu, and release the key to close it. 	Quick Menu
Select Option	<p>Do one of the following:</p> <ul style="list-style-type: none"> • Mouse over an option or press the appropriate number. • Select previous option: [or Mouse Scroll Wheel Up. • Select next option:] or Mouse Scroll Wheel Down. 	<p>Previous Action</p> <p>Next Action</p>
Perform Action	LMB / Enter / MMB for a selected / highlighted option.	Perform Action
Navigate to Previous Menu	Backspace, RMB , or click BACK .	Back
Menu Page Navigation	0 and 9 , or click the Box icons below the menu.	

9. Enabling Automatic Towing

The Towing Module allows automatic rope-towing and trailer-hitching between vehicles.

For information on more complex towing simulation, see Towing Vehicles in the VBS4 Trainee Manual.

Follow these steps:

1. In the **Editor Objects List**, select **Module**.
2. Expand the **Module** drop-down, select **Towing** and click **OK**.

The Towing Object Properties dialog opens:



3. Set the **Towing Options** (below).

4. Click **OK**.

The Towing icon appears on the map.

In addition, see the following Towing Module-related functionality:

- [Linking \(on the next page\)](#)
- [Triggers \(on page 30\)](#)
- [Towing Scripting Functions \(on page 31\)](#)

9.1 Towing Options

The Towing Module has the following options that can be set:

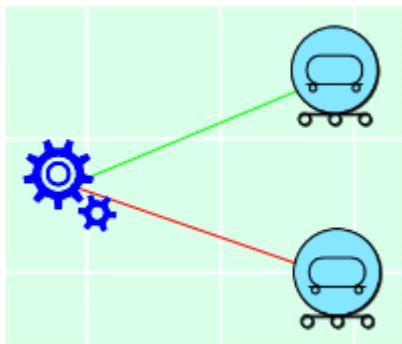
Towing Option	Description
Type	Towing type. Can be: <ul style="list-style-type: none">• Rope Towing - Select this option to attach a rope between two vehicles.• Trailer Hitch - Select this option to hitch a trailer to a vehicle.

Towing Option	Description
Activate when	<p>If you want to use Triggers (on the next page) with a hitch, you may need to adjust the following:</p> <ol style="list-style-type: none">1. Expand the first Activate when drop-down and select one of the following options:<ul style="list-style-type: none">• At least one trigger is activated - At least one Trigger must be activated for hitching to take place.• All triggers are activated - All Triggers on the map must be activated for hitching to take place.2. Expand the second Activate when drop-down and select AND / OR to control the relationship between Triggers and the condition code. Either both are true or just one of them.3. Enter true or false in the condition code field.

9.2 Linking

To make the Towing animation work you must link the vehicles / trailers to the **Towing Editor Object**.

Image-9: Towing and towed vehicle linked to the Towing Editor Object



Follow these steps:

1. Place two vehicles or a vehicle and a trailer on the map.

NOTE

If you select **Rope Towing** in the Object Properties dialog, ensure that the two vehicles are no more than 20 meters apart, preferably with the towing vehicle in front.

2. Right-click on the **Towing** icon and select one item from the list:

If two vehicles are present:

- **Select Towing Vehicle** - Select to link to the vehicle that is towing.
- **Select Towed Vehicle** - Select to link to the vehicle being towed.

If a vehicle and a trailer are present:

- **Select Tractor** - Select to link to the vehicle that is towing ("Tractor" is the name for any vehicle towing a trailer).
- **Select Trailer** - Select to link to the trailer.

3. Selecting any of these options closes the list and attaches a black arrow to the cursor.

4. Drag the mouse and click the **vehicle / trailer** you want to link to.

Link to a **towing vehicle / tractor** and the arrow turns green. Link to a **towed vehicle / trailer** and the arrow turns red. Both color changes confirm that the objects are linked to the Towing Editor Object.

5. Repeat steps 2 to 4 to link the other vehicle / trailer to the Towing Editor Object.

6. Preview the mission:

If you selected **Rope Towing** in the Object Properties dialog, you see a rope between the two vehicles. If you selected **Trailer Hitch**, the trailer is attached to the towing vehicle (unless there are **Triggers (below)** present).

9.3 Triggers

Triggers can be linked to the **Towing** module to start vehicle towing, based on a trigger condition. Triggers can be also added to the mission when the **Trailer Hitch** option is selected in the Object Properties dialog. This means that trailers can be hitched to vehicles when triggers are activated rather than the moment a vehicle and trailer are linked to the Towing Editor Object.

Follow these steps:

1. With a trailer and vehicle placed on the map, add a Trigger (see Triggers in the VBS4 Editor Manual).

2. Right-click the **Towing Editor Object** and select **Link to Condition Trigger** from the menu.

The menu closes and a black arrow is attached to the cursor.

3. Click the **Trigger Editor Object**.

The arrow turns purple, indicating that the Trigger is linked to the Towing Editor Object.

4. Preview the mission.

When the towing vehicle reaches the Trigger, the trailer is automatically hitched to it.

9.4 Towing Scripting Functions

The following towing scripting functions are available:

Scripting Function	Description
<u>fn_tow_towParent</u> (https://sqf.bisimulations.com/display/SQF/fn_tow_towParent)	Returns the parent vehicle that tows the given child vehicle.
<u>fn_tow_towChild</u> (https://sqf.bisimulations.com/display/SQF/fn_tow_towChild)	Returns the child vehicle that is towed by the given parent vehicle.
<u>fn_tow_canTow</u> (https://sqf.bisimulations.com/display/SQF/fn_tow_canTow)	Checks if a parent object can tow a child object using a given towing mode.
<u>fn_tow_canHitch</u> (https://sqf.bisimulations.com/display/SQF/fn_tow_canHitch)	Determines if a given child object can be hitched to a given parent object.
<u>fn_tow_startTow</u> (https://sqf.bisimulations.com/display/SQF/fn_tow_startTow)	Initiates towing between parent and child vehicles using a given towing mode.
<u>fn_tow_startHitch</u> (https://sqf.bisimulations.com/display/SQF/fn_tow_startHitch)	Initiates trailer towing for given parent and child objects.
<u>fn_tow_startRopeTow</u> (https://sqf.bisimulations.com/display/SQF/fn_tow_startRopeTow)	Initiates rope towing for given parent and child objects.
<u>fn_tow_stopTow</u> (https://sqf.bisimulations.com/display/SQF/fn_tow_stopTow)	Terminates towing between parent and child vehicles.
<u>fn_tow_stopHitch</u> (https://sqf.bisimulations.com/display/SQF/fn_tow_stopHitch)	Terminates trailer hitching for given parent and child objects.
<u>fn_tow_stopRopeTow</u> (https://sqf.bisimulations.com/display/SQF/fn_tow_stopRopeTow)	Terminates the rope towing connection between specific vehicle points.
<u>fn_tow_getRopeTowConnections</u> (https://sqf.bisimulations.com/display/SQF/fn_tow_getRopeTowConnections)	Returns a list of all rope towing connections for a given vehicle and any other vehicles in the vehicle chain.

Scripting Function

[fn_tow_getAvailableTowPoints](#)

(https://sqf.bisimulations.com/display/SQF/fn_tow_getAvailableTowPoints)

[fn_tow_setPointLocked](#)

(https://sqf.bisimulations.com/display/SQF/fn_tow_setPointLocked)

Description

Returns a list of available (not locked) towing points on a given vehicle and its trailers.

Sets the locked state of a towing memory point on a vehicle.