

# Editor Manual



VBS4 24.1.1



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The BISim Wiki is the primary resource on VBS4 scripting:

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

## PhysX

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

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



# Contents

<b>Editor Manual</b> .....	<b>1</b>
<b>1. VBS Editor Overview</b> .....	<b>20</b>
<b>2. Scenario Preparation</b> .....	<b>24</b>
<b>3. Mission Designer Interface</b> .....	<b>28</b>
3.1 Editor Menu Options .....	30
3.1.1 VBS4 Main Menu for Mission Design .....	30
3.1.2 View Menu Options .....	32
3.1.3 Tools Menu Options .....	33
3.1.4 Overlays Menu Options .....	35
3.1.5 Control AI Menu Options .....	36
3.2 Editor Toolbar .....	37
3.3 Tools Panel .....	37
3.4 Scenario Objects Panel .....	39
3.4.1 Filtering .....	41
3.5 3D Camera and 2D Map Views .....	43
3.6 Editor Settings .....	44
3.7 Using Editor Objects .....	46
3.7.1 Adding Objects .....	46
3.7.2 Editing Objects .....	49
3.7.3 Moving Objects .....	50
3.7.4 Linking Objects .....	51
3.8 Interacting with Editor Objects .....	52
3.8.1 Selecting Objects .....	54
3.8.2 Copy and Paste .....	55
3.8.3 Moving Editor Objects .....	55
3.8.4 Rotating Editor Objects .....	56
3.8.5 Adjusting Elevation .....	57
3.8.6 Moving Objects .....	57
3.8.7 Nudging Editor Objects .....	58

3.8.8 Editing Objects .....	58
3.8.9 Context Menu .....	58
3.8.10 Deleting Objects .....	60
3.8.11 Equip with Objects .....	60
3.8.12 Scaling Objects .....	60
3.9 Attaching Objects .....	61
3.10 Unit and Vehicle Editor Object Filters .....	62
3.11 Editor Object Positioning .....	65
3.11.1 Set GPS Coordinates .....	65
3.11.2 Set Azimuth .....	67
3.12 Linking Editor Objects .....	69
3.13 Measure Distance Tool .....	71
3.13.1 Accessing the Measure Distance Tool .....	71
3.13.2 Measure Distance Tool Dialog .....	73
3.13.3 Multiple End Points and Chains .....	74
3.13.4 Linking Points to Units and Vehicles .....	76
3.14 Module Editor Objects .....	77
3.15 Script Editor Object .....	78
3.15.1 Activate Triggers or Detonate IEDs .....	79
3.15.2 Run Generic Script Code .....	79
3.15.3 Request Medical Evacuation .....	80
3.15.4 Create a Minefield .....	80
3.16 Layers and Overlays .....	82
3.16.1 Layers .....	82
3.16.2 Object Overlays .....	87
3.17 Exaggerated View Mode .....	89
3.17.1 Global Settings Tab .....	91
3.17.2 Entity Specific Tab .....	94
3.17.3 SQF .....	96
3.17.4 Limitations .....	97
3.18 Export Custom Object Variants .....	98

3.19 Hidden Entities .....	99
3.20 Respawn Settings .....	101
<b>4. Mission Converter .....</b>	<b>105</b>
4.1 Conversion Results .....	110
<b>5. Setting Up VBS Radio .....</b>	<b>112</b>
5.1 Modes .....	115
5.2 Configure Communication Channels .....	118
5.2.1 Create Radio Channels .....	118
5.2.2 Edit Radio Channels .....	120
5.2.3 Delete Radio Channels .....	121
5.3 Configure Radio Types .....	122
5.3.1 Create Radio Types .....	123
5.3.2 Edit Radio Types .....	125
5.3.3 Delete Radio Types .....	126
5.4 Assign Channels and Radio Types .....	127
5.4.1 Unassign Radio Types .....	129
5.4.2 Override Assigned VBS Radio Properties .....	130
5.5 Advanced Settings and Presets .....	131
5.5.1 Presets .....	132
5.5.2 Degradation .....	133
5.6 Configure DIS .....	137
<b>6. Integration Tools and Objects .....</b>	<b>138</b>
6.1 VBS Gateway UI .....	139
6.1.1 Active Entities Page .....	140
6.1.2 Mappings Page .....	142
6.1.3 Content Sorting and Filtering .....	144
6.1.4 Settings Page .....	148
6.1.5 External Entities in VBS4 .....	149
6.1.6 Configure VBS Gateway .....	150
6.1.7 Configure Simulation Modeling .....	177
6.1.8 Mapping Tables .....	190

6.1.9 Entity Details Dialog .....	194
6.2 JSBSim Flight Model .....	197
6.2.1 Enabling and Configuration .....	198
6.2.2 Aircraft Controls .....	199
6.2.3 Model Animations .....	202
6.2.4 Logging .....	203
6.2.5 Additional SQF Commands .....	206
6.2.6 Custom Atmosphere .....	208
6.2.7 Custom Version of JSBSim .....	211
6.2.8 JSBSim Simulation Model Notes .....	212
6.2.9 JSBSim API .....	213
6.3 Add IG Viewpoints to Scenarios .....	220
6.3.1 Multiple IG View Objects .....	221
6.3.2 Edit IG View Configurations .....	224
6.3.3 Sensors .....	225
6.3.4 Create IG View Configuration Files .....	226
6.3.5 Enabling DIS Entities .....	231
<b>7. Terrain Tools and Objects .....</b>	<b>232</b>
7.1 Concertina Wire .....	233
7.1.1 Customize Slowing Distance and Tangled Speed .....	233
7.1.2 Examples .....	235
7.1.3 Repair .....	236
7.1.4 Motorcycles and Bicycles .....	236
7.2 Destructible Trees .....	237
7.3 Earthworks (Berms) .....	238
7.4 Glint Object .....	240
7.5 Hazardous Area .....	243
7.5.1 Creating a Hazardous Area .....	243
7.5.2 Hazardous Area Effects .....	247
7.5.3 Hazardous Area Symbology .....	248
7.5.4 Administrator Decontamination .....	248

7.6 Placing Improvised Explosive Devices .....	249
7.6.1 IED Options .....	251
7.6.2 IED Trigger Type .....	252
7.6.3 Equipment Inventory .....	256
7.6.4 Attaching IEDs to Units and Vehicles .....	256
7.6.5 Attaching IEDs to Triggers .....	257
7.6.6 Detonating an IED .....	258
7.6.7 Knock-Out Effect .....	259
7.6.8 On Explode Code .....	260
7.7 Light Source .....	261
7.7.1 Light Source Attachment .....	262
7.7.2 Light Source Rotation .....	262
7.8 Placing Mines .....	263
7.8.1 Create a Mine .....	263
7.8.2 Create a Minefield .....	265
7.9 Secondary Damage .....	267
7.10 Shopping Center .....	269
7.10.1 Monitoring Features .....	271
7.11 Sound Source .....	272
7.12 Training Targets .....	273
7.12.1 Lower Target at Mission Start .....	273
7.12.2 Lower / Raise Target .....	274
7.13 Water Current .....	275
7.14 Customizable Signs .....	276
<b>8. Environment Tools and Objects .....</b>	<b>277</b>
8.1 Define Scenario Settings .....	278
8.2 Weather Settings .....	285
8.2.1 Overcast .....	289
8.2.2 Precipitation .....	289
8.2.3 Wind .....	290
8.2.4 Fog .....	290

8.2.5 Water .....	291
8.2.6 Surface .....	292
8.2.7 Atmosphere .....	295
8.2.8 Atmospheric Parameters .....	295
<b>8.3 Map Settings .....</b>	<b>296</b>
8.3.1 Map Tab .....	297
8.3.2 Icons Tab .....	298
8.3.3 C2 Tab .....	300
8.3.4 Layers Tab .....	301
8.3.5 Custom Map Layers .....	302
8.3.6 Map Layer Elements .....	308
8.3.7 Export Map .....	315
8.3.8 Converting Raster Map Files .....	318
<b>8.4 Amputations .....</b>	<b>324</b>
8.4.1 Retrieve and Carry Amputated Limbs .....	325
8.4.2 Amputation Script Command Examples .....	325
8.4.3 Wounding .....	326
<b>8.5 Advanced Wounding .....</b>	<b>327</b>
8.5.1 Related Simulation Settings .....	327
8.5.2 Advanced Wounds .....	327
8.5.3 Advanced Wounding Editor Object .....	328
8.5.4 Units with Advanced Wounding .....	329
8.5.5 Bleeding Model .....	332
8.5.6 Controlling Treatment Duration .....	332
8.5.7 Advanced First Aid .....	334
<b>8.6 Concussion Effects .....</b>	<b>337</b>
8.6.1 Linking and Triggers .....	339
<b>8.7 Sandstorm .....</b>	<b>340</b>
8.7.1 Sandstorm Wind Sound Source .....	341
<b>9. Personnel and AI Tools and Objects .....</b>	<b>343</b>
9.1 Adding Units .....	344

9.1.1 Edit Unit Options .....	345
9.1.2 AI / Player Unit Settings .....	347
9.1.3 Advanced Unit Settings .....	348
9.1.4 Calculation and Implementation of Fatigue .....	355
9.2 Creating Unit Variants .....	357
9.3 Adding Groups .....	359
9.3.1 Creating and Adding to Groups with Links .....	362
9.3.2 Copy and Paste from a Single Entity .....	363
9.4 Creating Custom Groups .....	364
9.5 ORBAT Editor .....	366
9.5.1 ORBAT Editor Controls .....	367
9.5.2 Creating New ORBATS .....	368
9.5.3 Modifying Existing ORBATS .....	379
9.5.4 ORBAT Formations Editor .....	381
9.6 Creating Command Structures .....	384
9.6.1 Create Higher Echelons .....	385
9.6.2 Create Order of Battle .....	386
9.6.3 ORBAT during Execution .....	387
9.7 Customizable Symbology .....	388
9.7.1 Symbol Configuration .....	389
9.7.2 Entity Information (EIS) .....	390
9.8 Look At Editor Object .....	395
9.8.1 Limitations .....	396
9.9 Select Animation Style .....	397
9.9.1 Linking .....	398
9.10 AI Rules of Engagement .....	400
9.10.1 Selection Methods .....	403
9.11 Surrender .....	406
9.12 Unit Path Recording (UPR) .....	408
9.12.1 Create UPRs .....	408
9.12.2 Use UPRs .....	411

9.12.3 UPR Scripts .....	413
9.13 Verbal Command .....	414
<b>10. Control AI UI Overview .....</b>	<b>415</b>
10.1 Control AI Editor Objects .....	415
10.2 (F3) Waypoints Editor Object .....	416
10.3 Custom Behaviors .....	418
10.4 Control AI - Civilian Editor Object .....	418
10.5 Control AI - Activity Editor Object .....	418
10.6 Control AI - Area Editor Object .....	419
10.7 Control AI Menu .....	419
10.8 Waypoints .....	421
10.8.1 Linking Existing Waypoints to Other Editor Objects .....	423
10.8.2 Branching Waypoints .....	423
10.8.3 Waypoint Synchronization .....	424
10.8.4 Waypoint Considerations .....	425
10.9 AI on Rails .....	426
10.9.1 Individual Move .....	427
10.9.2 Individual Fire At .....	429
10.9.3 Delayed Order Execution .....	432
10.9.4 Branching Orders .....	434
10.9.5 AI on Rails Orders .....	436
10.10 Military AI .....	442
10.10.1 Infantry Tutorial .....	443
10.10.2 Vehicle Tutorial .....	447
10.10.3 Interoperability Tutorial .....	451
10.10.4 Military AI Orders and Behaviors .....	456
10.11 Convoy AI .....	482
10.11.1 Fully Autonomous Convoy .....	483
10.11.2 Pause / Resume Convoy .....	485
10.11.3 Player Units in Convoy .....	490
10.11.4 Convoy SQF Functions .....	492

10.11.5 Convoy Order .....	494
10.12 Bridge Laying Convoy AI .....	501
10.12.1 Deploy DSB Order .....	505
10.13 Aircraft AI .....	508
10.13.1 Aircraft Tutorial .....	509
10.13.2 Aircraft AI Orders and Behaviors .....	512
10.14 Civilian AI .....	521
10.14.1 Define Populations .....	522
10.14.2 Define Pedestrian Flows .....	530
10.14.3 Define Civilian Riot .....	537
10.14.4 Define Traffic Flows .....	540
10.14.5 Defining Responsive Behavior .....	552
10.14.6 Basic Example Scenario .....	557
10.14.7 Civilian AI Editor Objects .....	573
10.15 Animal AI .....	587
10.15.1 Creating a Herd .....	587
10.15.2 Reaction to Threats .....	589
10.16 Example Content .....	590
10.16.1 Additional Example Content .....	590
10.17 Known Issues .....	591
10.17.1 Military .....	591
10.17.2 Convoy .....	592
10.17.3 Bridge Laying Convoy .....	593
10.17.4 Aircraft .....	594
10.17.5 Civilian .....	594
10.17.6 Civilian Traffic .....	595
10.17.7 Animal .....	596
10.17.8 General .....	597
<b>11. Vehicles Tools and Objects .....</b>	<b>598</b>
11.1 Adding Vehicles .....	599
11.1.1 Edit Vehicle Options .....	600

11.1.2 Advanced Vehicle Settings .....	604
11.1.3 IFF Codes .....	608
11.2 Creating Vehicle Variants .....	609
11.2.1 Customize Vehicle Weapon Loadouts .....	609
11.2.2 Customize Vehicle Cargo .....	611
11.3 Adding Unmanned Vehicles .....	614
11.4 Add ACATS ARH Models to Missions .....	616
11.4.1 Customize the ARH Ammunition Load .....	616
11.5 Control Links .....	618
11.5.1 Control Link Parameters .....	620
11.5.2 Unmanned Vehicle and Security Camera Setup .....	622
11.6 UV Network .....	624
11.7 V-BAT Scenario Design .....	627
11.7.1 Setting Up the V-BAT with UVS .....	628
11.7.2 Attaching the V-BAT to a Landing Point .....	628
11.7.3 Assigning Waypoints to the V-BAT .....	631
11.8 First-Person View (FPV) Drones .....	632
11.8.1 Considerations .....	633
11.8.2 Controls .....	633
11.8.3 Limitations .....	635
11.9 Enabling Automatic Towing .....	636
11.9.1 Towing Options .....	636
11.9.2 Linking .....	637
11.9.3 Triggers .....	638
11.9.4 Towing Scripting Functions .....	639
11.10 Add Resupply Points to Missions .....	641
11.10.1 Resupply Point (FARP) setvariables .....	643
11.11 Vehicle Path Recording (VPR) .....	645
11.12 Gunner Arcs .....	650
11.12.1 Arc Limits .....	651
11.13 Vehicle Repair .....	652

11.13.1 Vehicle Damage .....	652
11.13.2 Object Properties Dialog .....	653
11.14 Slingloads .....	656
11.15 Designing OPV River Class Missions .....	658
11.16 Commander Machine Interface (CMI) Editor Object .....	659
<b>12. Equipment Tools and Objects .....</b>	<b>661</b>
12.1 Edit Equipment Loadout .....	662
12.1.1 JTAC Digital Watch .....	663
12.1.2 Optical Imaging Devices .....	664
12.2 Edit Weapon Components .....	665
12.2.1 UCS Scripting Commands .....	671
12.3 Weapon / Ammo Editor Object .....	673
12.3.1 Filtering the List .....	674
12.3.2 Limitations .....	675
12.4 Active Protection System .....	676
12.4.1 Equip a Vehicle with the APS .....	677
12.4.2 Vehicle Countermeasures HUD .....	680
12.5 ATGM Attractor .....	683
12.6 Ballistics Computer .....	685
12.6.1 Presets .....	685
12.7 Boomerang .....	687
12.7.1 Linking to a Vehicle .....	689
12.7.2 Operation .....	690
12.8 CBRN Equipment .....	691
12.8.1 Area Marker Equipment .....	692
12.8.2 Area Marking Kit .....	692
12.8.3 CBRN Markers .....	693
12.8.4 CBRN Suits Crate .....	693
12.8.5 Decontamination Equipment .....	693
12.8.6 Detection Devices .....	694
12.8.7 M8 Chemical Detection Paper .....	695

12.8.8 M9 Chemical Detection Paper .....	695
12.8.9 SCBA Mask .....	695
12.8.10 CBRN1 and CBRN3 Forms .....	695
12.9 Drone Munitions .....	696
12.9.1 Linking .....	697
12.10 Electronic Warfare .....	698
12.10.1 Editor Object Settings .....	698
12.10.2 Linking to a Unit or Vehicle .....	711
12.10.3 Radar Over VBS Gateway .....	713
12.11 Enabling CREW .....	717
12.11.1 CREW Link Editor Object .....	717
12.11.2 Entity Capability .....	719
12.11.3 Line of Sight (LOS) .....	722
12.11.4 Range Visualization .....	723
12.11.5 Limitations .....	724
12.12 Fast Rope .....	725
12.12.1 Linking .....	727
12.12.2 Fast-Roping on to Objects .....	728
12.13 HHMD / AN/PSS-14 Mine Detector .....	730
12.13.1 Adding the HHMD / AN/PSS-14 Kit to a Unit Inventory .....	730
12.13.2 Placing the HHMD / AN/PSS-14 Kit in a Scenario .....	732
12.14 Infantry Assault Bridge .....	734
12.14.1 Adding IAB Components to a Scenario .....	734
12.14.2 Adding IAB Components to a Vehicle .....	735
12.15 Laser Warning Receiver .....	736
12.15.1 Vehicle Countermeasures HUD .....	738
12.16 Light Beacon .....	740
12.17 Military Road Signs - Scenario Design .....	742
12.17.1 Road Sign Equipment .....	742
12.17.2 Road Sign Equipment in Vehicles .....	743
12.17.3 Pre-Assembled Road Signs .....	744

12.17.4 Customize Road Sign Crates .....	746
12.18 Mixed Reality Helmet .....	747
12.18.1 Add the Helmet to a Scenario .....	747
12.18.2 Mixed Reality Symbol Editor Object .....	750
12.19 Advanced Mortars .....	754
12.19.1 Adding Mortars to a Scenario .....	754
12.19.2 Ammunition .....	755
12.19.3 Mortar Location and Targeting .....	756
12.20 Radio Jamming Device .....	758
12.20.1 Create a Jammer .....	759
12.20.2 Define a Location .....	761
12.20.3 Assign Jammers .....	762
12.20.4 Edit Jammers .....	763
12.20.5 Delete Jammers .....	764
12.21 Reference Documents .....	765
12.22 Retractable Radio Mast .....	767
12.22.1 Configuring Antennas .....	768
12.22.2 Editing Antennas .....	772
12.22.3 Deleting Antennas .....	773
12.22.4 Land Rover Wolf - FFR Antenna .....	774
12.23 Spike LR .....	775
12.23.1 Adding the Spike to a Scenario .....	775
12.23.2 Key Bindings .....	776
12.23.3 Administrator Object Properties Dialog .....	777
12.24 Swedish Body Armor .....	780
12.24.1 Ballistic Helmet .....	780
12.24.2 Body Armor .....	780
12.24.3 Equipping a Unit with Body Armor .....	780
<b>13. Objectives Tools and Objects .....</b>	<b>781</b>
13.1 Adding Markers .....	782
13.1.1 Create Markers .....	783

13.1.2 Edit Markers .....	785
13.1.3 Marker Overlays .....	786
13.2 Mission Briefings .....	789
13.2.1 Edit Briefing Dialog .....	790
13.2.2 Create Mission Briefings .....	790
13.2.3 Edit Mission Briefings .....	797
13.2.4 Import a Mission Briefing PDF .....	798
13.2.5 Show / Hide the Mission Briefing .....	799
13.3 Intelligence Reports .....	800
13.3.1 Intelligence Reports Configuration .....	802
13.3.2 Linking Intelligence Reports .....	804
13.3.3 Show Conversations Dialog .....	805
13.4 Add Reference Marks to Missions .....	807
13.5 Placing Hidden Objects .....	808
13.6 Triggers .....	810
13.6.1 Basic Trigger Settings .....	810
13.6.2 Advanced Trigger Settings .....	816
13.6.3 Trigger Shortcuts .....	819
13.6.4 Trigger Linking .....	819
13.7 Game Logic .....	821
<b>14. Support Tools and Objects .....</b>	<b>822</b>
14.1 Aerial Delivery System .....	823
14.1.1 On Creation .....	825
14.1.2 Trigger .....	826
14.1.3 Linking .....	826
14.2 Artillery Strike .....	830
14.2.1 Artillery - Trigger Synchronization .....	834
14.3 Close Air Support .....	835
14.3.1 Bomb / Missile Run .....	836
14.3.2 Strafing Run .....	838
14.3.3 Trigger Synchronization .....	840

14.4 VBS Call for Fire - FDC UI .....	842
14.4.1 Gunlines Details Panel .....	843
14.4.2 Main FDC Panel .....	844
14.4.3 Gunline Management .....	848
14.4.4 Target Management .....	857
14.5 IR Laser .....	860
14.6 MEDEVAC / CASEVAC .....	862
14.6.1 Helicopter Selection .....	863
14.6.2 Ground Vehicles .....	864
14.6.3 MEDEVAC Player Re-spawn Location .....	864
14.6.4 Known Limitations .....	865
<b>15. Observation Tools and Objects .....</b>	<b>866</b>
15.1 Action Camera .....	867
15.2 Camera Editor Object .....	869
15.2.1 Linking Camera Waypoints to Objects .....	872
15.2.2 Scripting the Camera .....	872
15.3 Bookmark Camera .....	873
15.4 GBOSS Security Camera .....	875
15.5 Invisible Camera / UAV .....	876
15.6 Spectator Units .....	877
15.7 UAV Video Streaming .....	879
15.7.1 Streaming.xml File .....	880
15.7.2 Place and Set Up the Editor Objects .....	882
15.7.3 Link the Editor Objects to a Unit / UAV .....	886
15.7.4 Starting the Stream .....	887
15.7.5 Limitations .....	889
15.8 Viewport Config .....	890
15.8.1 Viewport Configuration File .....	895
15.8.2 General Viewport Limitations .....	900
15.8.3 Viewport Config Editor Object Limitations .....	901
15.9 Render Target Config .....	902

15.9.1 Render Target Configuration File .....	904
15.9.2 Render Target Config Editor Object Limitations .....	906

# 1. VBS Editor Overview

VBS4 includes VBS Editor to provide entity level mission editing, enabling the creation of complex custom scenarios to meet almost any training need:

- Create Battlespaces anywhere on the Earth.
- Support for large numbers of fidelity constructive (AI) civilian and military entities in the same Battlespace supporting battalion level scenarios.
- Quickly prepare a scenario using VBS Plan to:
  - Quickly *sketch out* and execute a tactical plan without prior simulation or scenario generation knowledge, and then build a mission from it.
  - Quickly generate doctrinally correct and equipped forces that are either attacking, defending, or moving through a designated area.
  - A simple workflow that allows for military symbols to be easily placed in 2D or 3D.
  - Build a mission from the plan, converting the symbology into entities with the applicable orders.
- View and modify your scenario in 2D Map or 3D Camera views.
- Add personnel, vehicles, and objects from the content library of over 12,000 models.
- Modify individual personnel and vehicle loadouts, and create custom personnel and groups.
- Set specific conditions for your scenario, including time and date, weather, and general AI behavior.
- Tools for rapidly creating training use cases such as mission rehearsal, pre-deployments, UAV and sensor management, sniper and marksmanship, convoys and driving, radio procedures, and enemy mindset training.
- Use the extensive set of Editor Objects that provide a wide range of functionality, such as Advanced Wounding, Close Air Support, and IEDs.
- Set AI behaviors at group or individual level, and control their actions through the use of Waypoints and Triggers.
- Use AI to provide more complex behaviors including civilian ambiance, vehicle convoys, and infantry maneuvers.
- Use the SQF scripting language to interact directly with the simulation engine to control entity states and perform more complex actions.

The VBS Editor Manual focuses exclusively on the use of VBS Editor in Prepare Mode to create and modify scenarios.

- **Scenario Preparation**

Use VBS Editor to perform detailed entity level editing of a scenario.

For a selected Battlespace, use VBS Editor to add personnel, vehicles, equipment, and create hazards and objectives for engaging and realistic training.

The VBS Editor may be used to create a whole scenario, but is typically used in combination with VBS Geo and VBS Plan.

For more information see, [Scenario Preparation \(on page 24\)](#).

The VBS Editor UI in Prepare Mode provides 2D Map and 3D Camera Views of the terrain, and a set of Tools and Panels to interact with the terrain and the simulation objects in it.

- [Mission Designer Interface \(on page 28\)](#)

The VBS Editor User Interface is also used in other Modes for other use cases apart from Scenario Preparation:

- **Scenario Execution**

Use VBS Editor in Execute Mode to manage Scenarios. In a running Scenario, use VBS Editor to monitor simulation users, manage the scenario, and insert simulation objects, hazards, and events in real-time.

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

- **After Action Review**

Instructors can record a Scenario Execution in real-time. After Action Review (AAR) then enables the Instructors to review the Scenario with Trainees to analyze their actions, explore alternatives, and replay the entire Scenario from multiple perspectives.

For more information, see Scenario Assessment in the VBS4 AAR Manual.

- **Command and Control**

Trainees can access a limited version of the Editor Interface. Command and Control or C2 provides users with a tactical map view that provides a limited overview of the Scenario with specific functionality applicable to their role in the Scenario.

For more information, see Command and Control (C2) Screen in the VBS4 Trainee Manual.

All of these use cases employ the same VBS Editor User Interface, but with access to different tools and functions.

For information about the VBS Editor UI in other modes, see the applicable topic:

- Instructor Interface in the VBS4 Instructor Manual
- AAR Playback and the User Interface in the VBS4 AAR Manual
- Command and Control (C2) Screen in the VBS4 Trainee Manual

This document focuses on the functions and objects available to Mission Designers for Scenario Preparation, and many of these functions are also available to Instructors during Scenario Execution. These functions are split into the following categories:

- [Mission Converter \(on page 105\)](#)

Use the Mission Converter tool to convert VBS3 missions to VBS4 Battlespaces.

- [Setting Up VBS Radio \(on page 112\)](#)

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

Configure VBS Radio as part of your mission design process using VBS Editor.

- [Integration Tools and Objects \(on page 138\)](#)

VBS4 supports a wide range of integrated simulation use cases.

Configure the mission or specific Editor Objects to enable these broader simulation use cases such as combined simulation and image generation hosting.

- [Terrain Tools and Objects \(on page 232\)](#)

VBS4 includes terrain that may be used without alteration to support your scenarios.

However, you can use VBS Editor to add additional features, objects, and scenario hazards.

- [Environment Tools and Objects \(on page 277\)](#)

Determine the conditions that apply to the scenario, such as weather and medical simulation settings.

- [Personnel and AI Tools and Objects \(on page 343\)](#)

Add the playable and AI characters that populate your scenario. VBS4 also provides a set of functions to determine and control AI behaviors.

 **NOTE**

The minimum requirement to save or preview a mission is a single playable character.

Add a playable character to a mission as a Unit, part of a Group, or as part of the crew of a Vehicle.

- [Control AI UI Overview \(on page 415\)](#)

Use the VBS Control AI to create sophisticated missions with Computer Generated Forces (CGF) behaviors that for individual and group infantry, vehicle convoys, overcoming terrain obstacles (bridge construction and deployment), civilian pattern-of-life simulation, and so on.

- [Vehicles Tools and Objects \(on page 598\)](#)

Add crewed and uncrewed vehicles to support your scenario. VBS4 provides a large selection of civilian and military vehicles, including land, air, and watercraft, as well as static weapons. In addition, there are specific Editor Objects to support vehicle-based scenarios.

- [Equipment Tools and Objects \(on page 661\)](#)

Most units and vehicles include a default set of equipment. VBS Editor enables you to modify the equipment provided as well as populating the scenario with additional equipment, such as weapons and ammunition. VBS4 also provides a set of equipment Editor Objects with specific functionality.

- [Objectives Tools and Objects \(on page 781\)](#)

A mission may include a Briefing and an Overview to provide instructions to players at the start of the mission. In addition, VBS4 provides a set of objects, such as Waypoints and Triggers, that you can use to provide mission structure and events.

- [Support Tools and Objects \(on page 822\)](#)

Many training scenarios require the use of 'external' support, such as Airstrikes and MEDEVAC. VBS4 provides a set of support Editor Objects that the mission designer or Administrator can use to enhance training scenarios.

- [Observation Tools and Objects \(on page 866\)](#)

VBS4 includes a number of options and specific Editor Objects that enable non-users to observe or record the scenario during runtime.

- **Scripting**

VBS4 provides the custom SQF Scripting Language to enable advanced functionality that is not possible using Editor Objects. Use of scripting requires familiarity with basic programming concepts.

For more information, see the VBS4 Scripting Manual.

For a demonstration of some VBS Editor functionality in action, see the VBS4 Instructor Series - Intro to Editor Mode video at <https://youtu.be/wNRyYJU9Mxc>.

**NOTE**

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

## 2. Scenario Preparation

The primary VBS4 use case is the creation of engaging and realistic training Scenarios.

Create a Battlespace, and use VBS Geo, VBS Plan, and VBS Editor to create your Scenario.

### Follow these steps:

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

In the **VBS4 > Client** tab, select the **VBS4 Configuration** to use:

- **VBS4 Online**

Starts VBS4 Clients and Dedicated Servers connected to a VBS World Server hosting the Whole-Earth Terrain and providing access to stored Battlespaces.

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

- **VBS4 Offline**

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



#### **WARNING**

Do not select or input the **Server IP** Address to connect to a Dedicated Server.

- Select **admin**.

2. To enable additional options for Scenario Preparation, select the following in VBS Launcher:

**Server > gateway (-gateway)**

Enables the **Tools > Gateway GUI** options to configure VBS Gateway and Entity Mapping.

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

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

3. Click **Launch Modules**.

VBS4 starts in Battlespaces mode.

4. Create a Battlespace in the Whole-Earth Terrain:

- a. Select the **Battlespaces** tab, and in the Battlespaces List, click **+ New Battlespace**.
- b. Use the Orbit Camera Controls to navigate the globe and click the required location.
- c. Input the Battlespace details and click **Save Changes**.

VBS4 adds the new Battlespace to the Battlespaces List, ready for Scenario Preparation.

For more information, see Creating Battlespaces in the Introduction to VBS4 Guide.

5. Select your Battlespace in the Battlespaces List and use any of the **Prepare** functions in the Battlespace Functions Panel:

- Highlight **Geo** and click **Create** to use VBS Geo to modify the terrain for your Scenario.  
For details about editing the terrain, see VBS Geo Overview in the VBS Geo Manual.
- Highlight **Plan** and click **Create** to use VBS Plan to quickly populate your Scenario with ORBATs and define Tactical Plans.  
For details about creating Plans, see VBS Plan Overview in the VBS Plan Manual.
- Highlight **Editor** and click **Create** to use VBS Editor to perform individual entity and detail level modifications in your Scenario.  
For details about creating missions, see [VBS Editor Overview \(on page 20\)](#).

 **NOTE**

VBS4 opens the local copy of the Battlespace. To use a Battlespace saved on VBS World Server, synchronize it first. For more information, see [Synchronize Battlespaces](#) in the [Introduction to VBS4 Guide](#).

The VBS4 UI switches to Prepare Mode, opens the selected Tool, and displays the Tool Selection options in the VBS4 Toolbar.

Click **Plan**, **Editor**, or **Geo** in the VBS4 Toolbar to switch seamlessly between the VBS4 Tools in Prepare Mode.

 **WARNING**

VBS4 requires a playable character in the Scenario to enable Preview and Scenario Execution.

Do one of the following:

- Add a playable character in VBS Editor.  
For more information, see [Adding Units \(on page 344\)](#).
- Specify a playable unit in VBS Plan and click **Build Mission**.  
For more information, see [Tactical Unit Tool](#) and [Build Missions](#) in the VBS Plan Manual.

6. To setup VBS Radio as part of your Scenario:

- Select **Editor** and **Tools > Radio Admin** to configure the Channels, Radio Types, and Assignments.

For more information, see [Setting Up VBS Radio \(on page 112\)](#).

7. To configure IG View Objects to broadcast viewpoints to VBS Blue IG, see [Add IG Viewpoints to Scenarios \(on page 220\)](#).
8. To preview your mission, click the **Preview** button in the VBS4 Toolbar of any of the Tools.



The Scenario starts as a playable mission with you controlling the first playable character placed in the Scenario.

- Play the Scenario as a Trainee to preview the Scenario in action.  
For information about controlling your character, see the VBS4 Trainee Manual.
- Modify the Scenario as an Instructor to play test various aspects of the Scenario.  
Press **Map (M)** or **Pause (Esc)**, and select **Editor** to open VBS Editor in Preview Mode.  
Preview Mode provides the majority of the same VBS Editor functions as Execute Mode.  
For more information, see Instructor Interface in the VBS4 Instructor Manual.

 **NOTE**

Any changes made to the Scenario during the Preview only persist for the duration of the Preview and are not saved as part of the Battlespace.

- Restart the Scenario as an Instructor.  
Press **Pause (Esc)** and in the **Main Menu** in the VBS4 Toolbar, select **Restart Battlespace**.
  - Return to the Editor UI in Prepare Mode to continue editing the Scenario.  
Press **Pause (Esc)** and in the **Main Menu** in the VBS4 Toolbar, select **End Battlespace**.
  - Open the Config Browser.  
Press **Pause (Esc)** and in the **Main Menu** in the VBS4 Toolbar, select **Config Browser**.
9. To save your Scenario, click the **Main Menu** in the VBS4 Toolbar, and under **Battlespaces** select one of the following options:
    - **Save** - Saves changes into the currently open Battlespace.
    - **Save As** - Creates a new Battlespace, or overwrites the existing one, based on the name you enter in the dialog.

VBS4 saves the Battlespace locally, creating and updating the files described in Battlespaces Folder in the Introduction to VBS4 Guide.

When you are connected to VBS World Server, you are given the option to upload the Battlespace to the VBS World Server. For more information see Synchronize Battlespaces in the Introduction to VBS4 Guide.

A scenario saved to VBS World Server is available for use on all connected Clients:

- Modify the Scenario using the same process described in this topic.
- Execute the Scenario as described in Scenario Execution in the VBS4 Instructor Manual.

## **WARNING**

### **Current Limitations**

In this release of VBS4, the following limitations apply during Scenario Preparation:

- **Avoid editing the same Battlespace on two separate Clients at the same time.**

Scenario Preparation uses a local copy of the Battlespace files. Synchronizing Battlespaces uploads edits to the VBS World Server. If two Administrators edit at the same time, the first to upload is overwritten by the second.

- **Do not edit the Geo Project for a Battlespace if there are After Action Review recordings.**

Each Battlespace only supports a single Geo Project which is loaded during Scenario Execution and Scenario Assessment. Editing the terrain with VBS Geo after Scenario Execution may invalidate the AAR recording, for example by changing a flat area into a hill. The AAR package replays the movements and events that occurred when the terrain was flat, but during Playback, the hill is rendered as part of the terrain.

For a demonstration of a simple Scenario, see the VBS4 Instructor Series - CQB Squad Training and video at <https://youtu.be/JcnJseLQ8zs>.

## **NOTE**

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

## 3. Mission Designer Interface

VBS Editor is the primary tool in Mission Design for entity level editing of a Scenario.

Access VBS Editor in one of the following ways:

- From the Battlespaces List, select the Battlespace and then click **Editor** in the Battlespace Functions Panel.
- From VBS Geo or VBS Plan, click **Editor** in the VBS4 Toolbar.

VBS Editor opens in Prepare mode, focused on the center of the Battlespace location, enabling you to create or edit the Mission associated with the current Battlespace.

### **NOTE**

This topic focuses on the use of VBS Editor in Prepare mode for the Scenario Design use case.

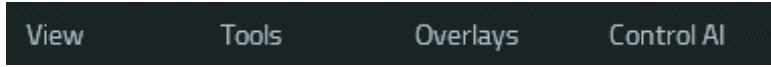
For other Editor modes, see the following topics:

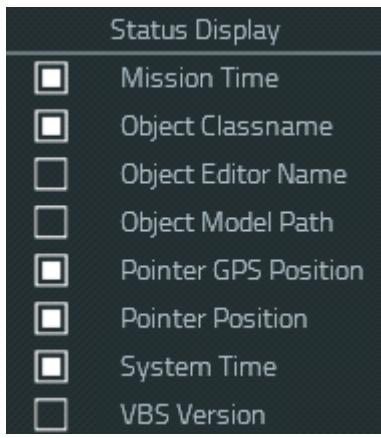
- Execute - Instructor Interface in the VBS4 Instructor Manual
- Training C2 - Command and Control (C2) Screen in the VBS4 Trainee Manual
- Assess - AAR Playback and the User Interface in the VBS4 AAR Manual

**Image-1: VBS Editor in Prepare Mode**



VBS Editor contains the following primary UI elements:

1	<b>VBS4 Toolbar</b>	<p>VBS Editor in Prepare Mode displays the following VBS4 Toolbar:</p>  <p>Tool Selection enables seamless switching to VBS Geo and VBS Plan, plus VBS4 Settings, Documentation, and Notifications.</p> <p>For more information, see <a href="#">VBS4 Toolbar</a> in the <a href="#">Introduction to VBS4 Guide</a>.</p> <p>The Toolbar in Prepare Mode also displays the Preview Button to quickly run the Scenario in single-player mode.</p> 
2	<b>Editor Menu</b>	<p>The Editor Menu provides access to specific Editor functions.</p> 
3	<b>Editor Toolbar</b>	<p>Click the icons in the Editor Toolbar to access specific <a href="#">Editor Toolbar</a> (on page 37).</p> 
4	<b>Tools Panel</b>	<p>The Tools Panel is the primary interface to add and manage Editor Objects in the Scenario.</p> <p>For more information, see <a href="#">Tools Panel (on page 37)</a>.</p> <p>Use the arrows at the bottom of the Tools Panel to open and close the Object Preview.</p> <p>Place the cursor over an object in the 2D map or 3D terrain to view an object image and basic details.</p>
5	<b>Scenario Objects Panel</b>	<p>The Scenario Objects Panel lists the Editor Objects in the Scenario, including any ORBAT hierarchies and enables access to individual Editor Object functions.</p> <p>For more information, see <a href="#">Scenario Objects Panel (on page 39)</a>.</p>
6	<b>Editor Tabs</b>	<p>The Tabs enable access to VBS4 functions, and also to contract and expand their panels.</p>  <p>Access the <a href="#">Tools Panel (on page 37)</a> and <a href="#">Scenario Objects Panel (on page 39)</a> for the main Editor Object functions.</p>  <p>Access Call for Fire functions in the <a href="#">VBS Call for Fire - FDC UI (on page 842)</a>.</p>

7	<b>3D Camera / 2D Map Views</b>	VBS Editor can switch between a 3D Camera View or a 2D Map View of the Scenario. The views are configurable, and enable placement of Editor Objects and interaction with them. For more information, see <a href="#">3D Camera and 2D Map Views (on page 43)</a> .
8	<b>Status Footer</b>	Click the arrow in the bottom-right to select which items to display in the footer. 

## 3.1 Editor Menu Options

The Editor Menu provides the following options to Mission Designers during Scenario Preparation:



- [VBS4 Main Menu for Mission Design \(below\)](#)
- [View Menu Options \(on page 32\)](#)
- [Tools Menu Options \(on page 33\)](#)
- [Overlays Menu Options \(on page 35\)](#)
- [Control AI Menu Options \(on page 36\)](#)

### 3.1.1 VBS4 Main Menu for Mission Design

In this release of VBS4, the following Editor options are available under the VBS4 Main Menu.

Click the **Menu Icon** to expand the following options:



Editor Menu	Description
<b>Option</b>	
<b>Save</b>	Use this option to save the current Editor Objects as part of the Scenario.
	<div style="border: 2px solid red; padding: 10px;"><p> <b>WARNING</b></p><p>This option saves the current state of the Tactical Plan in VBS Plan, the terrain Geo Project edits in VBS Geo, and the entities in the Mission from the VBS Editor.</p></div>
	All Battlespace files are saved locally with an option to upload to a connected VBS World Server. For more information, see Battlespaces Folder in the Introduction to VBS4 Guide.
<b>Save As</b>	Use this option to save the current Editor Objects as part of the Scenario in a new Battlespace, or an overwritten version of the original Battlespace, based on the name you enter in the dialog.
	<div style="border: 2px solid red; padding: 10px;"><p> <b>WARNING</b></p><p>This option saves the current state of the Tactical Plan in VBS Plan, the terrain Geo Project edits in VBS Geo, and the entities in the Mission from the VBS Editor.</p></div>
	All Battlespace files are saved locally with an option to upload to a connected VBS World Server. For more information, see Battlespaces Folder in the Introduction to VBS4 Guide.
<b>Save and Upload</b>	Use this option to save the current Editor Objects as part of the Battlespace and upload it to the connected VBS World Server.
	<div style="border: 2px solid red; padding: 10px;"><p> <b>WARNING</b></p><p>This option saves the current state of the Tactical Plan in VBS Plan, the terrain Geo Project edits in VBS Geo, and the entities in the mission from VBS Editor.</p></div>
	All Battlespace files are saved locally and uploaded to a connected VBS World Server. For more information, see Battlespaces Folder in the Introduction to VBS4 Guide.
	<div style="border: 2px solid #0070C0; padding: 10px;"><p> <b>NOTE</b></p><p>This option is only available if VBS4 is connected to VBS World Server, and only in Prepare mode.</p></div>
<b>Clear</b>	Removes all Editor Objects from the Scenario.
<b>Edit Briefing</b>	Create / edit a Mission Briefing to display to Trainees at the start of the scenario. The Mission Briefing can also be accessed by Trainees during a scenario. For more information, see <a href="#">Mission Briefings (on page 789)</a> .
<b>Close Prepare</b>	End Scenario Preparation and return to the main VBS4 UI in Battlespaces mode. VBS Editor prompts you to <b>Save and Close</b> or <b>Close Without Saving</b> or <b>Cancel</b> .

## 3.1.2 View Menu Options

In the Editor Menu, click **View** to expand the following options:

View Menu Option	Description
<b>2D Map View</b>	Switch between the 2D Map and 3D Camera View of the Scenario. For more information about Views, see <a href="#">3D Camera and 2D Map Views (on page 43)</a> .
<b>3D Camera View</b>	
<b>Map Settings</b>	Control the appearance and content of the Map for Trainees using C2 Mode. For more information, see <a href="#">Map Settings (on page 296)</a> .
<b>Editor Settings</b>	Modify Editor UI display settings. For more information, see <a href="#">Editor Settings (on page 44)</a> .
<b>Show / Hide Texture</b>	Display surface textures in the 2D Map View. <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><p><b>NOTE</b> Requires the visibility of the <code>satelliteTexture</code> map layer (VBS4 satellite data) to be switched on. For more information, see <a href="#">Map Layer Elements (on page 308)</a> and <a href="#">Layers Tab (on page 301)</a>.</p></div>
<b>Enable / Disable Shaded Relief</b>	Display elevation changes in the 2D Map View. <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><p><b>NOTE</b> The following considerations apply:<ul style="list-style-type: none"><li>This option is only available, if surfaces textures are hidden, using <b>Hide Texture</b>.</li><li>Requires the visibility of the <code>shadedRelief</code> map layer (VBS4 elevation data) to be switched on. For more information, see <a href="#">Map Layer Elements (on page 308)</a> and <a href="#">Layers Tab (on page 301)</a>.</li></ul></p></div>
<b>Show / Hide 3D Icons</b>	If <b>Show 3D Icons</b> is selected, Unit Symbology Markers are shown above entities / objects in 3D Camera View.
<b>Camera Collision On / Off</b>	If <b>ON</b> , the 3D camera can clip through the terrain.
<b>Units with Advanced Wounding...</b>	Select to open the Units With Advanced Wounding list, see <a href="#">Advanced Wounding (on page 327)</a> .

View Menu Option	Description
<b>Unit Symbol Configuration</b>	Select to open the Unit Symbols dialog, see <a href="#">Customizable Symbology (on page 388)</a> .
<b>Exaggerated View Mode</b>	Select to open the Exaggerated View dialog. For more information, see <a href="#">Exaggerated View</a> in the VBS4 Editor Manual.

### 3.1.3 Tools Menu Options

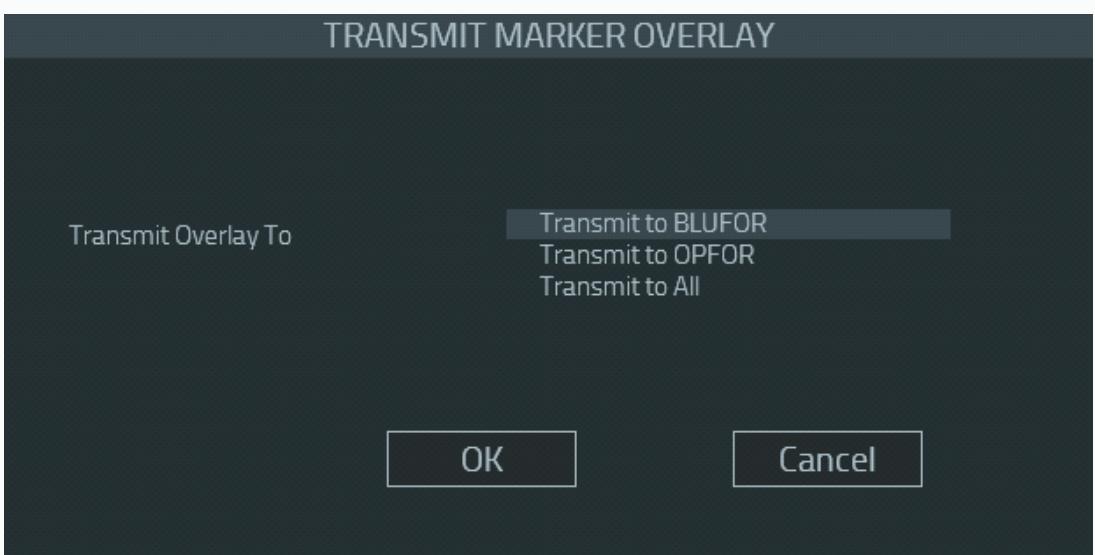
In the Editor Menu, click **Tools** to expand the following options:

Tools Menu Option	Description
<b>Scenario Settings</b>	Change overall settings for the Scenario. For more information, see <a href="#">Define Scenario Settings (on page 278)</a> .
<b>Weather Settings</b>	Change weather, cloud, and sea settings. For more information, see <a href="#">Weather Settings (on page 285)</a> .
<b>Atmospheric Parameters</b>	Set specific Atmospheric Parameters for display to Players in the Atmospheric Parameters HUD. For more information, see Atmospheric Parameters in the VBS4 Trainee Manual.
<b>Instructor Operator Station</b>	Open the companion VBS Instructor Operator Station application to monitor the scenario.
<div style="border: 1px solid #8B9E7A; padding: 10px; margin: 10px 0;"><p> <b>FEATURE NOTICE</b> VBS IOS is not included with VBS4. For more information, contact <a href="mailto:support@bisimulations.com">support@bisimulations.com</a>.</p></div>	
<b>Radio Admin</b>	Opens the VBS Radio user interface. <div style="border: 1px solid #0072BC; border-radius: 10px; padding: 5px; margin-top: 10px;"><p> <b>NOTE</b> Only available if VBS Radio is enabled.</p></div>
<b>Respawn Settings</b>	Opens the Respawn Settings dialog. For more information, see <a href="#">Respawn Settings (on page 101)</a> .
<b>Developer Console</b>	Open the Developer Console to enable the execution of SQF scripting, and the reading and assigning of variables. For more information, see <a href="#">Developer Console</a> in the VBS4 Scripting Manual.

Tools Menu Option	Description
<b>ORBAT Editor</b>	Opens the <a href="#">ORBAT Editor (on page 366)</a> dialog.
<b>Measure Distance</b>	Open the Measure Distance Tool to measure the distance between two points. For more information, see <a href="#">Measure Distance Tool (on page 71)</a> .
<b>Show / Hide Toolbar</b>	Toggle the <a href="#">Editor Toolbar (on page 37)</a> on and off.
<b>Show / Hide Status Bar</b>	Toggle the <a href="#">Status Footer (on page 30)</a> on and off.
<b>Undelete Map Objects</b>	Legacy VBS3 functionality that does not apply to VBS4.
<b>Reference Documents</b>	View the available set of Reference Documents. For more information, see <a href="#">Reference Documents (on page 765)</a> .
<b>Create Form</b>	Opens the Form dialog, which is used to create form templates that can be sent across the network. Trainees use the forms to send reports, orders, request support, and so on, see <a href="#">Creating a Form in the VBS4 Trainee Manual</a> .
<b>List Forms</b>	Opens a list of completed forms, for more information see <a href="#">Completed Forms in the VBS4 Trainee Manual</a> .
<b>IG View Editor</b>	Modify the configuration of IG Views for integration with Image Generation products. For more information, see <a href="#">Add IG Viewpoints to Scenarios (on page 220)</a> .
<b>Export Map</b>	Export the currently visible region of the map as a QGIS project. For more information, see <a href="#">Export Map (on page 315)</a> .

### 3.1.4 Overlays Menu Options

In the Editor Menu, click **Overlays** to view the following options:

Overlays Menu Option	Description
<b>New Marker Overlay</b>	Add sets of military markers to the map and then transmits them to other participants in the Scenario.  For more information, see <a href="#">Adding Markers (on page 782)</a> .
<p><b>NOTE</b></p> <p>When an Instructor commits a Marker Overlay during Scenario Execution, a prompt displays to select which side to transmit the overlay to. Only members of the selected side and other administrator users see the new markers.</p> 	
<b>Load Mission Marker Overlay</b>	Load a previously saved Marker Overlay.
<b>New Object Overlay</b>	These options enable the Instructor to create and inject a set of Editor Objects into a Scenario together instead of having each object immediately appear in the Scenario as it is created.  For more information, see <a href="#">Object Overlays (on page 87)</a> .
<b>Load Mission Object Overlay</b>	

### 3.1.5 Control AI Menu Options

In the Editor Menu, click **Control AI** to expand the following options:

File Menu Option	Description
<b>Reload Behaviors</b>	Reloads behaviors when they are updated.
<b>AI Debug Panel</b>	Open the Control AI Debug Panel and select visualizations to display.
<b>Hide AI Debug</b>	Switch the Control AI Debug visualizations off. To switch them on again, select <b>AI Debug Panel</b> .

For more information, see [Control AI Menu \(on page 419\)](#).

## 3.2 Editor Toolbar

The Editor Toolbar enables the manipulation of Editor Objects and the 2D Map Scale.

Icon	Description
	Default select / normal mode. Enables you to select entities / objects.
	Object move mode. Enables you to move entities / objects.
	Object rotate mode. Enables you to rotate entities / objects.
	Object scale mode. Enables you to scale the object size.
	Set the mission time of day.
	Map scale zoom in. Enables you to zoom the map in (changes the map scale).
	Map scale zoom out. Enables you to zoom the map out (changes the map scale).

**NOTE**

If the terrain is configured for discrete map scales and the current map scale is within the predefined range, the map scale is shown when the Tools panel is minimized.

For more information about manipulating Editor Objects, see [Interacting with Editor Objects \(on page 52\)](#).

## 3.3 Tools Panel

The Tools Panel contains a set of tabs to add and manage objects in the scenario. Click the **Tools Tab** to access the panel.



The Tools Panel opens:



The Tools Panel contains the following tabs:

Icon	Tab	Description
	<b>Controls</b>	Displays the available keyboard shortcuts. The Controls content is context sensitive and changes according to the selected object and action being performed in the Editor.
	<b>Editor Objects</b>	Use the Editor Objects List to select the type of entity / object you want to add to the scenario, see <a href="#">Using Editor Objects (on page 46)</a> .
	<b>Bookmarks</b>	Use this tab to create timed event markers during a scenario, and to jump to a bookmark during review (AAR).
	<b>Layers</b>	Use this tab to organize objects in the scenario. For more information, see <a href="#">Layers and Overlays (on page 82)</a> .

**TIP**

Click the Tool Tab to minimize or maximize the Tools Panel. Resize the panel by dragging the bottom-right corner.

## 3.4 Scenario Objects Panel

This panel has two tabs.

Tab	Description
<b>ORBAT</b>	<p>Order of Battle (ORBAT).</p> <p>Shows the hierarchical structure of entities / objects in the scenario, including their respective symbology icons.</p> <p>Filtering always shows the entire list of entities / objects linked with the units, vehicles, UAVs linked with groups, echelons, and waypoints that they are filtered with.</p> <p>For more information, see <a href="#">Filtering (on page 41)</a>.</p>
<b>Scenario Objects</b>	<p>Shows only entities in the scenario, listed under their parent categories, including their respective symbology icons.</p> <p>Filters function without limitations (see <a href="#">Filtering (on page 41)</a>).</p>

The Scenario Objects panel and the ORBAT / Scenario Objects tabs have the following functions:

- Click the **Tools** tab to expand / collapse the panel.



- Drag the bottom-left corner of the Scenario Objects panel to resize it.
- Use the arrows to expand / collapse category lists:
  - Click the **Expand / Collapse All** icons to expand / collapse all the category lists.



- Click the **Expand / Collapse Selected** icons to expand / collapse a specific category list.



- Right-click individual entities / objects to access context menu options.
- If there is an Autonomous Vehicle (AV) in the scenario, AV symbology together with the name of the AV is shown in the ORBAT tab and the UNMANNED category of the Scenario Objects tab.
- If the Sensor Streaming EO is used in the scenario, the Sensor Streaming icon together with a radio wave indicator is shown in the OBJECT category of the Scenario Objects tab. For more information, see [UAV Video Streaming \(on page 879\)](#).
- If the Electronic Warfare EO is used in the scenario, the Electronic Warfare icon is shown in the OBJECT category of the Scenario Objects tab. For more information, see [Electronic Warfare \(on page 698\)](#).

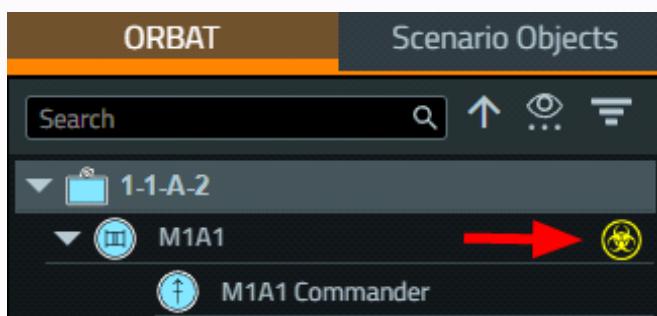
- If the Hazardous Area EO is used in the scenario, hazard symbology is shown together with the CBRN substance type in the OBJECT category of the Scenario Objects tab. For more information, see [Hazardous Area Symbology \(on page 248\)](#).



Once in Execute Mode (RTE), hazard symbology appears next to contaminated entities in both the ORBAT and Scenario Objects tabs.



### EXAMPLE



### 3.4.1 Filtering

You can use various filter functions in the ORBAT / Scenario Objects tabs to find entities.

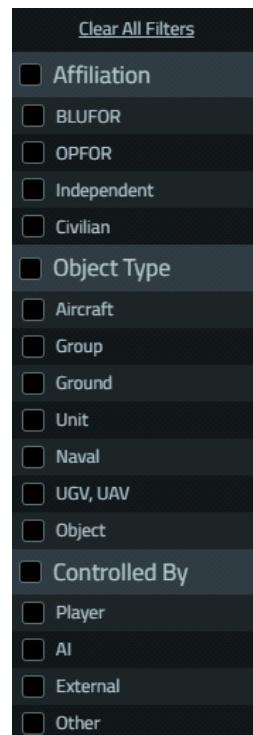
#### NOTE

If filtering is applied in the ORBAT tab, Objects are not affected, only Units, Groups, Vehicles, and Waypoints. If filtering is applied in the Scenario Objects tab, everything is affected.

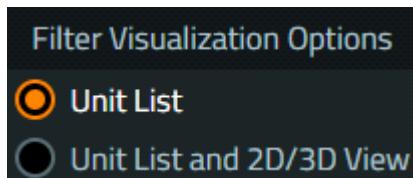
If the **BLUFOR** option is selected in the filter list in the ORBAT / Scenario Objects tab, Objects (such as: buildings, crates, markers, and so on) are not filtered out.

Do one of the following:

- Enter the name of the entity you are looking for in the **Search** field.
- Click the **Open Filters** icon to open the filter list and check the box next to the specific **entity or category (Affiliation, Object Type, Controlled By)** you want to filter.



- Click the **Filter Visualization Options** icon to filter the visibility of entities in the ORBAT / Scenario Objects tabs and on the 2D Map / in 3D Camera View.



Select one of the following options:

- Unit List** - Shows only filtered entities in the ORBAT / Scenario Objects tab.
- Unit List and 2D / 3D View** - Shows only filtered entities in the ORBAT / Scenario Objects tab and on the 2D Map / in 3D Camera View.

#### NOTE

Entities / objects that are selected on the 2D map remain visible in the ORBAT and Scenario Objects tabs, even if they are filtered out.

### Empty Vehicle Behavior

The following events occur with regard to empty vehicles and Civilian entities, when using the filter list (opened using the Open Filters icon).

- If a Civilian unit enters an empty vehicle of a different side (BLUFOR, OPFOR, Independent), and you check the relevant box in the filter list:
  - Civilian** - The Civilian unit is visible on the map and in the ORBAT / Scenario Objects tab list.
  - BLUFOR / OPFOR / Independent** - The BLUFOR / OPFOR / Independent unit is visible on the map and in the ORBAT / Scenario Objects tab list.
- If a unit of a side other than Civilian enters a vehicle of another affiliation, for example, a BLUFOR unit enters an OPFOR vehicle, and you check the relevant box in the filter list:
  - BLUFOR** - The BLUFOR unit is visible on the map and in the ORBAT / Scenario Objects tab list.
  - OPFOR** - The OPFOR vehicle is not visible on the map or in the ORBAT / Scenario Objects tab list.

## 3.5 3D Camera and 2D Map Views

Mission Designers can navigate the scenario in both 3D Camera and 2D Map Views.

Click the **Keyboard Icon** to open the Controls Panel displaying the applicable camera controls for your current Mode.



### 2D Map View

- From the Editor Menu, select **View > 2D Map View**.
- Press **Map (M)** from any other view.
- From the 3D Camera View, right-click an object and select **Center in Map** to open the 2D Map View with the selected object centered in the map.

### 3D Camera View

- From the Editor Menu, select **View > 3D Camera View**.
- In the 2D Map, right-click a position on the map and select **Default Camera** to open the 3D Camera View in the selected position.

Use the views to place new Editor Objects, to modify them, and to interact with them.

### Hide the User Interface

To get an unobstructed view of the Editor 2D Map or 3D Camera View, press **I** to hide the Editor Interface.

#### NOTE

Some indicators that are drawn directly in the Map or 3D View, such as Hazardous Areas and Plan Drawings are not hidden by this control.

For more information, see [Using Editor Objects \(on page 46\)](#) and [Interacting with Editor Objects \(on page 52\)](#).

## Image-2: Classic Camera and Editor Controls

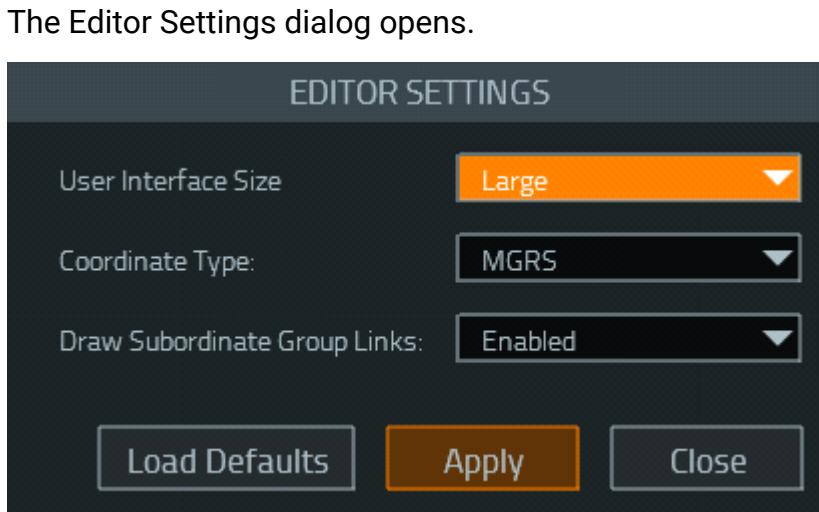


## 3.6 Editor Settings

Editor Settings enables you to change Editor display settings in both Prepare and Execute Modes.

### Follow these steps:

1. In the Editor Menu, expand **View** and select **Editor Settings**.



2. Modify the Editor Settings as required.

Settings	Description
<b>User Interface Size</b>	Select the display size of the font and icons in the Editor UI.
<b>Coordinate Type</b>	Select the coordinate type to display in the 2D Map View grid and the Status Footer.
<b>Draw Subordinate Group Links</b>	Select whether to display lines linking groups within an ORBAT hierarchy.

3. Click **Apply Changes** and **Close**.

VBS4 applies the selected settings to the Editor UI.

Click **Load Defaults** to reset the Editor Settings to their default settings.

## 3.7 Using Editor Objects

The basic purpose of the VBS Editor is to add, edit, and remove objects in a terrain to initially create and edit a scenario (Prepare mode) and then to administer a running scenario (Execute mode).

This topic provides an overview of generic Editor Object operations with references to other parts of the Editor Manual that provide more detailed information.

### Follow this process:

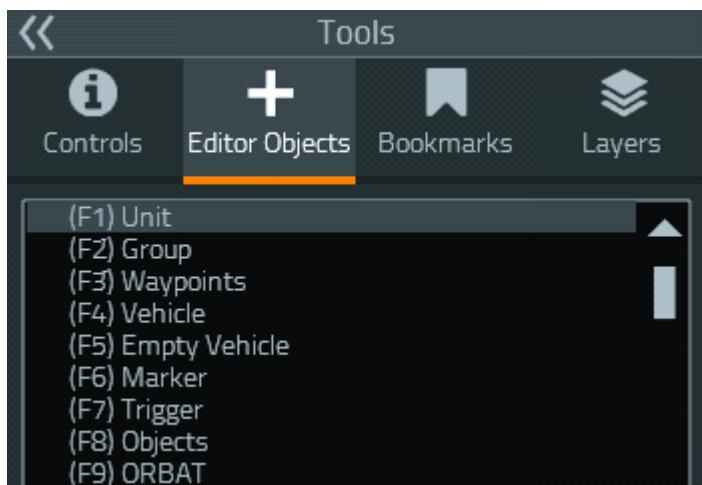
1. [Adding Objects \(below\)](#)
2. [Editing Objects \(on page 49\)](#)
3. [Moving Objects \(on page 50\)](#)
4. [Linking Objects \(on page 51\)](#)

### 3.7.1 Adding Objects

Use the Editor Objects List to access all Editor Objects and set their parameters before adding them to the scenario.

#### Follow these steps:

1. In the Editor, expand the **Tools Panel** in the upper-left corner, and click **Editor Objects** to open the Editor Objects List.



2. Select the Editor Object type to add from the Editor Objects List.

**TIP**

Use the **F-keys** to quickly select a main Editor Object category.

The Editor Objects List contains the following categories:

- **(F1) Unit**

Add individual characters to the scenario.

For more information, see [Adding Units \(on page 344\)](#).

- **(F2) Group**

Add small military, typically fire team size, groups of characters to the scenario.

For more information, see [Adding Groups \(on page 359\)](#).

- **(F3) Waypoints**

Add waypoints to act as player objectives or AI orders to the scenario.

For more information, see [Waypoints \(on page 421\)](#).

- **(F4) Vehicle and (F5) Empty Vehicle**

Add vehicles to the scenario, either crewed (F4) or uncrewed (F5).

For more information, see [Adding Vehicles \(on page 599\)](#).

- **(F6) Marker**

Add tactical marker annotation to the Scenario map.

For more information, see [Adding Markers \(on page 782\)](#).

- **(F7) Trigger**

Add entities to the Scenario that trigger events when specific conditions are met.

For more information, see [Triggers \(on page 810\)](#).

- **(F8) Objects**

VBS4 includes a library of individual objects from ammunition and magazines, signposts and street furniture, to structures and buildings, that only require a minimum set of object properties in order to place them in a Scenario.

**WARNING**

Some objects use specific functionality designed for Vehicles.

These items are listed under the **(F4) Vehicles** and **(F5) Empty Vehicles** categories instead of the **(F8) Objects** category:

- SPTA - Objects > CCTV Cameras
- GB Objects > CBRNE Casualty Bags

- **(F9) ORBAT**

Add ORBATS to the Scenario.

For more information, see [ORBAT Editor \(on page 366\)](#).

- **Specific Editor Objects**

VBS4 includes a large set of Editor Objects that have their own specific object properties.

For more information about these objects, see the applicable topics in the VBS4 Editor Manual.

Placeable objects may also be added to your Favorites list. For more information, see [Adding Units \(on page 344\)](#), [Adding Vehicles \(on page 599\)](#), [Unit and Vehicle Editor Object Filters \(on page 62\)](#), and [Context Menu \(on page 58\)](#).

3. Do one of the following to open the Object Properties dialog:

- Double-click a placement position on the 2D map or 3D terrain.
- Right-click a placement position on the 2D map or 3D terrain and select **New Object**.

**TIP**

To place an object on the navigable surface of another object, such as the deck of a ship, hold **LCtrl** and double-click the placement position in the 3D view.

The Object Properties dialog for the Editor Object category opens.

#### 4. Input the Editor Object parameters.

The dialog varies for each Editor Object category but typically consists of the following options:

- Select the specific type of Editor Object to add from the category.
- Set specific parameters for that Editor Object type and category.
- Set exact position and orientation for the Editor Object.
- Set additional scripted properties such as Initialization Statements and Trigger Conditions.

#### 5. Click **OK** to add the Editor Object to the mission.

The Editor adds the object to the map either in the original placement position clicked, or the coordinates specified in the Object Properties. The Editor also adds the object to the Scenario Objects Tree.

### 3.7.2 Editing Objects

After an Editor Object is added to a mission, you can edit its properties.

#### Follow these steps:

##### 1. Do one of the following:

- Right-click the object in the 2D map or 3D terrain, and select **Edit Object**.
- Right-click the object in the Scenario Objects Tree, and select **Edit Object**.
- Double-click the object in the 2D map or 3D terrain.

The Object Properties dialog for the Editor Object opens.

##### 2. Edit the Editor Object parameters.

The dialog varies for each Editor Object category but typically consists of the following options:

- Select the specific type of Editor Object to add from the category.
- Set specific parameters for that Editor Object type and category.
- Set exact position and orientation for the Editor Object.
- Set additional scripted properties such as Initialization Statements and Trigger Conditions.

##### 3. Click **OK** to confirm the Editor Object properties.

### 3.7.3 Moving Objects

The Editor provides several ways to position and orient Editor Objects.

- Drag-and-drop Editor Objects in the 2D map for basic positioning.

- Move and rotate objects in the 2D map or 3D terrain for more detailed placement.

For more information, see [Interacting with Editor Objects \(on page 52\)](#).

- Use GPS Coordinates to set an exact object position.

For more information, see [Set GPS Coordinates \(on page 65\)](#).

- Use Azimuth to set an exact object orientation.

For more information, see [Set Azimuth \(on page 67\)](#).

## 3.7.4 Linking Objects

Linking Editor Objects enables relationships between objects that affect their behavior in VBS4.

### Follow these steps:

1. In the Editor, right-click the object to view its context options.

The exact set of options depend on the object type and the editor mode, but include the following:

Object Link Option	Description	Applicable To
<b>Orders &gt; Group With</b>	<p>Links the unit / object to a lead unit / vehicle to become part of that group.</p> <p>For more information, see <a href="#">Creating and Adding to Groups with Links (on page 362)</a>.</p>	Units, Groups, Vehicles
<b>Attach to Object</b> or <b>More... &gt; Attach to Object</b>	<p>Link the object to another object to create an Editor association.</p> <p>When the parent object is moved in the Editor, the attached objects also move, retaining their relative position and orientation.</p> <p>For more information, see <a href="#">Attaching Objects (on page 61)</a>.</p>	Most Editor Objects except Units and Groups
<b>Attach to Trigger</b> or <b>More... &gt; Attach to Trigger</b>	<p>Links the object to a Trigger. When the Trigger condition happens, the linked objects are affected.</p> <p>For more information, see <a href="#">Triggers (on page 810)</a>.</p>	Most Editor Objects
<b>Orders &gt; Attach to Higher Echelon</b>	<p>Links groups to form a group hierarchy structure.</p> <p>For more information, see <a href="#">Creating Command Structures (on page 384)</a>.</p>	Groups, Vehicles
<b>Specific Link Options</b>	<p>Some objects have link functionality specific to their use, for example Control Links for Unmanned Vehicles.</p> <p>See the appropriate topics for details of the link types required.</p>	Specific Editor Objects

2. Select the link type, and click an appropriate object to link to.

The Editor adds the link and updates the map and Scenario Objects Tree as appropriate to the object types and the link type.

## 3.8 Interacting with Editor Objects

Most Editor Objects (EOs) within the VBS Editor are 3D representations of real-world entities within your scenario, such as units, vehicles, buildings, trees, signs, rocks, or other "props". To add an EO, select an object type in the Editor Objects List, then double-click on the map or on the terrain in 3D Camera View.

After completing the Object Properties for the object and clicking **OK**, VBS4 adds the object to the scenario where it can be moved and modified.

### **WARNING**

Editor Objects in 3D Camera View cannot be placed, pasted, or moved beyond a distance of approximately 2 Km from the current viewpoint. No intersections in 3D Camera View are present past the internally calculated distance. Therefore, moving objects beyond this boundary is possible only in the 2D Map View.

The following table and sections describe a range of methods for modifying VBS Editor-placed objects through various interface shortcuts.

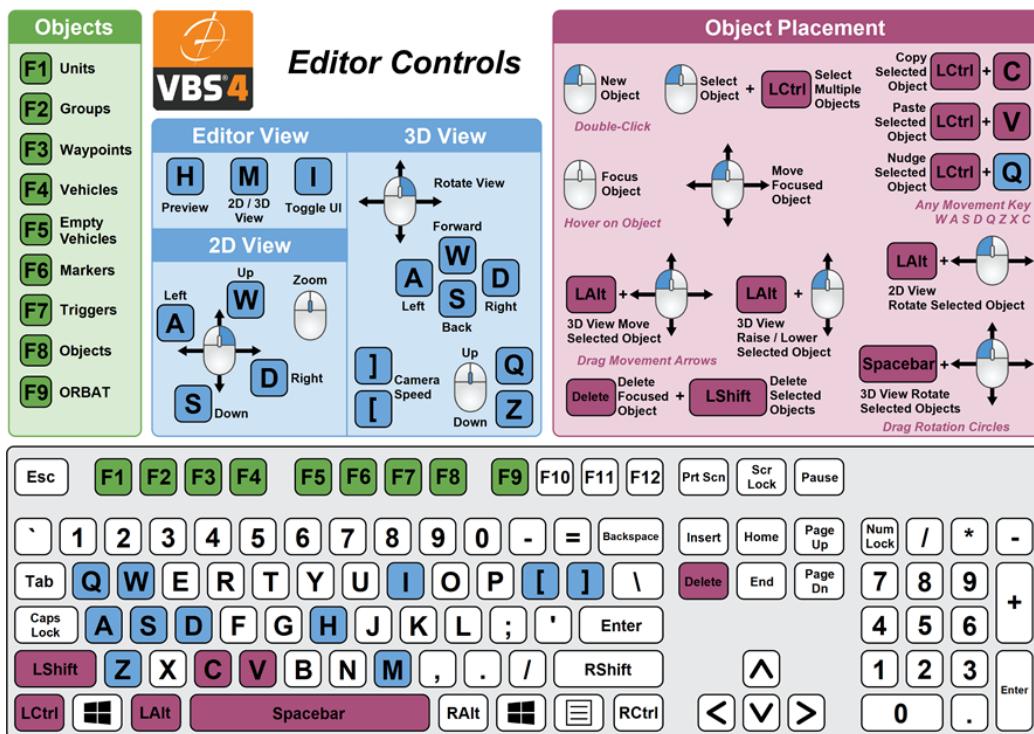
Action	Controls	Notes
Select Object	Click the object or drag a selection box around object.	Green bounding box.
Multiple Select	<b>LCtrl + LMB</b> or draw a selection box around objects.   <b>TIP</b> The objects selected are highlighted in the Scenario Objects Panel. Review the selection and use <b>LCtrl + LMB</b> in the Scenario Objects Panel to select or deselect objects before performing further operations, such as Copy and Paste.	
Focus on Object	Hover the cursor over the selected object.	Yellow bounding box.
Copy	Select the object and then press <b>LCtrl + C</b> .	
Paste	Press <b>LCtrl + V</b> .	
Delete Object	Do one of the following: <ul style="list-style-type: none"><li>Place your cursor over the object, and press <b>Delete</b>.</li><li>Select the object, and press <b>LShift + Delete</b>.</li></ul>	

Action	Controls	Notes
Delete Multiple Objects	Select multiple objects and press <b>LShift + Delete</b> .	
Move Object	Hold <b>LMB</b> and drag.	
3D Rotate Object	Select one or more objects, hold <b>Space</b> , and then hold <b>LMB</b> and drag one of the rotation circles.	Circles are gray if object is locked.
2D Rotate Object	Hold <b>LShift + RMB</b> and drag.	
3D Movement	Select object(s) hold <b>LAlt + LMB</b> and drag one of the movement arrows.	Arrows are gray if object is locked.
Raise / Lower Object	Hold <b>LAlt + RMB</b> and drag.	
Nudge Object	<b>LAlt</b> + a movement key ( <b>W, A, S, D, Q, Z, X, C</b> ).	
Change Time Scale	To speed up or slow down mission time, press <b>+</b> / <b>-</b> (not on the numpad).	

### NOTE

The Help Text panel provides context-sensitive help as you use the interface. It describes the mouse buttons, keys, and combinations of both that are available as you perform tasks within VBS Editor. To expand the help text, click the icon at the top left of the interface:





### 3.8.1 Selecting Objects

Click an EO to select it using either of the following methods:

- Hold **LCtrl + LMB** to select additional EOs.
- Hold **LMB** and drag to draw an EO selection box to select multiple EOs.

#### TIP

The objects selected are highlighted in the Scenario Objects Panel. Review the selection and use **LCtrl + LMB** in the Scenario Objects Panel to select or deselect objects before performing further operations, such as Copy and Paste.

## 3.8.2 Copy and Paste

Copying and pasting is a very quick method of duplicating large numbers of EO<sup>s</sup>.

**Follow these steps:**

1. Select the **objects** to copy.



### TIP

The objects selected are highlighted in the Scenario Objects Panel. Review the selection and use **LCtrl + LMB** in the Scenario Objects Panel to select or deselect objects before performing further operations, such as Copy and Paste.

2. Press **LCtrl + C**.
3. Move your cursor to where you want to paste the Editor Objects.
4. Press **LCtrl + V**.

You can quickly create groups of units or vehicles from a single entity on the fly.

**Follow these steps:**

1. Select a single entity.
2. Press **LCtrl + C**.
3. Move your cursor to where you want to paste the next entity in the group.
4. Press **LCtrl + V**.

The entities are linked as a group.

5. Repeat steps 3 and 4 repeatedly to add more entities to the group.



### NOTE

The original entity becomes the group leader.

## 3.8.3 Moving Editor Objects

You can move EO<sup>s</sup> by selecting them and then performing a click-and-drag operation.

**To move an EO in 2D or 3D, follow these steps:**

1. Select the **objects** to move.
2. Move the mouse over one of the selected EO<sup>s</sup>.
3. Hold the **LMB**.
4. Move the mouse.

### 3.8.4 Rotating Editor Objects

You can change the orientation of 2D and 3D EO's using the following methods:

- **LShift + RMB (2D and 3D method)**

**Follow these steps:**

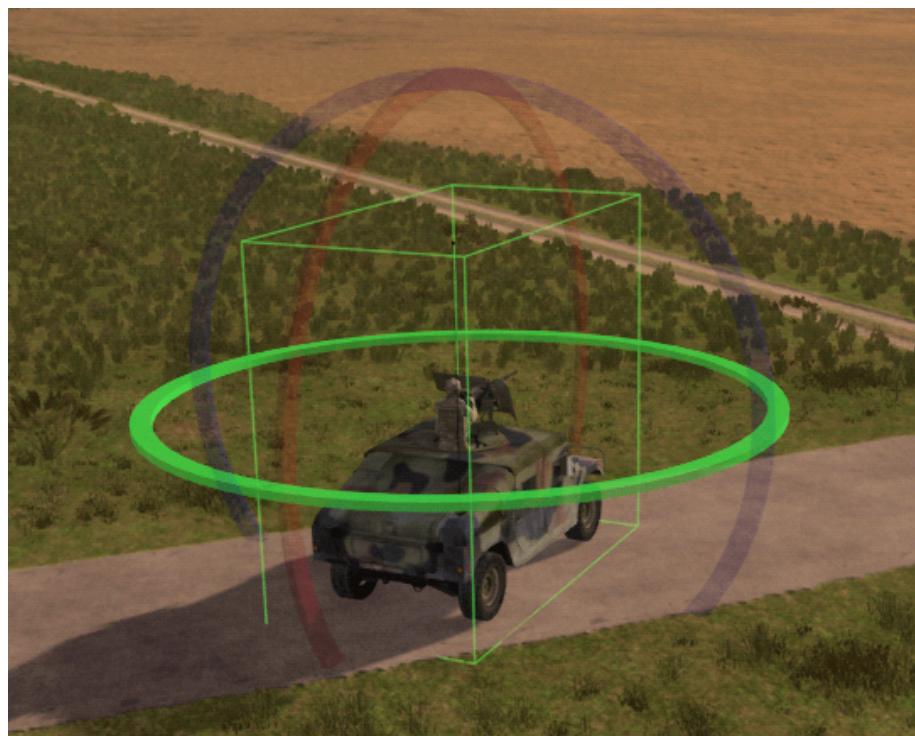
1. Select the **objects** to rotate.
2. Hold **LShift**
3. Hold the **RMB**.
4. Hold **LShift + RMB** and move the mouse.

- **Spacebar + LMB (3D method)**

**Follow these steps:**

1. Select the **objects** to rotate.
2. Press and hold **Spacebar**.
3. Click and drag the **LMB** on any of the three rotation circles (one for each axis).

**Image-3: 3D Rotation**



### 3.8.5 Adjusting Elevation

You can change the altitude of Editor Objects in 3D (but not 2D) with a **LAlt + RMB** and drag combination. To raise or lower an EO in 3D, execute the following procedure.

**Follow these steps:**

1. Select the **objects** to elevate.
2. Hold **LAlt**.
3. Hold the **RMB**.
4. Move the mouse up and down with both the **LAlt + RMB** held.

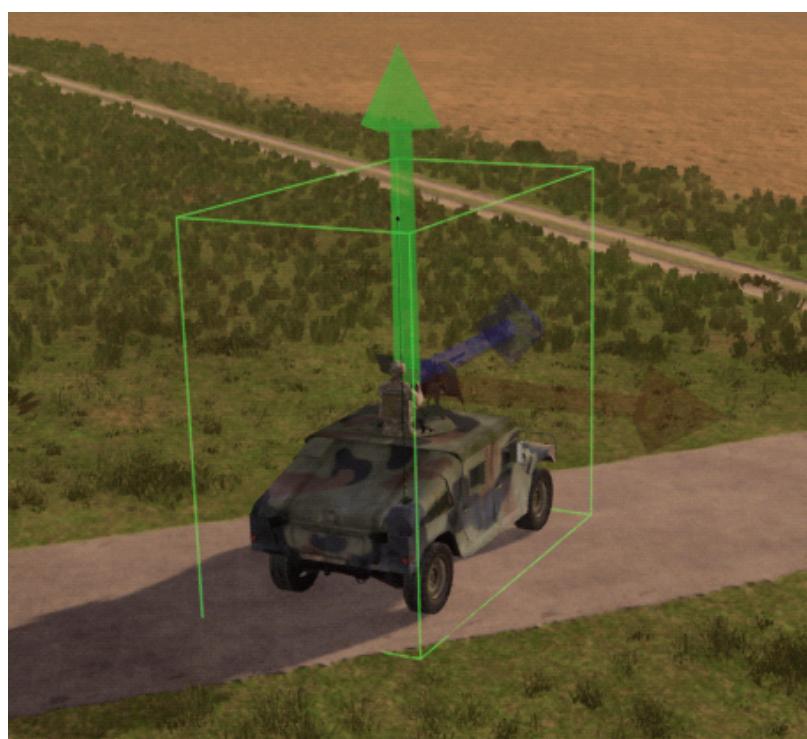
### 3.8.6 Moving Objects

You can move objects by executing the following procedure.

**Follow these steps:**

1. Select the **objects** to move.
2. Hold **LAlt**.
3. Click one of the **movement arrows**.
4. Move the mouse up and down and side-to-side to move in the direction of the selected movement arrow.

**Image-4: 3D Movement method LAlt + LMB**



## 3.8.7 Nudging Editor Objects

You can also move EO's with the keyboard. This is called "nudging". EO's can be nudged in any direction.

### Follow these steps:

1. Select the **objects** to nudge.
2. Hold **LAlt**.
3. Press **W, A, S, D, Q, Z, X, C** to nudge forward, left, back, right, up, down, counter-clockwise or clockwise respectively.
4. Release **LAlt** when finished.

## 3.8.8 Editing Objects

At any time you can double-click an EO to bring up the Object Properties dialog.

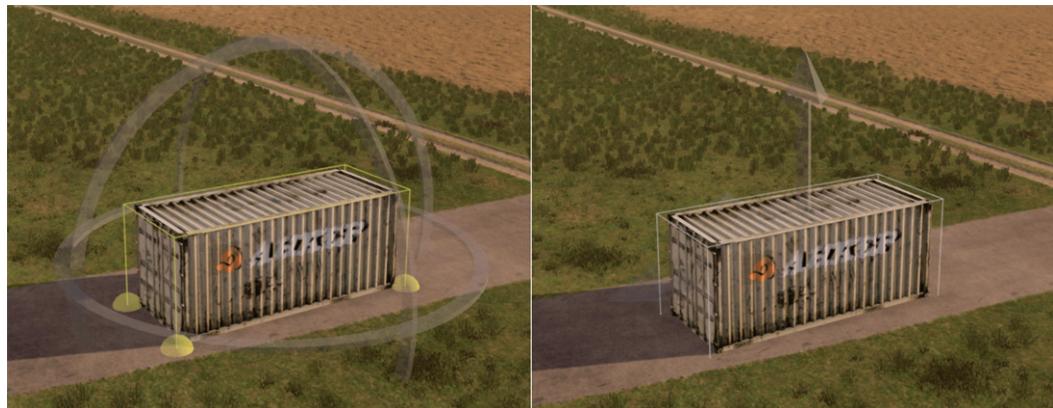
## 3.8.9 Context Menu

A right-click context-sensitive menu is available at all times in the VBS Editor. To view the context menu, right-click the terrain or on an EO. Some common options are:

Menu Item	Description
<b>Default Camera</b>	Moves the 3D camera to the selected position and switches to 3D mode.
<b>Center in Map</b>	Moves the 2D map to the selected position and switches to 2D mode.
<b>New Object</b>	Brings up the Add Object dialog to create an Editor Object at the selected position.
<b>Edit Object</b>	Brings up the EO dialog for the EO you have right-clicked on.
<b>Add to Favorites / More... &gt; Add to Favorites</b>	Adds units, vehicles, or placeable objects to your Favorites list. For more information, see <a href="#">Adding Units (on page 344)</a> , <a href="#">Adding Vehicles (on page 599)</a> , and <a href="#">Unit and Vehicle Editor Object Filters (on page 62)</a> .
<b>Snap To Surface</b>	Instantly snap the object to the surface below (useful when placing objects inside of buildings).
<b>Above Ground Off / On</b>	Valid only for <b>Object</b> EO types, when <b>Above Ground</b> is set to <b>Off</b> you will be able to move the object ( <b>Alt + RMB + mouse up / down</b> ) below the ground.

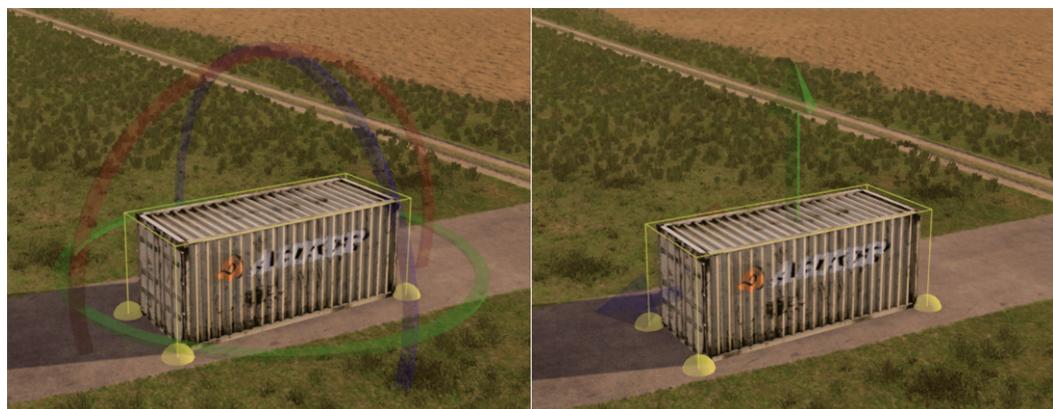
**Menu Item****Description****Lock / Unlock Position**

Valid only for **Object** EO types, when **Lock Position** is selected the object is anchored in the world and is not movable or selectable with the **LMB** in Prepare mode. This feature is useful when adding building objects as you can lock the building into place and then add additional objects (such as furniture) inside.

**Image-5: Locked Object****NOTE**

All objects are locked by default when the simulation is started (previewed).

To unlock an object, right-click it in the VBS Editor and select **Unlock Position**.

**Image-6: Unlocked Object****Reset Rotation / Interventions > Reset Rotation**

Resets any manual rotation that has been applied to an object.

As for [Snap To Surface \(on the previous page\)](#), [Above Ground Off / On \(on the previous page\)](#) and [Lock / Unlock Position \(above\)](#), many context-menu items are EO specific. For example, in Execute Mode there are options to wound, kill, heal or respawn units, damage vehicles or link EOs to others (see Entity Management in the VBS4 Instructor Manual).

### 3.8.10 Deleting Objects

You can use either of the following methods to delete EO:s:

- To delete a single object, hover the mouse over it and press the **Delete** key.
- To delete all selected objects use **Shift + Delete**.

### 3.8.11 Equip with Objects

Some objects include internal storage that can contain other objects. To place objects in the internal storage, right-click the container object and select **Equip with Objects**. For more information, see [Placing Hidden Objects \(on page 808\)](#).

#### NOTE

Only Editor Objects that have **(s)** at the end of their name can contain other objects. For example, **Scenery - Furniture > Kitchen counter (s)**.

### 3.8.12 Scaling Objects

It is possible to scale the size of an object by clicking the **Scaling Tool** icon on the VBS Editor.



To change the scale of the object uniformly in all directions, drag any of the axis arrows.

To change the scale of an object in just one axis, press and hold **LCtrl** and drag the desired axis arrow.

In **Settings > Controls > Editor Controls > Show 3D scale arrows** a key can be mapped to show the 3D scaling arrows at any time in 3D view without having to select the Scaling Tool icon. By default, there is no key mapped to this function.

## 3.9 Attaching Objects

It is possible to attach objects (including vehicles) to other objects. Attached objects maintain their offsets to their parent object, when the parent object is moved in VBS Editor (Prepare / Preview / Execute Mode).

### **NOTE**

Attachments remain active in VBS Editor (Preview / Execute), and on a Dedicated Server.

#### To attach an object to another object:

1. Do one of the following:
  - Hold **LShift**, and left-click an object (becomes the child object).
  - Right-click an object (becomes the child object), and select **Attach to Object** (for vehicles, **More... > Attach to Object**) from the context menu.
2. Click another object (becomes the parent object).

The objects are attached by a purple line.

If you move the parent object, both the parent and child objects move. If you move the child object, the parent object does not move.

#### To detach attached objects:

1. Right-click an attached object, and select **Attach to Object** (for vehicles, **More... > Attach to Object**).
2. Click an empty space on the 2D / 3D map.

The object is detached from the other object.

#### Multiple Attachments

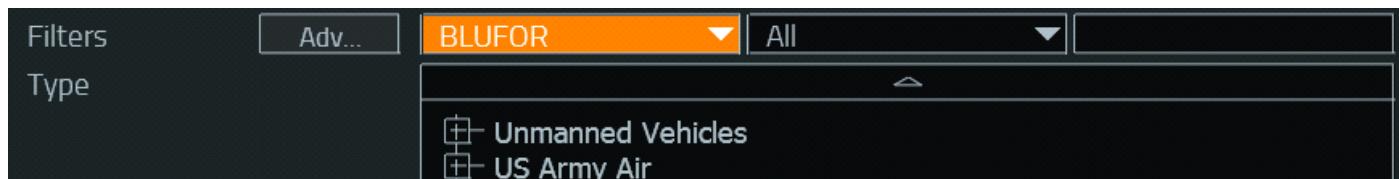
It is possible for objects with attachments to be attached to other objects.

**Image-7: Vehicle and fence are attached to the tower, and the tower is attached to the house.**



## 3.10 Unit and Vehicle Editor Object Filters

For Units and Vehicles, there are a large number of Editor Objects. The Editor Object Properties dialogs for these object types include **Filters** to enable mission designers and administrators to quickly find the object required.



To locate the object required, do any of the following:

- Use the **Side** filter to reduce the **Type** list of objects to only objects for that side, for example:
  - All
  - Favorites (entities that are in your Favorites list).

**NOTE**

If your Favorites list is empty, you see the following message in the **Type** list:

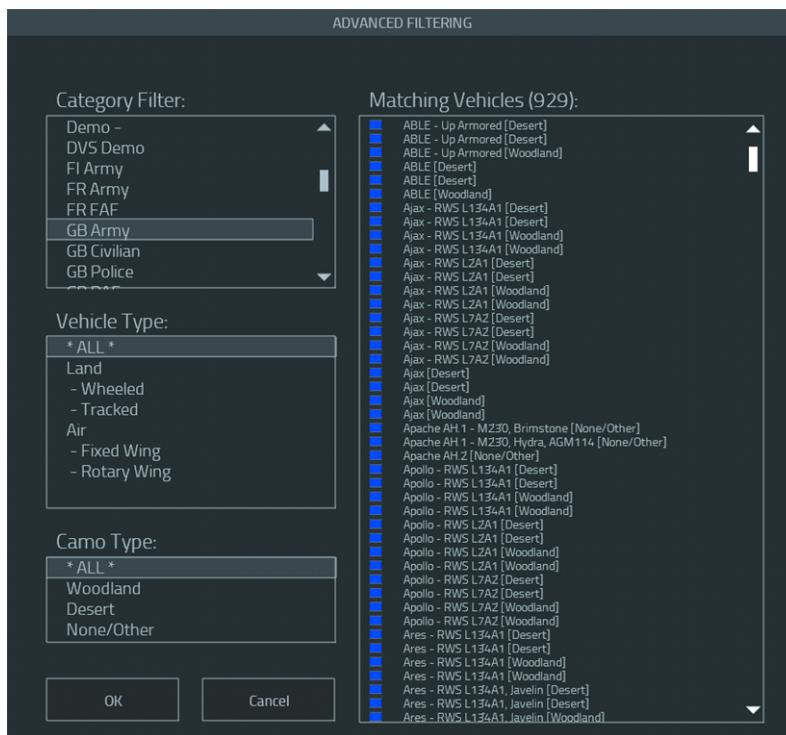
Favorites list is currently empty. Select a filter and click on the star icons to add favorites.

For more information, see [Adding Units \(on page 344\)](#), [Adding Vehicles \(on page 599\)](#), and Entity Management in the VBS4 Instructor Manual.

- BLUFOR
  - OPFOR
  - Independent
  - Civilian
  - Game Logic
- Use the **Customer** filter to reduce the **Type** list of objects to only objects of interest to that customer, for example US Customer.
  - Use the **Search** input to dynamically reduce the **Type** list to objects matching the search term.

These filters are cumulative, so for example, selecting a side and inputting a search term only displays objects that match both filters.

- To use more specific criteria, click **Adv...** to open the Advanced Filtering Options.



- Use the **Category** filter to list objects matching the unit or vehicle category.
- Vehicles Only:** Use the **Vehicle Type** filter to list vehicles matching the selected type.
- Use the **Camo Type** filter to list objects matching the selected type.

The Matching list on the right displays all the objects matching the selected filters, color-coded by side:

- Blue** - BLUFOR
- Red** - OPFOR
- Green** - CIVILIAN
- Yellow** - INDEPENDENT

ADVANCED FILTERING

Category Filter:

* ALL *
AE Air
AE Army
AF Army
AF Civilian
AF Taliban
AU Army
AU Navy

Vehicle Type:

* ALL *
Land
- Wheeled
- Tracked
Air
- Fixed Wing
- Rotary Wing
Sea

Camo Type:

* ALL *
Woodland
Desert
None/Other

OK

Cancel

Matching Vehicles (1859):

152H88 (S5-Z5) TEL [None/Other]
1RL131 (Spoon Rest) Radar [None/Other]
1V110 [Desert]
1V110 [Woodland]
1V152 [Desert]
1V152 [Woodland]
1V18 Artillery Support [Desert]
1V18 Artillery Support [Woodland]
1V19 Artillery Support [Desert]
1V19 Artillery Support [Woodland]
280CDI - M2, Mag 58 [Desert]
280CDI - M2, Mag 58 [None/Other]
280CDI - M2, Mag 58 [Woodland]
290GD (10 kN) [Desert]
290GD (10 kN) [None/Other]
290GD (10 kN) [Woodland]
290GD (12 kN) - Ambulance [Desert]
290GD (12 kN) - Ambulance [None/Other]
290GD (12 kN) - Ambulance [Woodland]
290GD (5 kN) - Hard Top [Desert]
290GD (5 kN) - Hard Top [None/Other]
290GD (5 kN) - Hard Top [Woodland]
290GD (5 kN) - Soft Top [Desert]
290GD (5 kN) - Soft Top [None/Other]
290GD (5 kN) - Soft Top [Woodland]
290GD (7.5 kN) - Hard Top [Desert]
290GD (7.5 kN) - Hard Top [None/Other]
290GD (7.5 kN) - Hard Top [Woodland]
290GD (7.5 kN) - Soft Top [Desert]
290GD (7.5 kN) - Soft Top [None/Other]
290GD (7.5 kN) - Soft Top [Woodland]
290GD Stinger Weapon Platform [Desert]
290GD Stinger Weapon Platform [None/Other]
290GD Stinger Weapon Platform [Woodland]
2S23 [None/Other]
2S23 Nona-SVK [Desert]
2S23 Nona-SVK [Woodland]
30N6E (Flap Lid) Radar [None/Other]
30N6E2 (Tomb Stone) Radar [None/Other]
4300 Box Truck [None/Other]
4300 Flatbed [None/Other]
55KGE Command Post [None/Other]
55RGM S-500 SAM Launcher [None/Other]
55RGM S-500 SAM Launcher [None/Other]

Filter the matching list further by selecting the list and typing a search term.

Place the cursor over an entry in the list to view a preview image and information about the object.

Vehicle Preview:

Matching Vehicles (556):

To filter, type search phrase.

- Support Vehicle 9T - UST [Woodland]
- Support Vehicle 9T - UST, Up Armored [Desert]
- Support Vehicle 9T - UST, Up Armored [Woodland]
- Support Vehicle 9T - UST, Up Armored, L7A2 [Desert]
- Support Vehicle 9T - UST, Up Armored, L7A2 [Woodland]
- Support Veh...
- To filter, type search phrase.
- Support Vehicle 9T IMM - Cargo, Crane [Desert]
- Support Vehicle 9T IMM - Cargo, Crane [Woodland]
- Support Vehicle 9T IMM - Cargo, Crane, Up Armored [Desert]
- Support Vehicle 9T IMM - Cargo, Crane, Up Armored [Woodland]
- Support Vehicle 9T IMM - Cargo, Crane, Up Armored, L7A2 [Desert]
- Support Vehicle 9T IMM - Cargo, Crane, Up Armored, L7A2 [Woodland]
- Support Vehicle 9T IMM - Cargo, Up Armored [Desert]
- Support Vehicle 9T IMM - Cargo, Up Armored [Woodland]
- Support Vehicle 9T IMM - Cargo, Up Armored, L7A2 [Woodland]
- Support Vehicle 9T IMM - Flat Platform [Desert]
- Support Vehicle 9T IMM - Flat Platform [Woodland]
- Support Vehicle 9T IMM - Flat Platform, Crane [Desert]
- Support Vehicle 9T IMM - Flat Platform, Crane [Woodland]
- Support Vehicle 9T IMM - Flat Platform, Crane, Up Armored [Desert]
- Support Vehicle 9T IMM - Flat Platform, Crane, Up Armored [Woodland]
- Support Vehicle 9T IMM - Flat Platform, Crane, Up Armored, L7A2 [Desert]
- Support Vehicle 9T IMM - Flat Platform, Crane, Up Armored, L7A2 [Woodland]
- Support Vehicle 9T IMM - Flat Platform, Up Armored [Desert]
- Support Vehicle 9T IMM - Flat Platform, Up Armored [Woodland]
- Support Vehicle 9T IMM - Flat Platform, Up Armored, L7A2 [Desert]
- Support Vehicle 9T IMM - Flat Platform, Up Armored, L7A2 [Woodland]
- Support Vehicle 9T IMM - Troop Carrier [Desert]
- Support Vehicle 9T IMM - Troop Carrier [Woodland]
- Support Vehicle 9T IMM - Troop Carrier, Crane [Desert]
- Support Vehicle 9T IMM - Troop Carrier, Crane [Woodland]
- Support Vehicle 9T IMM - Troop Carrier, Crane, Up Armored [Desert]
- Support Vehicle 9T IMM - Troop Carrier, Crane, Up Armored [Woodland]
- Support Vehicle 9T IMM - Troop Carrier, Crane, Up Armored, L7A2 [Desert]
- Support Vehicle 9T IMM - Troop Carrier, Crane, Up Armored, L7A2 [Woodland]
- Support Vehicle 9T IMM - Troop Carrier, Up Armored [Desert]
- Support Vehicle 9T IMM - Troop Carrier, Up Armored [Woodland]
- Support Vehicle 9T IMM - Troop Carrier, Up Armored, L7A2 [Desert]
- Support Vehicle 9T IMM - UST [Desert]
- Support Vehicle 9T IMM - UST [Woodland]
- Support Vehicle 9T IMM - UST, Up Armored [Desert]

OK
Cancel

## 3.11 Editor Object Positioning

Positioning and orienting Editor Objects in 2D / 3D may not provide the level of accuracy required. You can set exact GPS coordinates and / or orientation (azimuth) for an Editor Object.

- Set GPS Coordinates (below)
- Set Azimuth (on page 67)

### 3.11.1 Set GPS Coordinates

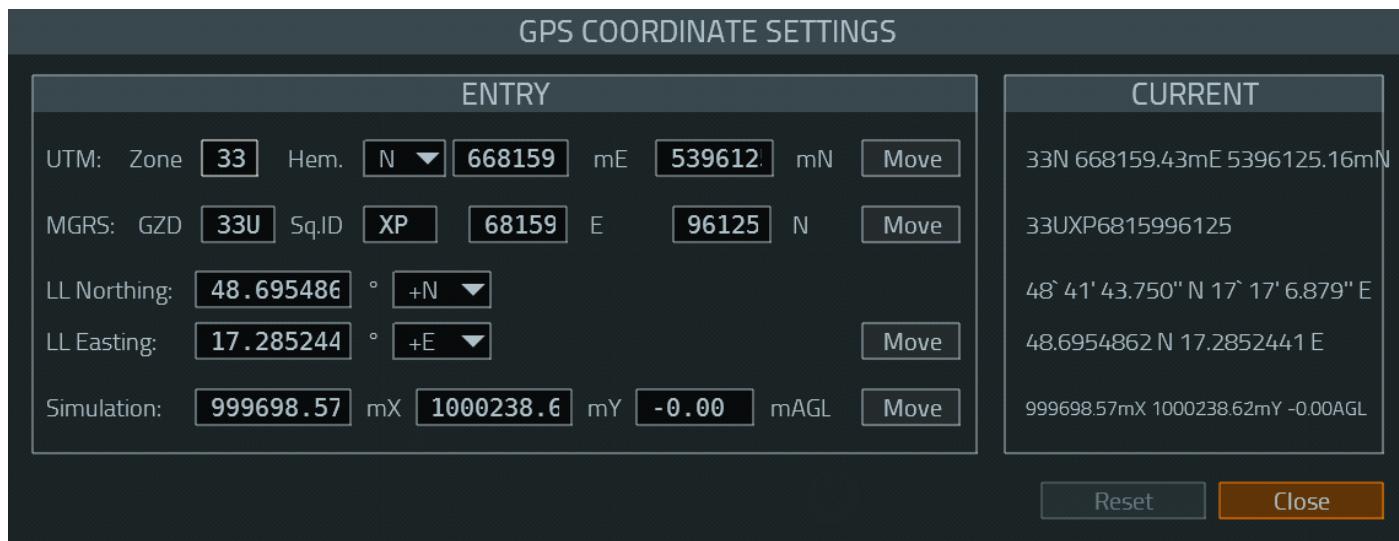
You can set the exact GPS coordinates of an Editor Object.

#### **NOTE**

Some Editor Objects, such as Group Markers, cannot be repositioned using exact coordinates. Drag and drop the EO in the map instead.

#### Set Coordinates Directly:

Right-click the Editor Object on the map or in the Scenario Objects Panel, and select **GPS Positioning (More... > GPS Positioning** for unit / vehicle / group) to open the **GPS Coordinate Settings** dialog:



1. Input the new GPS coordinates based on the standard parameters in the **ENTRY** part of the dialog (the **CURRENT** part of the dialog reflects the current GPS coordinates of the Editor Object).

Enter the GPS coordinates based on one of the four available formats:

- **UTM**
- **MGRS**
- **LL Northing / LL Easting**
- **Simulation**

2. Click the applicable **Move** button, and then click **Close**.

The Editor Object is relocated to the selected coordinates.

#### **Set Coordinates in Object Properties:**

Double-click the Editor Object to open the Objects Properties dialog.

If the Editor Object can be relocated, the Set GPS Coordinates button is available at the bottom of the dialog.



1. Click **Set GPS Coordinates** to open the **GPS Coordinate Settings** dialog:



2. Input the new GPS coordinates based on the standard parameters in the **ENTRY** part of the dialog (the **CURRENT** part of the dialog reflects the current GPS coordinates of the Editor Object).

Enter the GPS coordinates based on one of the four available formats:

- **UTM**
- **MGRS**
- **LL Northing / LL Easting**
- **Simulation**

3. Click the applicable **Save** button, and then click **Close**.

The Editor returns to the Object Properties dialog.

4. Click **OK**.

The Editor Object is relocated to the selected coordinates.

### 3.11.2 Set Azimuth

You can set the azimuth of an Editor Object.

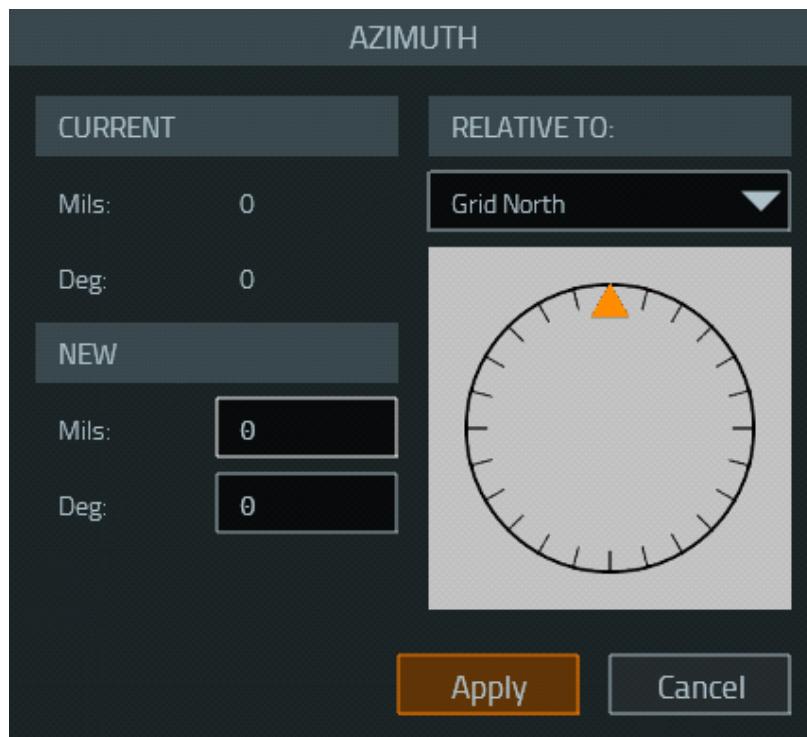
 **NOTE**

Set Azimuth is not available for all Editor Objects. Rotate them in the map by holding **LShift** + **RMB** and dragging the object instead.

**Follow these steps:**

1. Double-click the Editor Object to open the Object Properties dialog.
2. Click **Set Azimuth** in the Object Properties dialog.

3. Set the azimuth parameters:



- **Current Mils / Deg** - Current Editor Object azimuth in milliradians / degrees (not actual parameters, only displayed for reference).
- **New Mils / Deg** - New Editor Object azimuth in milliradians / degrees.
- **Relative To** - The azimuth can be relative to either the Grid North (map) or Magnetic North.

4. Click **Apply** to confirm the new azimuth.

The new Editor Object orientation is set.

## 3.12 Linking Editor Objects

Editor Objects can be linked to various entities using the following general methods:

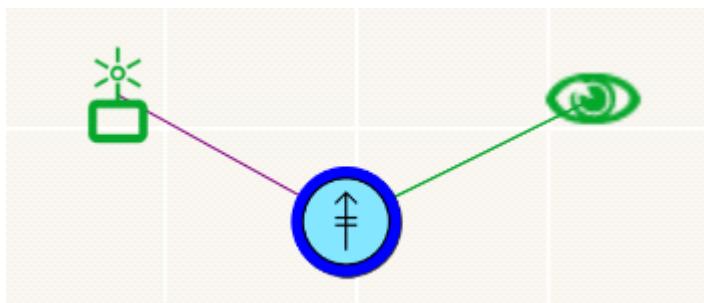
### LShift and Drag:

1. Press and hold **LShift**, and click the Editor Object.

A line is attached to the Editor Object, and your cursor.

2. Click the entity you want to link to.

A line links the Editor Object to the entity - the line color varies, depending on the linked Editor Object (for example, the line is purple for a Control Link and green for a Look At Editor Object).



### Right-click Editor Object:

Select an option in the context menu, and click the entity you want to link to:

- **Link to Unit** - Only links to non-grouped units, non-units or groups are ignored.
- **Link to Vehicle** - Only links to non-grouped vehicles, non-vehicles or groups are ignored.

#### NOTE

Nearly all vehicles with a gunner position or multiple crew members are classed as **groups**, not vehicles, so they cannot be linked to using **Link to Vehicle**. The **Link to Group** option must be used instead.

- **Link to Group** - Only links to groups, non-grouped entities are ignored.
- **Link to Entity** - Only used when linking [Waypoints \(on page 421\)](#) to units / vehicles / groups.
- **Link to Object** - Less common, only links to an entity / structure, others are ignored.

1. Right-click the Editor Object.

2. Select the type of link to use (unit, vehicle, group).

A line is attached to the Editor Object, and your cursor.

3. Click the entity / vehicle you want to link to.

A line links the Editor Object to the entity / vehicle you selected.

Editor Objects that can be linked include the following entities:

- [Boomerang \(on page 687\)](#)
- [Enabling CREW \(on page 717\)](#)
- [Control Links \(on page 618\)](#)
- [Intelligence Reports \(on page 800\)](#)
- [Light Beacon \(on page 740\)](#)
- [Measure Distance Tool \(on the next page\)](#)
- [Select Animation Style \(on page 397\)](#)
- [Surrender \(on page 406\)](#)

The following use the same methods for attaching:

- [Artillery Strike \(on page 830\)](#)
- [Close Air Support \(on page 835\)](#)
- [Placing Improvised Explosive Devices \(on page 249\)](#)
- [Light Source \(on page 261\)](#)
- [Look At Editor Object \(on page 395\)](#)

## 3.13 Measure Distance Tool

This tool enables you to measure distances between points placed on the 2D / 3D map. Distances are displayed as lines, with scalable text, and numbers in configurable units.

The following features are discussed:

- [Accessing the Measure Distance Tool \(below\)](#)
- [Measure Distance Tool Dialog \(on page 73\)](#)
- [Multiple End Points and Chains \(on page 74\)](#)
- [Linking Points to Units and Vehicles \(on page 76\)](#)

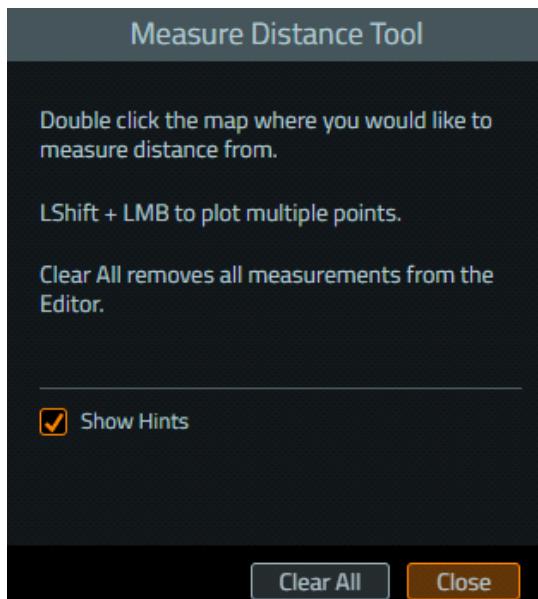
### 3.13.1 Accessing the Measure Distance Tool

Access the Measure Distance Tool using the Editor Menu or the Editor Objects List.

#### Editor Menu

1. Go to **Tools > Measure Distance**.

The first time you do this, the Measure Distance Tool dialog opens with a list of hints.



2. Uncheck **Show Hints**, if you do not want hints to appear.

The [Measure Distance Tool dialog \(on page 73\)](#) with editable properties opens.

3. Double-click the map where you want to measure the distance from (start point).

The Measure Distance Editor Object appears on the map as a white box, with a black arrow attached to it and your cursor.

## Editor Objects List

1. Select **Measure Distance** in the Editor Objects List.
2. Double-click the map where you want to measure the distance from (start point).

The Measure Distance Editor Object appears on the map as a white box, with a black arrow attached to it and your cursor, and the [Measure Distance Tool dialog \(on the next page\)](#) opens.

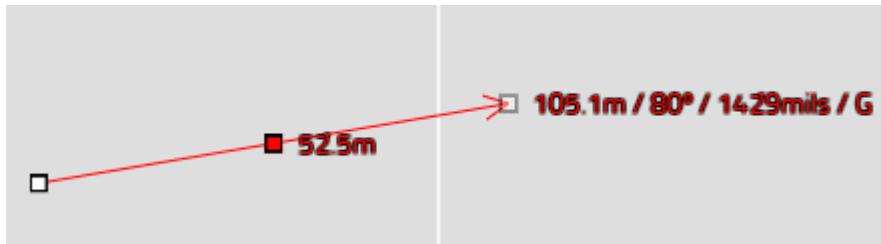
Click on the map where you want to measure the distance to (end point).

There is a line between the start point and the end point, with the measured distance displayed.

### NOTE

A **green** line means that a line of sight exists between the two points. If the line is **red**, there is no line of sight. Also, in the 2D Map View, start / end points appear on the map as small white boxes, in the 3D Camera View, they appear as white arrows.

**Image-8: Distance line in 2D Map View**



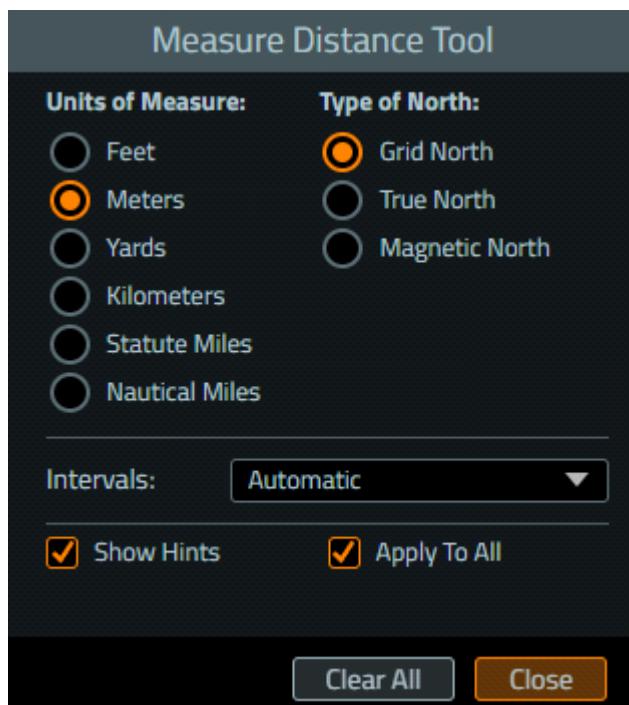
**Image-9: Distance line in 3D Camera View**



### 3.13.2 Measure Distance Tool Dialog

The Measure Distance Tool dialog allows you to set various parameters, that affect how measurements appear on the map. They can be adjusted at any time.

**Image-10: Measure Distance Tool dialog**



The dialog has the following controls:

Control	Description
Units of Measure	Select one of the options: Feet, Meters, Yards, Kilometers, Statute Miles, Nautical Miles.
Type of North	Select one of the options: Grid North, True North, Magnetic North.
Intervals	Select <b>Automatic</b> to automatically add measured intervals (divisions) between start / end points. Select <b>1 - 10</b> to use a specific number of intervals (divisions) to add at equal distances between the start / end points.
Show Hints	Select to show a list of Measure Distance Tool hints.
Apply to All	Selected - Updates all the points on the map to the settings currently configured in the dialog. Deselected - Applies the current settings in the dialog only to the points that you are currently configuring (see <a href="#">Measurement and North Settings (on the next page)</a> ).
Clear All	Click to remove all points and lines from the map.

Control	Description
<b>Close</b>	Click to close the dialog. To reopen the dialog at any time, double-click the Measure Distance Tool Editor Object, or go to <b>Tools &gt; Measure Distance Tool</b> .
<b>NOTE</b> Clicking <b>Close</b> in AAR or C2, also turns off the Measure Distance Tool.	

<b>NOTE</b> VBS4 remembers the dialog settings from the previous session.
--

### 3.13.2.1 Measurement and North Settings

Units of Measurement and North settings can be applied to one pair / group of linked points, leaving any other pairs / groups of points on the map with their original settings. For example, you have several groups of linked points on the map, all with measurements in Feet, but you want to change one group to use Meters.

#### Follow these steps:

1. Open the Measure Distance Tool dialog, and deselect **Apply to All**.
2. Select the **Start** or **End** point of the group you want to change, so that it flashes.
3. In the Measure Distance Tool dialog, select the **Meters** radio button.

All points and intervals in the group change to Meters, leaving the other groups as Feet.

### 3.13.3 Multiple End Points and Chains

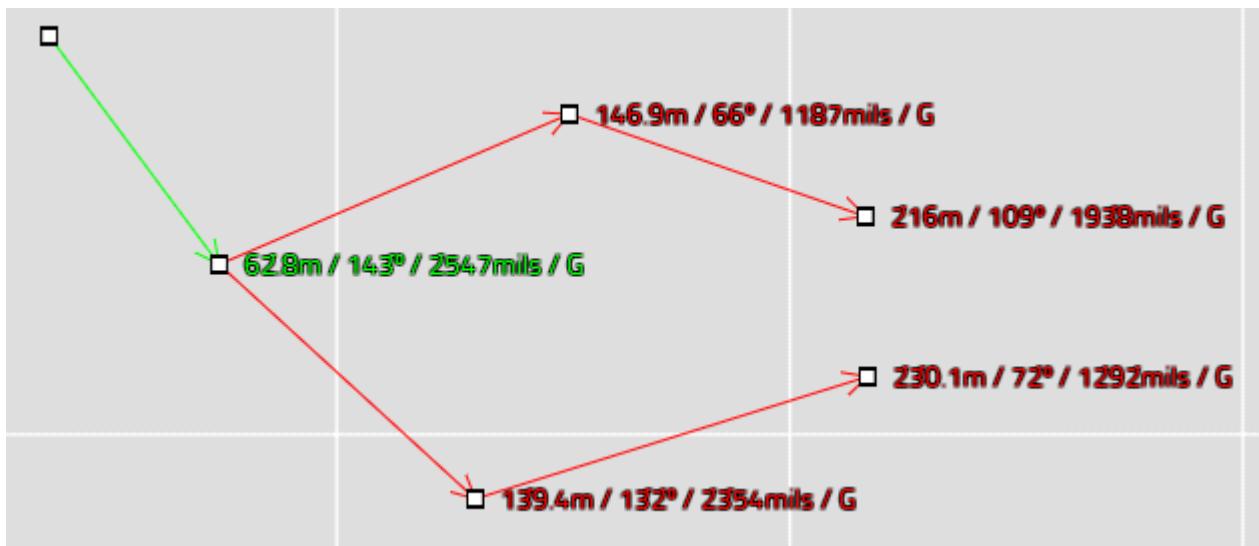
One Measure Distance point can connect to several end points. Points can also be chained together (in which case, the accumulative distance is displayed at each point).

#### Follow these steps:

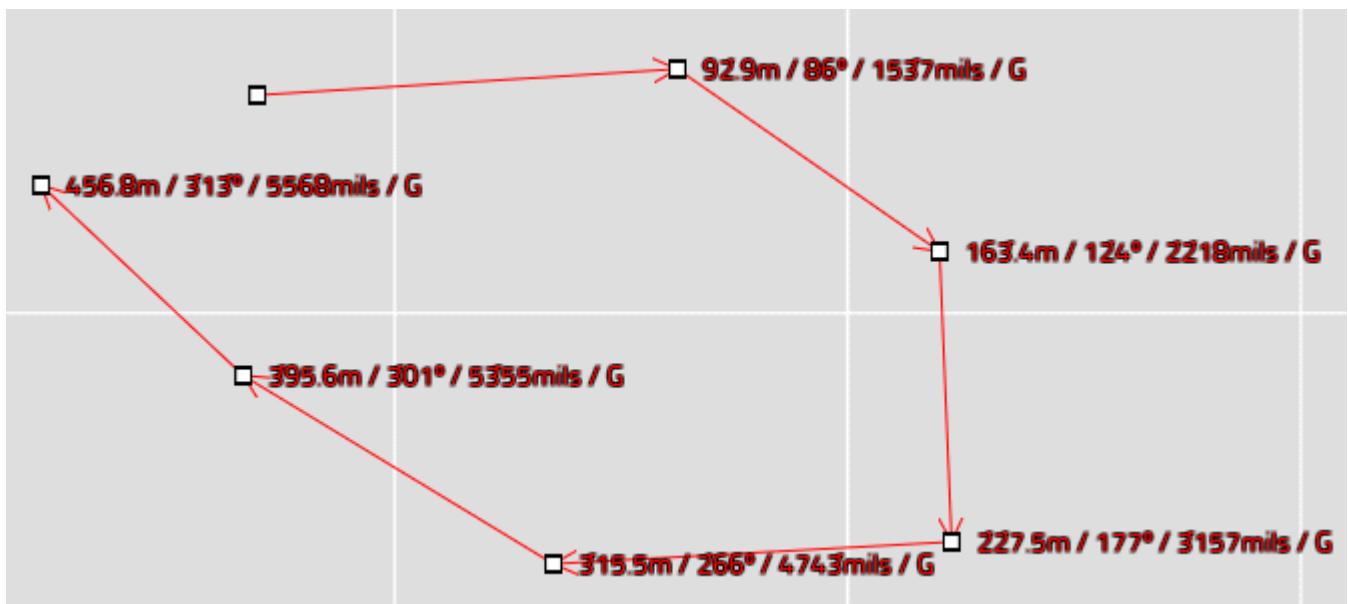
1. Press and hold **LShift**.
2. Click a **point**, that you want to connect to several end points, or create a chain from.  
A black arrow is attached to your cursor.
3. Do one of the following:
  - To place an end point, release **LShift**, and click the map where you want the end point to be.
  - To create a chain, continue to hold **LShift**, and click the map repeatedly to place as many points as you require. Before placing the end point, release **LShift**, which detaches the arrow from your cursor when the end point is placed.

One point is connected to several end points, or you have a chain.

**Image-11: Start point connected to several end points**



**Image-12: Points linked as a chain**



### 3.13.4 Linking Points to Units and Vehicles

You can measure the distance from a point to units, groups, or vehicles by linking the point to them.

#### Follow these steps:

1. Do one of the following:

- **Start / End Points**

- a. Press and hold **LShift**.

- b. Click a **Start / End Point**.

- A black arrow is attached to the point and your cursor.

- c. Release **LShift**.

- **Intervals**

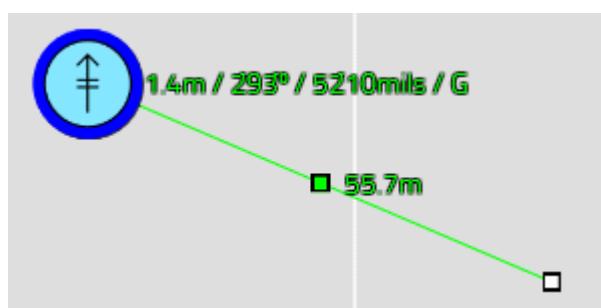
- a. Double-click an **Interval**.

- A black arrow is attached to the interval and your cursor.

2. Click a **Unit / Group / Vehicle**.

There is a line between the start / end point / interval, and the unit / group / vehicle, with the measured distance displayed.

**Image-13: Points attached to a unit / vehicle**



## 3.14 Module Editor Objects

Module Editor Objects allow Instructors and Administrators to quickly insert specialized features.

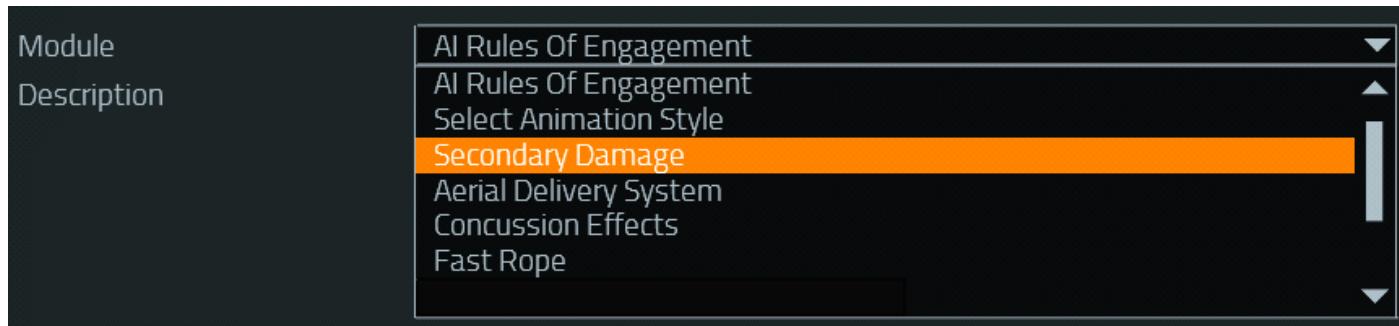
### **WARNING**

Adding / deleting this Editor Object in the VBS Editor during a multiplayer scenario may not be reflected on other clients.

#### Follow these steps:

1. In VBS Editor, select **Module** from the Editor Objects List.
2. Right-click a location on the map, and select **New Object**.
3. Expand the **Module** drop-down, select the **Module** you want to use, and click **OK**.

**Image-14: Module Object Properties dialog**



Explanations of how to configure individual Module types are found in the following sections:

- [AI Rules of Engagement \(on page 400\)](#)
- [Select Animation Style \(on page 397\)](#)
- [Secondary Damage \(on page 267\)](#)
- [Aerial Delivery System \(on page 823\)](#)
- [Concussion Effects \(on page 337\)](#)
- [Fast Rope \(on page 725\)](#)
- [IR Laser \(on page 860\)](#)
- [Enabling Automatic Towing \(on page 636\)](#)

## 3.15 Script Editor Object

The Script Editor Object gives access to a range of script-controlled systems.

### **i** NOTE

With the introduction of the [Module Editor Objects](#) (on the previous page), the Script Editor Object is being reviewed. Some functionality may not be available.

### **!** WARNING

Adding / deleting this Editor Object in the VBS Editor during a multiplayer scenario may not be reflected on other clients.

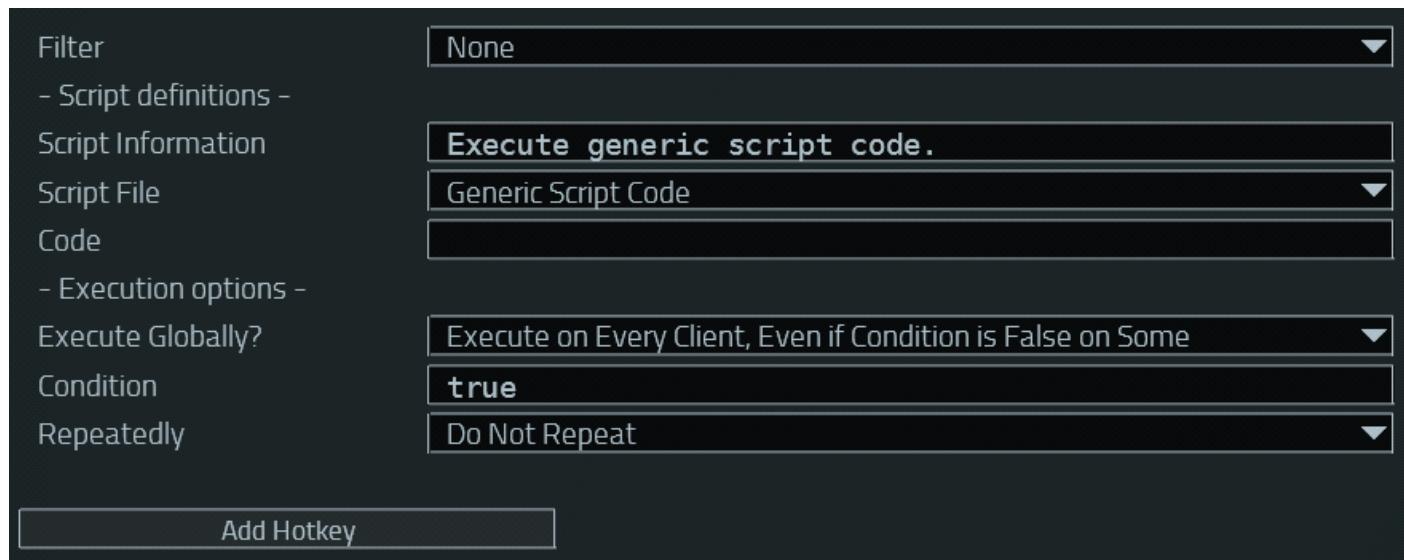
The Script Editor Object allows you to:

- [Activate Triggers or Detonate IEDs](#) (on the next page)
- [Run Generic Script Code](#) (on the next page)
- [Request Medical Evacuation](#) (on page 80)
- [Create a Minefield](#) (on page 80)

### **i** NOTE

The UAV control options (**Exec UAV2** and **Exec UAV3**) are not functional.

**Image-15: Script Editor Object dialog**



### 3.15.1 Activate Triggers or Detonate IEDs

You can activate multiple triggers / detonate IEDs, using the Script Editor Object.

**Follow these steps:**

1. In the Editor Objects List, select **Script** and place the Script Editor Object on the map.
2. In the **Filter** drop-down, select **Special Scripts**.
3. In the **Script File** drop-down, select **Activate Trigger(s)** or **Explode Linked IED**.
4. In the **Execute Globally?** drop-down, select whether the script should run locally or globally in a multiplayer scenario:
  - **Execute Only on Client Where Condition is True** - Runs the script only on clients, where the **Condition** setting (see step 5) is true.
  - **Execute on Every Client, Even if Condition is False on Some** - Runs the script on all the clients.
5. In **Condition**, specify the Boolean condition for the linked triggers / IEDs (see step 8) to be executed.
6. In the **Repeatedly** drop-down, set whether the condition should be evaluated repeatedly or not:
  - **Do Not Repeat** - Evaluate the condition only once.
  - **Repeat When Condition is True Again** - Evaluate the condition every time it returns true.
7. Click **OK**.
8. Right-click the Script Editor Object, select **Link to Condition Trigger / Link IED**, drag the arrow and click the trigger / IED you want to link.  
Repeat this step for as many triggers / IEDs as you need.

When the scenario runs, the Script Editor Object activates / detonates the linked triggers / IEDs, according to the set condition.

For more information on IEDs, see [Placing Improvised Explosive Devices \(on page 249\)](#).

### 3.15.2 Run Generic Script Code

You can run generic / custom script code, using the Script Editor Object.

**Follow these steps:**

1. In the Editor Objects List, select **Script** and place the Script Editor Object on the map.
2. In the **Filter** drop-down, select **Special Scripts**.
3. In the **Script File** drop-down, select **Generic Script Code**.
4. In **Code**, specify the script code.

5. In the **Execute Globally?** drop-down, select whether the script should run locally or globally in a multiplayer scenario:
  - **Execute Only on Client Where Condition is True** - Runs the script only on clients, where the **Condition** setting (see step 6) is true.
  - **Execute on Every Client, Even if Condition is False on Some** - Runs the script on all the clients.
6. In **Condition**, specify the Boolean condition for the script to be executed.
7. In the **Repeatedly** drop-down, set whether the condition should be evaluated repeatedly or not:
  - **Do Not Repeat** - Evaluate the condition only once.
  - **Repeat When Condition is True Again** - Evaluate the condition every time it returns true.

When the scenario runs, the Script Editor Object executes the script, according to the set condition.

### 3.15.3 Request Medical Evacuation

You can request medical evacuation, using the Script Editor Object. For more information, see [MEDEVAC / CASEVAC \(on page 862\)](#).

### 3.15.4 Create a Minefield

You can create a minefield, using the Script Editor Object.

**Follow these steps:**

1. Add a trigger (see [Triggers \(on page 810\)](#)) to the map.

 **WARNING**

The trigger must be of a certain size to define the minefield area. Also, the trigger area can only be rectangular. Circular areas are converted to rectangular ones.

2. In the Editor Objects List, select **Script** and place the Script Editor Object on the map.
3. In the **Filter** drop-down, select **Special Scripts**.
4. In the **Script File** drop-down, select **Minefield**.
5. In the **Type** drop-down, select the type of mine to use.
6. In the **Warning Signs** drop-down, select one of the following:
  - **Don't Show Signs** - Does not show any warning signs about the minefield, to indicate it.
  - **Show Signs** - Shows warning signs about the minefield, to indicate it.
7. In the **Density** drop-down, select the mine density of: **Normal**, **Low**, or **Very Low**.

8. In **Grid Spacing**, specify the spacing (in meters) between the mines, as they are arranged into a grid.
9. In the **Execute Globally?** drop-down, select whether the script should run locally or globally in a multiplayer scenario:
  - **Execute Only on Client Where Condition is True** - Runs the script only on clients, where the **Condition** setting (see step 9) is true.
  - **Execute on Every Client, Even if Condition is False on Some** - Runs the script on all the clients.
10. In **Condition**, specify the Boolean condition for the minefield to be created.
11. In the **Repeatedly** drop-down, set whether the condition should be evaluated repeatedly or not:
  - **Do Not Repeat** - Evaluate the condition only once.
  - **Repeat When Condition is True Again** - Evaluate the condition every time it returns true.
12. Right-click the Script Editor Object, select **Link to Trigger (Creates Minefield)**, drag the arrow and click the trigger you created in step 1, to link.

When the scenario runs, the Script Editor Object creates a minefield, according to the set condition.

For more information on mines, see [Placing Mines \(on page 263\)](#).

## 3.16 Layers and Overlays

You can assign Editor Objects to a Layer or an Overlay (for example, when you need to separate one type of Editor Object from another), and replicate those Editor Objects in a different mission or a different client in a multiplayer scenario, using Layers or Overlays as templates.

- [Layers \(below\)](#) - Describes how to create and modify Layers.
- [Object Overlays \(on page 87\)](#) - Describes how to create, load, and transmit Object Overlays across the network in a multiplayer scenario. In addition to Object Overlays, you can add Marker Overlays. For more information, see Overlay Menu in the VBS4 Trainee Manual.

### 3.16.1 Layers

Layers are a very useful tool to assist you with organizing your mission. Layers have several purposes:

- Reducing clutter.
- Saving commonly used mission elements for later use.
- Merging scenarios together.
- Reusing mission content in different missions.

#### To add a Layer, follow these steps:

1. In the Tools panel, open **Layers**.

The Layers list contains the Base Layer, where all the Editor Objects are initially placed, by default.

2. To add a Layer, click the **New Layer** icon:



A new Layer appears in the list. The Editor Objects in the Base Layer become hidden.

#### NOTE

When the Editor Objects are hidden, they become:

- Semi-transparent on the map (2D View).
- Fully visible in the 3D View.
- Not visible in the Scenario Objects Panel.

3. To name the Layer, select the text field above the icons, enter the Layer name, and click the **Rename Selected Layer** icon:

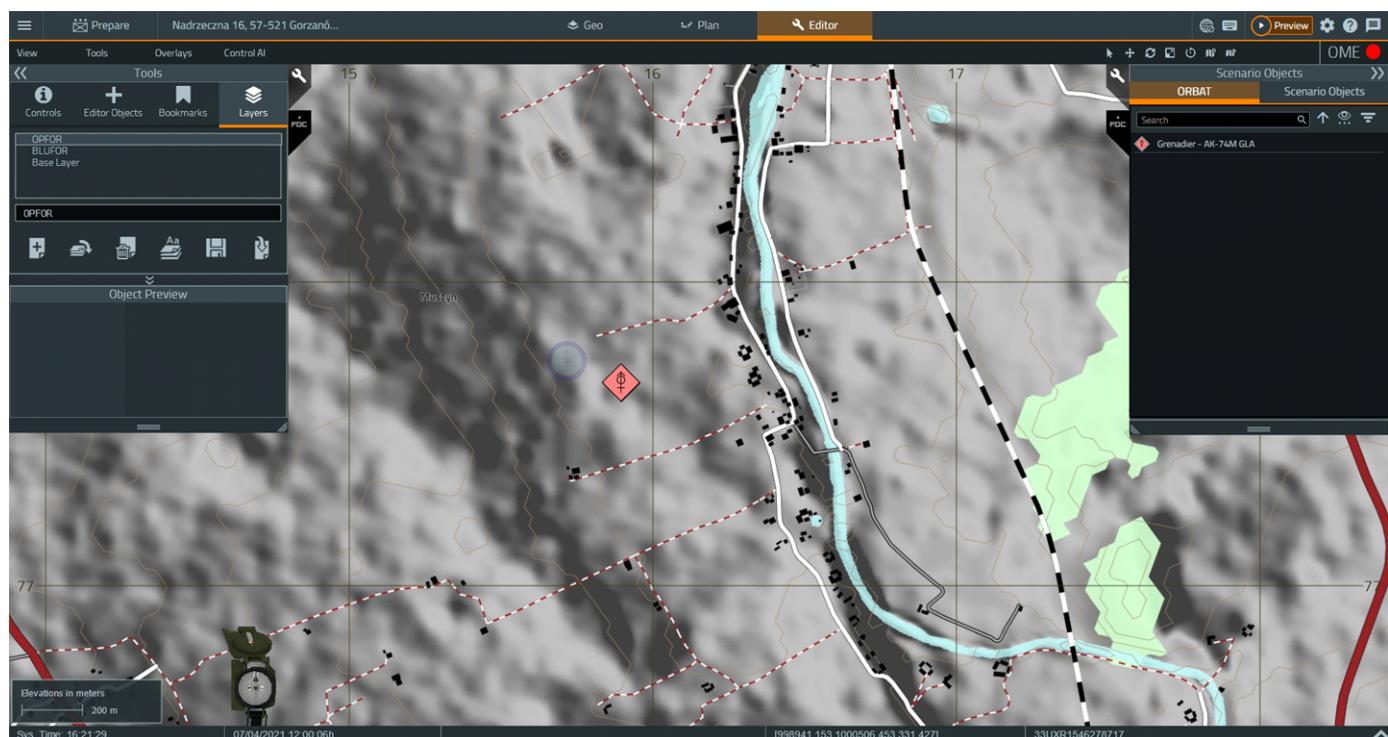


You can now add Editor Objects to the new Layer by selecting it.

### **NOTE**

Only Editor Objects that belong to the selected Layer are displayed. Editor Objects in other Layers are hidden.

**Image-16: Selected Layer**



In addition, you can do the following:

#### **Move Editor Objects to a Layer:**

You can move Editor Objects from one Layer to another.

The following Editor Object types can be moved:

- **(F1) Unit**
- **(F2) Group**
- **(F3) Waypoints**
- **(F4) Vehicle**
- **(F5) Empty Vehicle**

- **(F6) Marker**
- **(F8) Objects**
- **(F9) ORBAT** (consists of **(F1) Unit**, **(F4) Vehicle**, or **(F5) Empty Vehicle**)

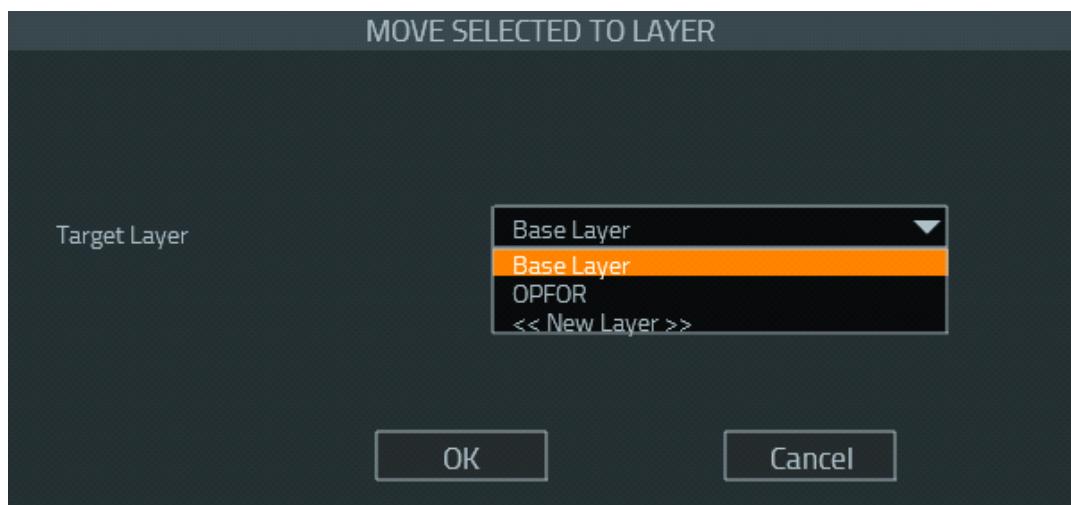
#### **i** NOTE

An Editor Object linked to other Editor Objects cannot be moved to another Layer, without moving the linked objects as well (for example, a member of a group, linked to other group members, cannot be moved without moving the entire group).

#### Follow these steps:

1. Right-click an Editor Object in a given Layer.
2. Select **Move Selected to Layer** (for unit / vehicle / group, **More... > Move Selected to Layer**).
3. Select the **Target Layer** you want to move the Editor Object to.
4. Click **OK**.

**Image-17: Move Selected to Layer dialog**



#### Merge Layers:

Merge two or more Layers together, so that the Editor Objects in each Layer appear in a single Layer.

#### Follow these steps:

1. Hold **LCtrl** and select the Layers you want to merge.
2. To merge the selected Layers, click the **Merge Layer** icon:



## Delete Layer:

You can delete a Layer.

### NOTE

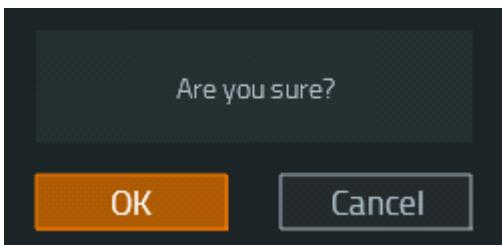
All the Editor Objects that belong to the deleted Layer are also deleted.

## Follow these steps:

1. Select the Layer you want to delete.
2. To delete the Layer, click the **Delete Layer** icon:



3. Click **OK** to confirm the deletion.



## Rename Layer:

You can rename an existing Layer.

## Follow these steps:

1. Select the Layer you want to rename.
2. Edit the Layer name in the text field above the Layer options.

### WARNING

Do not use special characters such as / in layer names. Layers with invalid names do not save correctly, even when the **Layer Saved** message appears.

3. To save the new Layer name, click the **Rename Selected Layer** icon:



## Save Layer:

You can save a Layer to be able to load it in a different mission.

## Follow these steps:

1. Select the Layer you want to save.
2. To save the Layer, click the **Save Layer** icon:



Layers use the `.Layer.biedi` file extension and are saved to:

`\Documents\VBS4\Overlays\`

## Load Layer:

You can load a saved Layer in a different mission.

## Follow these steps:

1. Open a different mission in Prepare mode.
2. Navigate to **Layers** in the Tools panel.
3. To load a Layer, click the **Load Layer** icon:



4. In the **Layer Name** drop-down, select a saved Layer you want to load.

## Move Mission Content to Another Mission:

You can move mission content from one mission to another (on the same map or a different one).

### NOTE

In order to be able to move the mission content, you first need to create a layer, and place all the mission Editor Objects in it. If the content is not placed in a custom layer, you may not be able to move it there later.

## To create a mission with movable content, follow these steps:

1. Add a new Layer and select it.
2. Make sure to add all the mission Editor Objects to the selected Layer.
3. Save the Layer and save the mission.
4. (Optional) Copy any custom mission content (such as `init.sqf`, or other custom SQF scripts) into the other mission folder.
5. Open the other mission and load the Layer.

## **WARNING**

It is not recommended to create / modify Layers in Execute mode, as this can lead to unexpected results.

For example, Layers created in Prepare mode do not appear in Execute mode - all Editor Objects divided into Layers in Prepare mode are grouped into a single Base Layer in Execute mode. Also, Layers that are created in Execute mode are not saved, when the mission is aborted / restarted.

### 3.16.2 Object Overlays

Similarly to a Layer, an Object Overlay is a template of Editor Objects. The key difference is that Editor Objects in an Object Overlay are not created until they are committed.

#### To add an Object Overlay, follow these steps:

1. In the VBS Editor menu, select **Overlays**, and then **New Object Overlay**.
2. In **Overlay Name**, specify the Object Overlay name, and click **OK**.
3. Add the Editor Objects to the Object Overlay.

Object Overlays can only contain the following Editor Object types:

- (F5) Empty Vehicle
- (F6) Marker
- (F7) Trigger
- (F8) Objects
- IED

#### **NOTE**

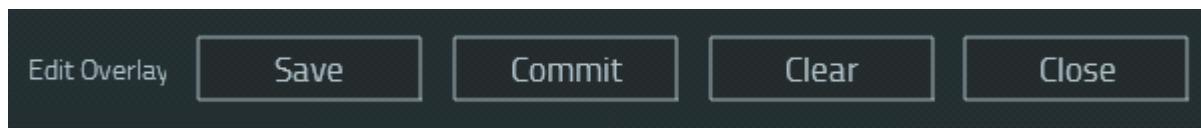
Object Overlays cannot contain units or groups.

4. Click **SAVE** and then **COMMIT**.

Once you commit the Object Overlay, its Editor Objects are transmitted across the network and created on all the clients in a multiplayer scenario.

#### **NOTE**

The commit action cannot be undone.

**Image-18: Edit Overlay interface**

**To load a saved Object Overlay, follow these steps:**

1. In the VBS Editor menu, select **Overlays**, and then **Load Mission Object Overlay**.
2. In **Overlay Name**, specify the Object Overlay name to load, and click **OK**.

The Object Overlay is loaded.

While editing an Object Overlay, only Editor Objects in the active Object Overlay are accessible. The icons for all pre-existing Editor Objects in the mission are blended with the map background.

Editing an Overlay only takes effect on your computer. If you are running a multiplayer scenario, none of your changes are visible on remote computers, until you commit the Object Overlay.

The purpose of using Object Overlays differs between Prepare and Execute mode:

- In Execute mode, an Overlay is used to construct a plan that you (as an administrator) execute at a given time. For example, you can pre-create a line of IEDs that you load as an Object Overlay, to avoid having to create each IED individually (multiplayer participants see Editor Objects, such as IEDs, created in real-time).
- In Prepare mode, Object Overlays can be used to speed up mission design. You can lay out the Editor Object once, and then load the Object Overlay for use in several missions, without having to recreate all of the Editor Objects.

## 3.17 Exaggerated View Mode

Exaggerated View Mode is a 3D visualization mode for Administrators / Instructors, which enables them to manipulate entities in a scenario by applying color-coding to them and adjusting their size. These techniques enable Instructors to easily identify entities during scenario run-time, and understand what is happening during a mission.

Using Exaggerated View Mode, entities adopt a single translucent color over their normal textures. Normally, the chosen colors correspond to the side the entity belongs to (for example, **blue** = BLUFOR, **red** = OPFOR). However, the colors can be customized. Entities can also be scaled up to make them appear larger, further exaggerating their appearance.

### **i** NOTE

In Exaggerated View Mode, environmental effects are automatically modified to allow the unobstructed rendering and visibility of entities. For example, fog is reduced or removed.

### **!** WARNING

Exaggerated View Mode visualizations are not shown in AAR, as they are not recordable. However, you can re-apply visualizations in AAR using the [Exaggerated View dialog \(on the next page\)](#) in AAR.

**Image-19: Evening scenario using Exaggerated View Mode**



**TIP**

Before applying Exaggerated View Mode, open 3D Camera View. This enables you to clearly see the adjustments you make, using the functions in the [Exaggerated View dialog \(below\)](#).

Go to **View > Exaggerated View Mode** to open the Exaggerated View dialog.

The dialog opens with the following tabs:

- [Global Settings Tab \(on the next page\)](#)
- [Entity Specific Tab \(on page 94\)](#)

**NOTE**

The Global Settings tab is open and active by default.

**Image-20: Exaggerated View dialog**

### 3.17.1 Global Settings Tab

Use this tab to scale entities, and apply color settings to sides.

#### **NOTE**

The **View** toggle is switched on by default, but can be switched off at any time.

**Follow these steps:**

1. In **Apply Exaggeration to**, check / uncheck the **side** and **entity types** you want to apply the Exaggerated View Mode settings to.

#### **NOTE**

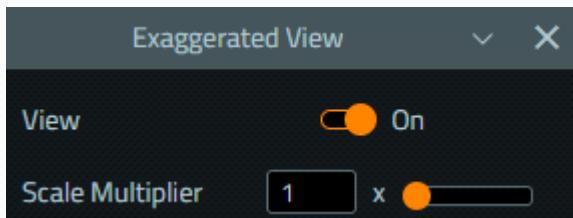
All options are checked (enabled) by default.

Sides	Entity Types		
BLUFOR	OPFOR	Units	Vehicles
Independent	Civilian	Aircraft	Watercraft

2. Adjust the scale of the entities.

#### **TIP**

To adjust the scale of entities only, click the up-arrow at the top of the Exaggerated View dialog to collapse the dialog.



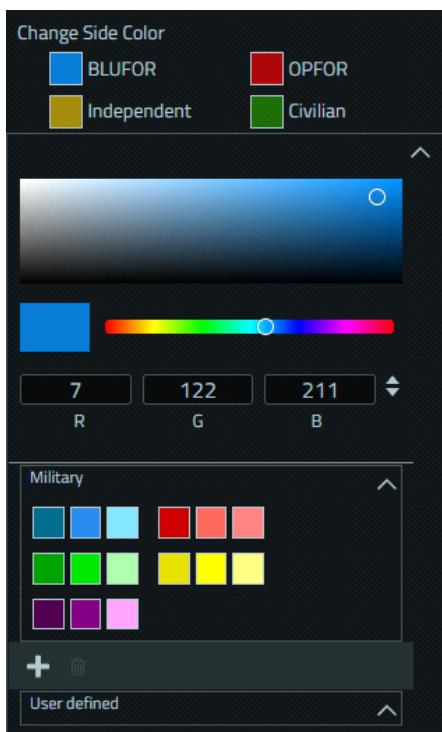
Do one of the following:

- Click **Autoscale**. This causes the 3D Camera to automatically scale entities, once it is 70 meters away from them.
- Use the **Scale Multiplier** to manually adjust the scale of entities:
  - Input a number between 1 and 10, and use the up / down arrows to make finer adjustments.
  - Use the slider to set the number.

3. In **Change Side Color**, click the square side icon that you want to set the color for (it is briefly highlighted by an **orange border**).



The dialog expands to show the color picker.



If the dialog does not expand, click the **down arrow**.

4. Apply either a customized or preconfigured color to the side:

### Customized

Do one of the following:

- Click in the color picker **window**, or use the **slider** to select a color.
- In the fields below the slider, use the **up / down arrows** to switch between RGB / HSL / Hex formats, and enter the numbers for the color manually.

Click the **+** icon to save the customized color.



**TIP**

To remove a color, go to the **User Defined** section, click the square **color** icon of the color you want to remove, and click the **trash** icon.



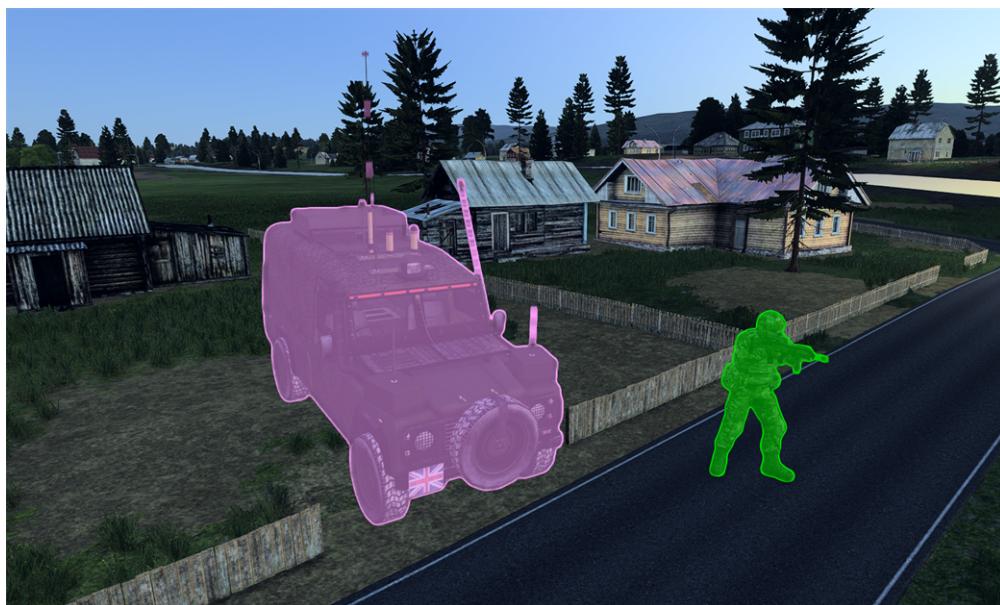
### Pre-configured

In the **Military** section, click one of the pre-configured square **color** icons.

5. To set colors for other sides, repeat steps 1 to 4.
6. When you have finished setting the colors and scale, click **X** to close the dialog.

The configured entities have Exaggerated View Mode applied.

### Image-21: Entities with color and scaling applied



## 3.17.2 Entity Specific Tab

Use this tab to apply Exaggerated View Mode color settings to specific entities.

### **NOTE**

This tab is disabled if no entities are placed in the scenario, or if no entities are selected.

### Follow these steps:

1. On the 2D Map / in 3D Camera View, do one of the following:
  - Select the **entity** you want to apply a specific color to.
  - Select the **entity** in the [Scenario Objects Panel \(on page 39\)](#), so that it is highlighted.

On the 2D Map the entity flashes, in 3D Camera View, a **green** circle appears on the entity.

2. Click the **Entity Specific** tab in the Exaggerated View dialog.



### 3. Apply either a customized or preconfigured color to the entity:

#### Customized

Do one of the following:

- Click in the color picker **window**, or use the **slider** to select a color.
- In the fields below the slider, use the **up / down arrows** to switch between RGB / HSL / Hex formats, and enter the numbers for the color manually.

Click the **+** icon to save the customized color.



#### TIP

To remove a color, go to the **User Defined** section, click the square **color** icon of the color you want to remove, and click the **trash** icon.



#### Pre-configured

In the **Military** section, click one of the pre-configured square **color** icons.

### 4. Click **X** to close the Exaggerated View dialog.

The entity has the color applied.



**NOTE**

Entity specific color RGB = 0,0,0 turns off the Entity Specific color and re-applies the side specific (BLUFOR, OPFOR, Independent, Civilian) color.

### 3.17.3 SQF

The following SQF functions are available, as alternatives to using the Exaggerated View dialog.

[fn\\_EditorTools\\_ExaggeratedView\\_vN\\_Enable](https://sqf.bisimulations.com/display/SQF/fn_EditorTools_ExaggeratedView_vN_Enable)  
([https://sqf.bisimulations.com/display/SQF/fn\\_EditorTools\\_ExaggeratedView\\_vN\\_Enable](https://sqf.bisimulations.com/display/SQF/fn_EditorTools_ExaggeratedView_vN_Enable))

[fn\\_EditorTools\\_ExaggeratedView\\_vN\\_IsEnabled](https://sqf.bisimulations.com/display/SQF/fn_EditorTools_ExaggeratedView_vN_IsEnabled)  
([https://sqf.bisimulations.com/display/SQF/fn\\_EditorTools\\_ExaggeratedView\\_vN\\_IsEnabled](https://sqf.bisimulations.com/display/SQF/fn_EditorTools_ExaggeratedView_vN_IsEnabled))

[fn\\_EditorTools\\_ExaggeratedView\\_vN\\_EnableAutoScale](https://sqf.bisimulations.com/display/SQF/fn_EditorTools_ExaggeratedView_vN_EnableAutoScale)  
([https://sqf.bisimulations.com/display/SQF/fn\\_EditorTools\\_ExaggeratedView\\_vN\\_EnableAutoScale](https://sqf.bisimulations.com/display/SQF/fn_EditorTools_ExaggeratedView_vN_EnableAutoScale))

[fn\\_EditorTools\\_ExaggeratedView\\_vN\\_IsAutoScaleEnabled](https://sqf.bisimulations.com/display/SQF/fn_EditorTools_ExaggeratedView_vN_IsAutoScaleEnabled)  
([https://sqf.bisimulations.com/display/SQF/fn\\_EditorTools\\_ExaggeratedView\\_vN\\_IsAutoScaleEnabled](https://sqf.bisimulations.com/display/SQF/fn_EditorTools_ExaggeratedView_vN_IsAutoScaleEnabled))

[fn\\_EditorTools\\_ExaggeratedView\\_vN\\_SetScale](https://sqf.bisimulations.com/display/SQF/fn_EditorTools_ExaggeratedView_vN_SetScale)  
([https://sqf.bisimulations.com/display/SQF/fn\\_EditorTools\\_ExaggeratedView\\_vN\\_SetScale](https://sqf.bisimulations.com/display/SQF/fn_EditorTools_ExaggeratedView_vN_SetScale))

[fn\\_EditorTools\\_ExaggeratedView\\_vN\\_GetScale](https://sqf.bisimulations.com/display/SQF/fn_EditorTools_ExaggeratedView_vN_GetScale)  
([https://sqf.bisimulations.com/display/SQF/fn\\_EditorTools\\_ExaggeratedView\\_vN\\_GetScale](https://sqf.bisimulations.com/display/SQF/fn_EditorTools_ExaggeratedView_vN_GetScale))

[fn\\_EditorTools\\_ExaggeratedView\\_vN\\_SetSideColor](https://sqf.bisimulations.com/display/SQF/fn_EditorTools_ExaggeratedView_vN_SetSideColor)  
([https://sqf.bisimulations.com/display/SQF/fn\\_EditorTools\\_ExaggeratedView\\_vN\\_SetSideColor](https://sqf.bisimulations.com/display/SQF/fn_EditorTools_ExaggeratedView_vN_SetSideColor))

[fn\\_EditorTools\\_ExaggeratedView\\_vN\\_GetSideColor](https://sqf.bisimulations.com/display/SQF/fn_EditorTools_ExaggeratedView_vN_GetSideColor)  
([https://sqf.bisimulations.com/display/SQF/fn\\_EditorTools\\_ExaggeratedView\\_vN\\_GetSideColor](https://sqf.bisimulations.com/display/SQF/fn_EditorTools_ExaggeratedView_vN_GetSideColor))

[fn\\_EditorTools\\_ExaggeratedView\\_vN\\_SetObjectColor](https://sqf.bisimulations.com/display/SQF/fn_EditorTools_ExaggeratedView_vN_SetObjectColor)  
([https://sqf.bisimulations.com/display/SQF/fn\\_EditorTools\\_ExaggeratedView\\_vN\\_SetObjectColor](https://sqf.bisimulations.com/display/SQF/fn_EditorTools_ExaggeratedView_vN_SetObjectColor))

[fn\\_EditorTools\\_ExaggeratedView\\_vN\\_GetObjectColor](https://sqf.bisimulations.com/display/SQF/fn_EditorTools_ExaggeratedView_vN_GetObjectColor)  
([https://sqf.bisimulations.com/display/SQF/fn\\_EditorTools\\_ExaggeratedView\\_vN\\_GetObjectColor](https://sqf.bisimulations.com/display/SQF/fn_EditorTools_ExaggeratedView_vN_GetObjectColor))

[fn\\_EditorTools\\_ExaggeratedView\\_vN\\_SetFilterSide](https://sqf.bisimulations.com/display/SQF/fn_EditorTools_ExaggeratedView_vN_SetFilterSide)  
([https://sqf.bisimulations.com/display/SQF/fn\\_EditorTools\\_ExaggeratedView\\_vN\\_SetFilterSide](https://sqf.bisimulations.com/display/SQF/fn_EditorTools_ExaggeratedView_vN_SetFilterSide))

[fn\\_EditorTools\\_ExaggeratedView\\_vN\\_GetFilterSide](https://sqf.bisimulations.com/display/SQF/fn_EditorTools_ExaggeratedView_vN_GetFilterSide)  
([https://sqf.bisimulations.com/display/SQF/fn\\_EditorTools\\_ExaggeratedView\\_vN\\_GetFilterSide](https://sqf.bisimulations.com/display/SQF/fn_EditorTools_ExaggeratedView_vN_GetFilterSide))

[fn\\_EditorTools\\_ExaggeratedView\\_vN\\_SetFilterType](https://sqf.bisimulations.com/display/SQF/fn_EditorTools_ExaggeratedView_vN_SetFilterType)  
([https://sqf.bisimulations.com/display/SQF/fn\\_EditorTools\\_ExaggeratedView\\_vN\\_SetFilterType](https://sqf.bisimulations.com/display/SQF/fn_EditorTools_ExaggeratedView_vN_SetFilterType))

[fn\\_EditorTools\\_ExaggeratedView\\_vN\\_GetFilterType](https://sqf.bisimulations.com/display/SQF/fn_EditorTools_ExaggeratedView_vN_GetFilterType)  
([https://sqf.bisimulations.com/display/SQF/fn\\_EditorTools\\_ExaggeratedView\\_vN\\_GetFilterType](https://sqf.bisimulations.com/display/SQF/fn_EditorTools_ExaggeratedView_vN_GetFilterType))

[fn\\_EditorTools\\_ExaggeratedView\\_ShowDialog](https://sqf.bisimulations.com/display/SQF/fn_EditorTools_ExaggeratedView_ShowDialog)  
([https://sqf.bisimulations.com/display/SQF/fn\\_EditorTools\\_ExaggeratedView\\_ShowDialog](https://sqf.bisimulations.com/display/SQF/fn_EditorTools_ExaggeratedView_ShowDialog))

[fn\\_EditorTools\\_ExaggeratedView\\_HideDialog](https://sqf.bisimulations.com/display/SQF/fn_EditorTools_ExaggeratedView_HideDialog)  
([https://sqf.bisimulations.com/display/SQF/fn\\_EditorTools\\_ExaggeratedView\\_HideDialog](https://sqf.bisimulations.com/display/SQF/fn_EditorTools_ExaggeratedView_HideDialog))

### 3.17.4 Limitations

Exaggerated View Mode has the following limitations:

- Changing settings using SQF commands / functions results in the changes being shown in the simulation. However, to see the changes in the Exaggerated View dialog you need to reopen it.
- Land / Water / Air Draw Distance settings (see Object Detail in the VBS4 Administrator Manual) and Exaggerated View Mode Autoscale / Scale Multiplier settings can affect the visibility of entities.
- Currently, Exaggerated View Mode cannot be applied to some vehicles which have Underground LODs, for example Bumerang vehicles.

## 3.18 Export Custom Object Variants

VBS4 enables the creation of custom object variants that are added to the Editor list for use in future mission design.

For example:

- [Creating Unit Variants \(on page 357\)](#)
- [Creating Custom Groups \(on page 364\)](#)
- [Creating Vehicle Variants \(on page 609\)](#)
- [Customize Road Sign Crates \(on page 746\)](#)

However, these custom objects are only available on the computer that they were created on.

Transfer the custom objects to other computers by using the saved mission.

**Follow these steps:**

1. Use VBS Editor to create the custom object as described in the relevant procedure.
2. Save the Scenario.

VBS4 saves the Scenario locally, and saves the custom content to:

`\Documents\VBS4\Config\`

3. Open the Scenario on the other computer.
4. Save the Scenario.

VBS4 saves the custom objects from the Scenario to the relevant configurations in:

`\Documents\VBS4\Config\`

These custom objects are now available in the Editor list for any future mission design using that computer.

 **NOTE**

When exchanging missions between computers, ensure that you save any modified Units and Vehicles with a different name. This avoids the possibility of duplicate display names showing in VBS Editor on the machine of the mission recipient.

## 3.19 Hidden Entities

Entities, such as Units, Groups, or Vehicles, can be hidden from the view of Trainees and AIs during scenario preparation. Hidden entities are invisible to Trainees and AIs during a mission.

Hidden entities are visible only to Administrators / Instructors as markers on the 2D Map, which can be moved around during scenario preparation, and the corresponding entities revealed or hidden again to scenario participants at any time during a mission execution.

This feature enables entities to be positioned in a scenario, without the risk of Trainees or AIs seeing or interacting with them.

### **WARNING**

Revealing hidden entities placed in the same position as a Trainee / AI results in collisions, so this should be avoided.

Hidden entity units cannot enter vehicles.

### Follow these steps:

1. During scenario preparation, in the **Scenario Objects Panel**, right-click the entity you want to hide.
2. In the context menu, select **Interventions > Hide Entity**.

The following events occur:

- The selected entity marker is grayed out on the map (group markers also have a dotted border).
- A crossed eye icon appears on the entity entry in the Scenario Objects Tree.



- The entity is made invisible to mission participants when the scenario starts.

### **NOTE**

To unhide the entity, repeat this step, but select **Interventions > Unhide Entity** in the context menu.

3. Start the scenario.
4. To reveal a hidden entity, in the **Scenario Objects Tree**, right-click the entity you want to reveal.

5. In the context menu, select **Interventions > Unhide Entity**.

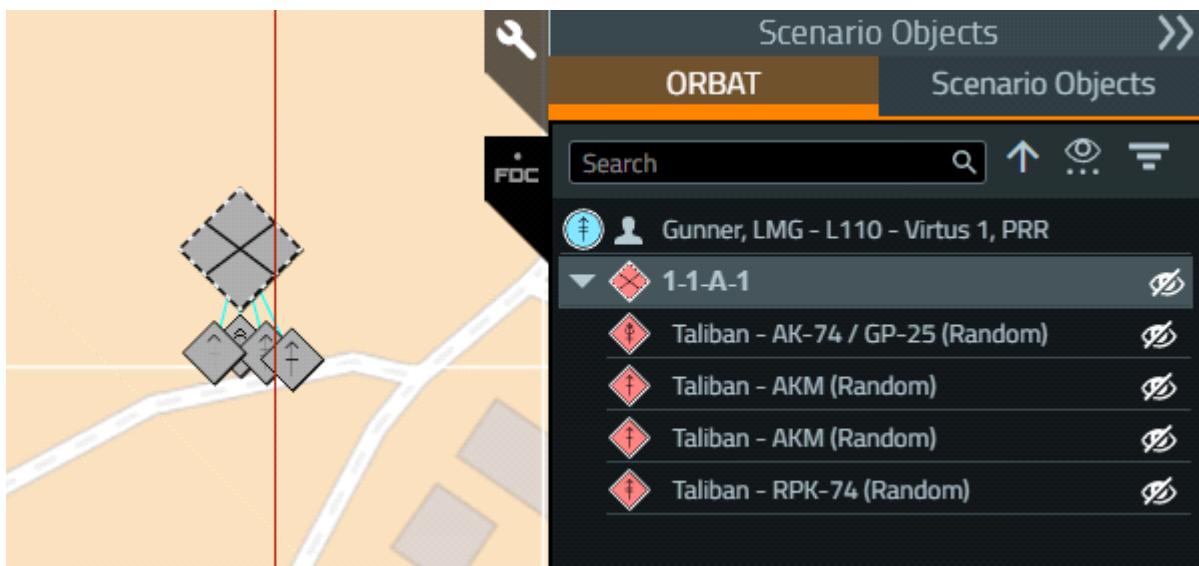
The following events occur:

- The entity marker on the map changes back to its normal appearance.
- The crossed eye icon disappears.
- The entity is made visible to scenario participants.

6. To hide the entity again, repeat steps 4 and 5, but this time select **Interventions > Hide Entity** in the context menu.

The entity is hidden.

**Image-22: Hidden OPFOR group**



## 3.20 Respawn Settings

The technique of respawning enables you to configure entities, such as units, animals, and vehicles, to automatically "resurrect" if they are killed / destroyed during a scenario.

In VBS4 you can customize respawn behavior using the Respawn Settings dialog.

### **i** NOTE

Respawning only works in multiplayer scenarios, and only works for players and playable units.

### **★** FEATURE NOTICE

The Respawn Settings dialog is intended to replace the previous respawning method described in Respawn Control in the VBS4 Scripting Manual.

If you load older missions with respawning applied using scripting, the respawn settings in the `description.ext` and `init.sqf` files are loaded. These files are not used when respawn is set up using the Respawn Settings dialog. Therefore, it is recommended to use the Respawn Settings dialog rather than the `description.ext` and `init.sqf` files.

Follow these steps:

1. Go to **Tools > Respawn Settings**.

The Respawn Settings dialog opens.



2. Using the drop-down menus, select from the following Respawn Modes:

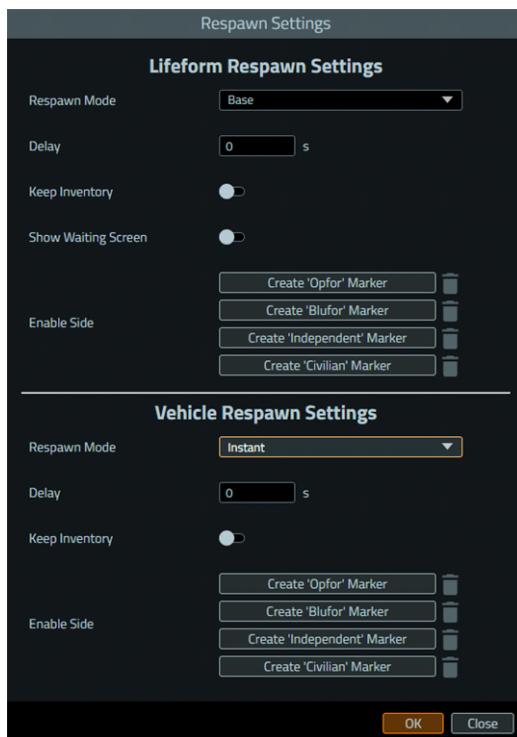
Option	Description
<b>None</b>	No respawn.
<b>Spectator</b>	Lifeforms only. Respawn as a seagull. You must have the <b>Seagull Respawn</b> setting enabled. For more information, see Simulation Settings in the VBS4 Administrator Manual.
<b>Instant</b>	Entities are respawned where they died. Vehicles are replaced by a duplicate of the original where they were destroyed. Requires a marker for a specific side placed anywhere on the map to function (the position of the marker is irrelevant). For more information, see <a href="#">Enable Side (on page 104)</a> .
<b>Base</b>	Respawn in base. Entities respawn at the position of the marker. Destroyed vehicles are replaced by a duplicate of the original at the position of the marker. Requires a marker for a specific side. For more information, see <a href="#">Enable Side (on page 104)</a> .
<b>Group</b>	Lifeforms only. Respawn in group. Entities only respawn in a group if there are AI units available. If there are no AI units available the entity stays dead, or respawns as a seagull if the <b>Seagull Respawn</b> setting is enabled. For more information, see Simulation Settings in the VBS4 Administrator Manual.
<b>Side</b>	Lifeforms only. Respawn as an AI on a side. Entities only respawn in a group if there are AI units available. If there are no AI units available the entity stays dead, or respawns as a seagull if the <b>Seagull Respawn</b> setting is enabled. For more information, see Simulation Settings in the VBS4 Administrator Manual.

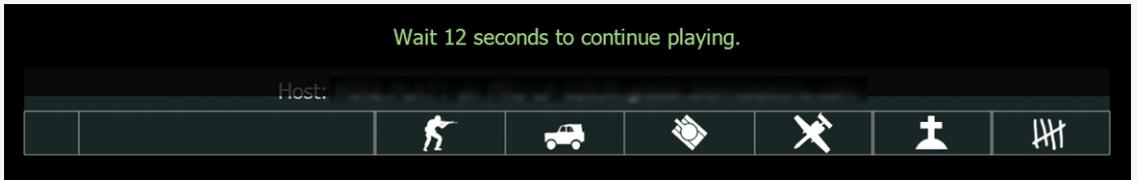
The dialog expands to show further settings.

**NOTE**

The settings that are available depend on the Respawn Mode you select in the Respawn Mode drop-downs.

### 3. Adjust the settings described in the following table:



Setting	Description
<b>Delay</b>	Use the arrows or enter a number in seconds to control the respawn delay.
<b>Keep Inventory</b>	Enable to keep the loadout of entities upon respawn. This means that any inventory items added, removed, modified, or any ammunition spent during or before a scenario starts is kept after respawn. If this setting is disabled, entities return to their default loadout upon respawn.
<b>Show Waiting Screen</b>	Lifeforms only. Enable to show the scoreboard and the respawn countdown timer for the entity that is killed. 

**NOTE**

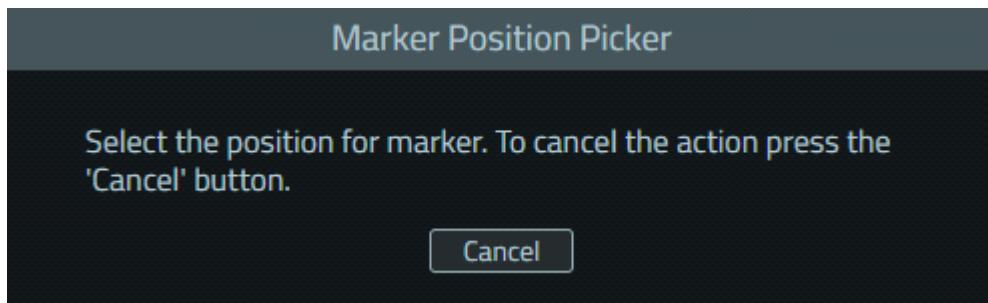
For the Waiting Screen to be shown, the **Delay (above)** setting should have a value above **0**.

#### 4. Enable Side

Use these buttons to create markers for [Base](#) (on page 102) and [Instant](#) (on page 102) respawn modes on the 2D Map.

- a. Click **Create 'Opfor' / 'Blufor' / 'Independent' / 'Civilian' Marker**.

The Marker Position Picker dialog opens.



- b. Click a location on the map.

A **red** (OPFOR) / **blue** (BLUFOR) / **green** (CIVILIAN) / **yellow** (INDEPENDENT) marker is placed on the map.

- c. **Optional.** To move the marker, click **Pick Position for 'Opfor' / 'Blufor' / 'Independent' / 'Civilian' Marker**, and click a new location on the map.

The marker moves to the new location.

- d. To delete a marker from the map, click the **Trash** icon to the right of the applicable marker button in the Respawn Settings dialog.



5. Click **OK**.

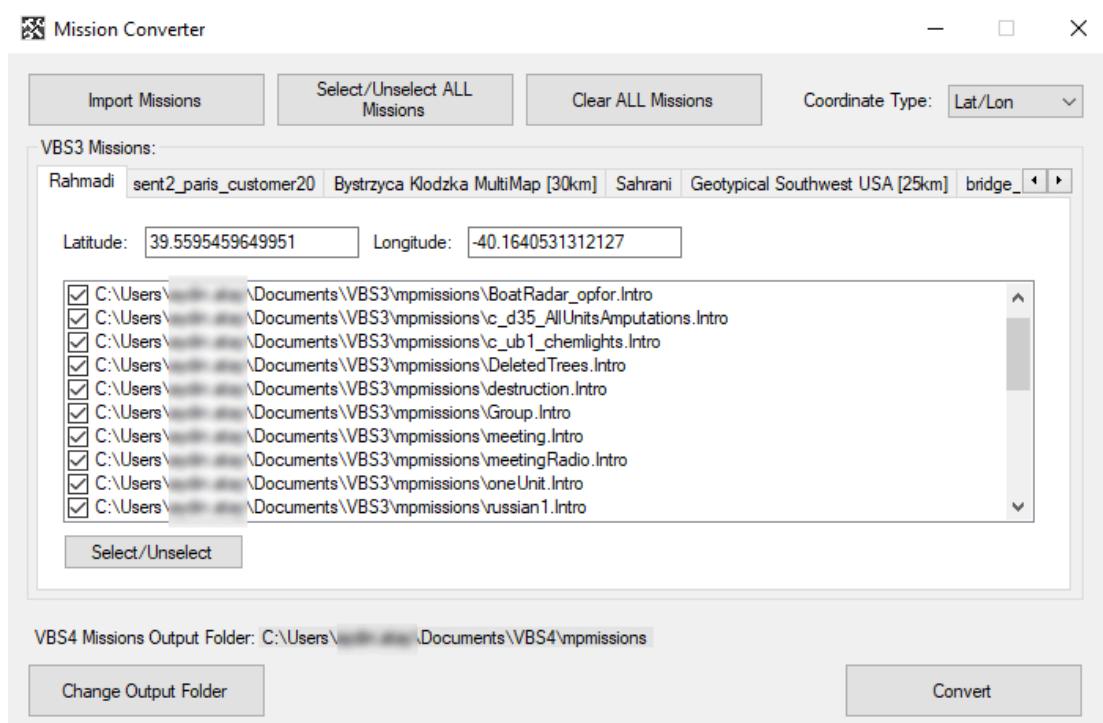
## 4. Mission Converter

By default, VBS3 missions are different from VBS4 scenarios, and cannot be modified and executed in VBS4. However, the Mission Converter tool allows you to convert VBS3 missions to VBS4 scenarios.

The Mission Converter tool is distributed as a VBS4 component, and is available in:

**\VBS4\_Installation\optional\Components\MissionConverter\**

**Image-23: Mission Converter UI**



### TIP

For a video tutorial of the Mission Converter, see **Watch > VBS4 Tutorials > Converting Missions from VBS3 to VBS4** on the Bohemia Interactive Simulations [Customer Portal](#) (<https://bisimulations.com/support/customer-portal>).

### NOTE

All Game AI units, vehicles, and waypoints are converted to Control AI ones.

The Mission Converter has the following capabilities:

- Automatically scans the default VBS3 mission folders, and loads them. The scanned folders are:
  - `\Documents\VBS3\mpmissions\`
  - `\VBS3_Installation\mpmissions\`
  - `\Documents\VBS3 Other Profiles\`
- Gives users the option to select any folder that contains VBS3 missions, or select specific missions to convert in that folder.
- The conversion import function searches for both `.pbo` files and mission folders.
- Automatically reads all relevant map data, such as coordinates and names from the VBS3 configuration, if the mission map has configuration data in the available VBS3 version.
- Transforms VBS3 map coordinates to VBS4 Whole-Earth Terrain coordinates.
- Gives users the option to change the map coordinates to wanted positions before conversion. Coordinates can be monitored and edited in Geographic or UTM form.

The Mission Converter has the following limitations:

- All used mission content and its map terrain need to be present in VBS4, in order for the converted mission to work correctly. For more information on terrain conversion, see the VBS3 to VBS4 Terrain Conversion Tool in the VBS World Server Manual.
- For VBS3 missions using the following terrains, coordinate conversion is automatic:
  - Sahrani
  - Rahmadi
  - Bystrzyca Kłodzka MultiMap

For VBS3 missions using other terrains, the following manual adjustments may be required:

- Define real-world coordinates for the map, before conversion (the default position is `{0,0}`).
- Check the positions of all mission entities, and reposition them according to the terrain.
- If you run the Mission Converter from VBS3, the coordinates of where the map should be on the Whole-Earth Terrain in VBS4 are automatically calculated for all maps present in VBS3, including custom maps. However, if you run the Mission Converter from VBS4, the only VBS4 Whole-Earth Terrain coordinates which get automatically calculated are for Sahrani, Rahmadi, and Bystrzyca Kłodzka MultiMap, since VBS4 does not have access to VBS3 configuration files. VBS3 missions that use other terrains have to be adjusted manually.

- The following mission artifacts cannot be converted:
  - Elevation changes.
  - Flood modifications.
  - VBS3 biotopes.
- Due to differences in the road network between VBS3 and VBS4, the locations of actual pedestrian crosswalks may not match the locations of physical (painted) crosswalks.

### To convert a VBS3 mission, follow these steps:

1. Copy the Mission Converter component folder (`\MissionConverter\`) from:

`\VBS4_Installation\optional\Components\` to:

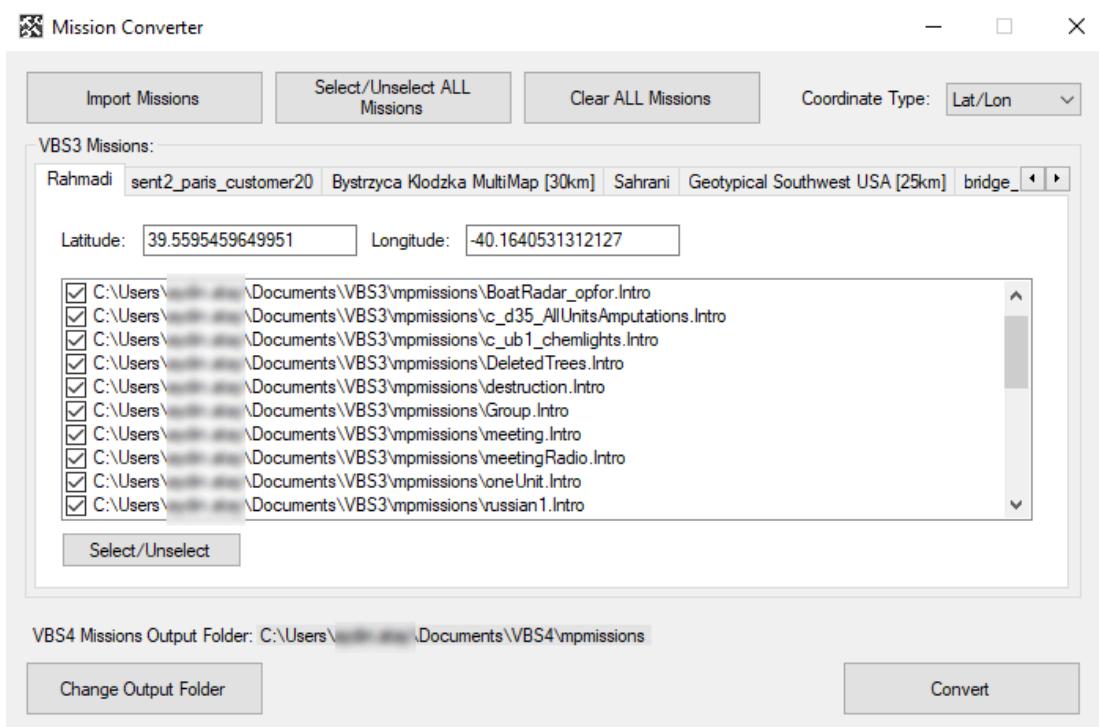
`\VBS3_Installation\Components\`, to run it from VBS3.

#### NOTE

The Mission Converter component can also run from VBS4, but, in that case, it only has data for VBS4-ready maps, which are: Rahmadi, Sahrani, and Bystrzyca Kłodzka MultiMap.

2. Start VBS3.

The Mission Converter UI opens as a separate application, after the component finishes reading the map data from the configuration and loading the default missions.



### 3. Select the missions you want to convert.

#### NOTE

All missions are selected by default.

The following controls are available:

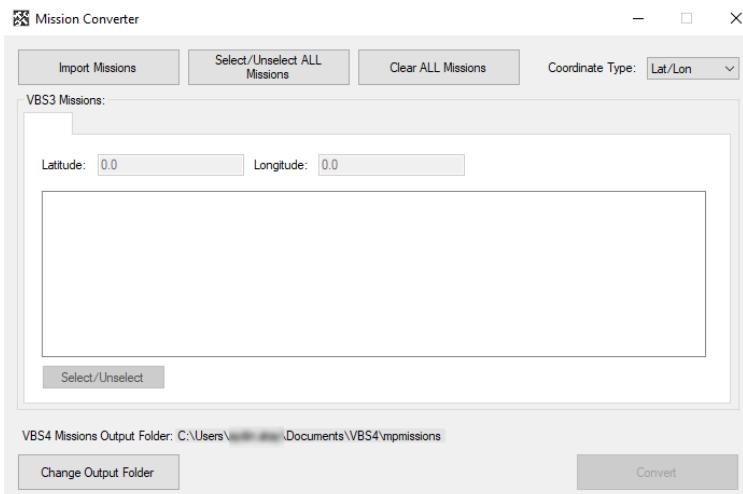
- Use the check boxes in the missions list, to select / unselect missions.
- Under **VBS3 Missions**, click the terrain tabs to switch to missions for the selected terrain.
- Click **Select / Unselect ALL Missions** to select / unselect all the available missions, for all the terrains.

#### TIP

If you want to select / unselect missions for the selected terrain, click **Select / Unselect**.

- Click **Clear ALL Missions** to clear the missions list, to be able to select a different missions folder.

If you select this option, the missions list is cleared.



**To select a different missions folder, follow these steps:**

- a. Click **Import Missions**.
- b. Browse to the missions folder you want, and click **OK**.

4. Click **Change Output Folder** to select the converted VBS4 scenarios folder.

The default VBS4 scenarios location is initially selected:

**\Documents\VBS4\Battlespaces\**

 **NOTE**

If a VBS4 scenario with the same name already exists in the output folder, the existing scenario is not overwritten. Instead, a new scenario folder is created with the same name, plus the suffix "*\_N*", where *N* is incremented each time a VBS4 scenario with the same name is converted.

5. Browse to the folder, where the converted VBS4 scenarios should be stored, and click **OK**.
6. In the **Coordinate Type** drop-down, select the coordinate type for conversion:
  - **Lat/Lon** - Geographic latitude / longitude coordinates.
    - For this coordinate type, you can modify the **Latitude** and **Longitude**.
  - **UTM** - UTM coordinates.
    - For this coordinate type, you can modify the **Northing**, **Easting**, **Zone**, and **Hemisphere**.

 **NOTE**

If the VBS3 map has no configuration information (for example, if the map is not be present in a particular VBS3 version, or the Mission Converter runs from VBS4 instead of VBS3), the coordinate values are initially set to 0, and the user is asked to fill the coordinates.

7. Click **Convert** - see [Conversion Results \(on the next page\)](#).

The missions are converted to Battlespaces.

8. For each Battlespace, open the Battlespace in VBS4, and resave it to convert Game AI waypoints to Control AI ones.

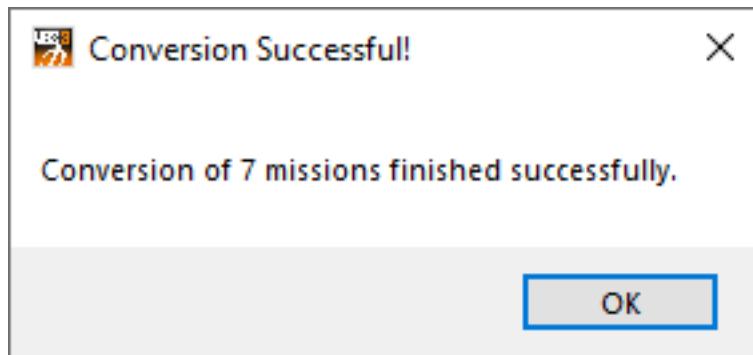


**FEATURE NOTICE**

For removed and temporarily disabled AI-related functionality, see One AI in the VBS4 Release Notes.

## 4.1 Conversion Results

If the conversion is successful (at least one mission is successfully converted), the Conversion Successful dialog appears.

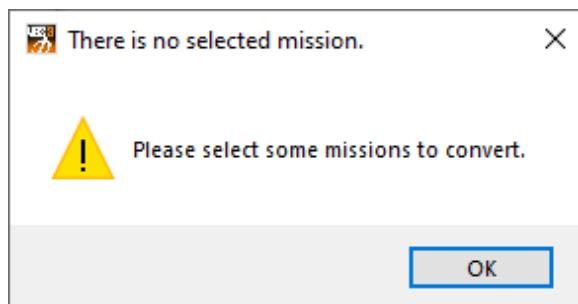


Successfully converted VBS4 scenarios become available in the Battlespaces Mode.

In case of unsuccessful conversion, the following problems may occur:

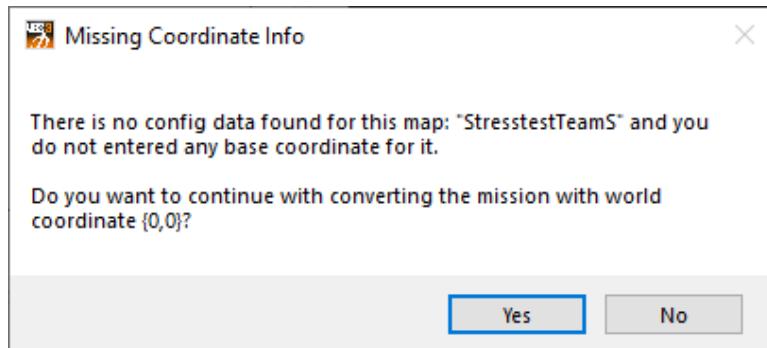
### No selected missions

If the user does not select any missions for conversion, this warning appears.



### Missing coordinate information

If the user does not specify the map coordinates, this pop-up asks the user whether to save the map to a position with **Latitude** = 0 and **Longitude** = 0, or not convert the mission.



## Conversion failed

This means that an unexpected error occurs, and none of the selected missions are converted. For more information on the error, see [MissionConverter.log](#) in:

[\VBS3\\_Installation\Log\](#)



## 5. Setting Up VBS Radio

Set up VBS Radio as part of your mission design process using the VBS Editor in Prepare Mode. VBS Radio enables vehicles, units, and groups to communicate with each other.



### TIP

Add these objects to the scenario before configuring VBS Radio.

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



### WARNING

This menu option is not accessible in Execute Mode.

#### Follow these steps:

##### 1. Start VBS4 as the Administrator:

- In VBS Launcher, select **-admin** in the Client tab.
- In a command-line, start VBS4 using the **-admin** parameter.



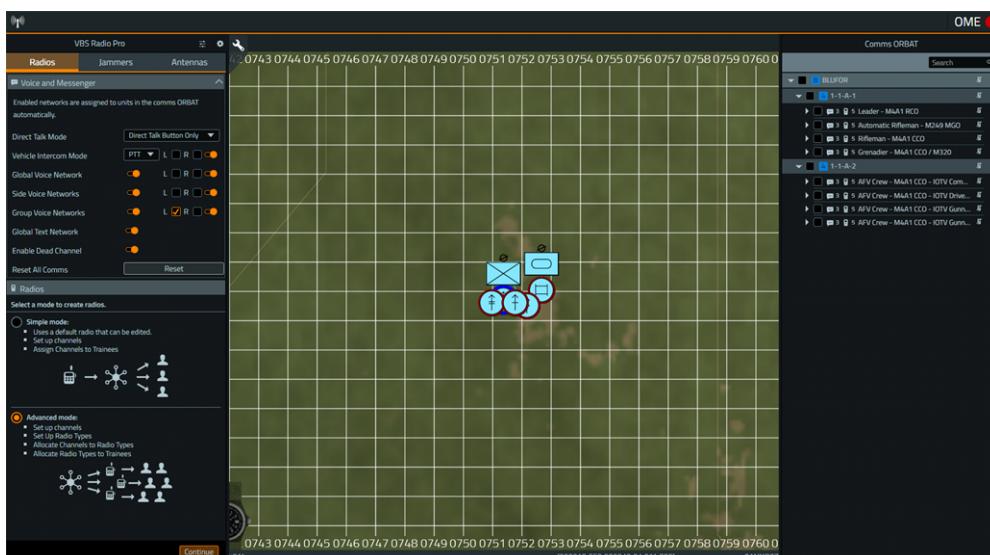
### NOTE

VBS Radio is enabled by default.

##### 2. Select a **Battlespace** and in the Battlespace Functions panel, select **Editor** then **Create**.

The VBS Editor opens in Prepare Mode.

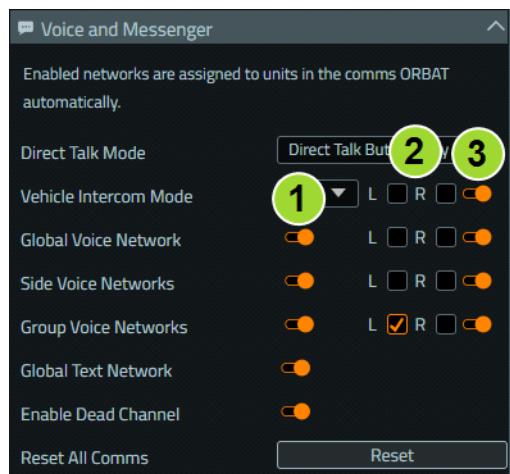
##### 3. Go to **Tools > Radio Admin** to open the VBS Radio UI.



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

Setting	Description
<b>Direct Talk Mode</b>	Use the drop-down select the Direct Talk Mode for your scenario. Direct Talk simulates natural speech, by allowing users to hear others who are in close proximity. Select from the following options: <ul style="list-style-type: none"><li>• Off (Default)</li><li>• Direct Talk Button Only</li><li>• VOX</li><li>• With Radio Transmissions</li><li>• With VoIP Transmissions</li><li>• With Radio / VoIP Transmissions</li></ul>
<b>Vehicle Intercom Mode</b>	Use the drop-down to select from the following intercom options for communication within vehicles: <ul style="list-style-type: none"><li>• Off</li><li>• PTT</li><li>• VOX</li></ul>
<b>Global Voice Network</b>	Click to enable / disable the Global Voice Network.
<b>Side Voice Networks</b>	Click to enable / disable the Side Voice Networks.
<b>Group Voice Networks</b>	Click to enable / disable the Group Voice Networks.
<b>Global Text Network</b>	Click to enable / disable the Global Text Network.
<b>Enable Dead Channel</b>	Click to enable / disable the Dead Channel.
<b>Reset All Comms</b>	Click <b>Reset</b> to return VBS Radio to its default state: <ul style="list-style-type: none"><li>• Removes all custom Radio Types and assignments.</li><li>• Removes all custom Channels and assignments.</li><li>• Resets all VBS Radio settings.</li></ul>
<b>Switches and Default Monitoring</b>	For more information, see <a href="#">Switches and Default Monitoring (on the next page)</a> .

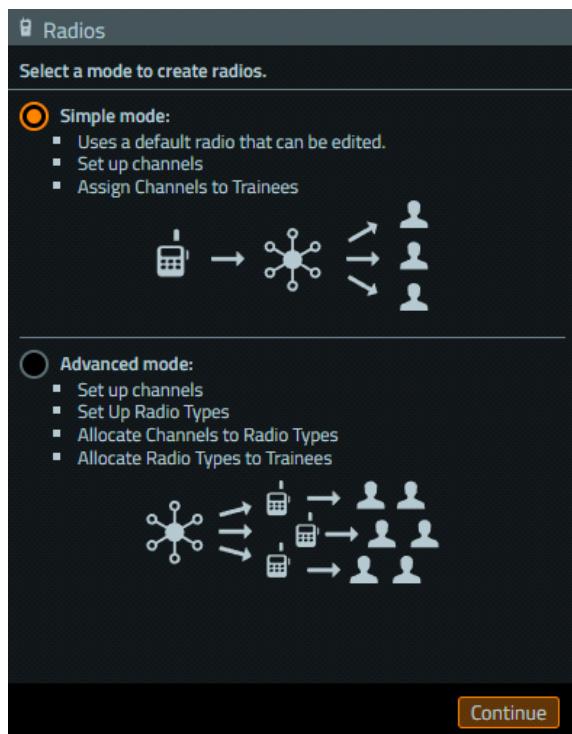
## Switches and Default Monitoring



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

## 5.1 Modes

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



### Follow these steps:

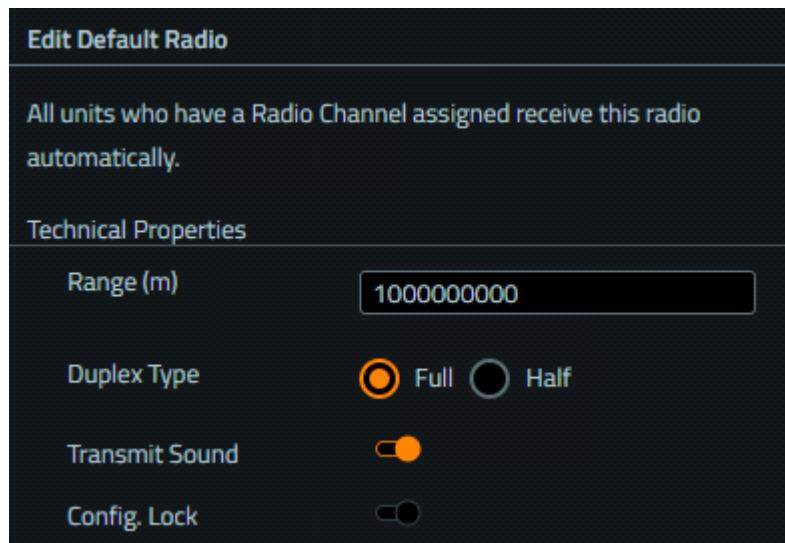
1. Click **Continue** to open the Active Radio and Available Channels lists.
2. In the Active Radio section (in **Simple Mode**), click the **down arrow** to see the properties of the Default Radio.



Properties	
Range (m)	10000000000
Duplex	Full
Transmit Sound	On
Config. Lock	On
Freq. Range (MHz)	1-3000

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

The Edit Default Radio panel opens.



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

#### Simple Mode:

- [Assign Channels and Radio Types \(on page 127\)](#)

#### Advanced Mode:

- [Configure Communication Channels \(on page 118\)](#)
- [Configure Radio Types \(on page 122\)](#)



#### FEATURE NOTICE

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

- [Assign Channels and Radio Types \(on page 127\)](#)

#### Optional:

- [Advanced Settings and Presets \(on page 131\)](#)

6. Click the **spanner** icon at the top-right of the VBS Radio Pro panel to exit VBS Radio setup.



7. Click the **Main Menu** in the VBS4 Toolbar, and under **Battlespaces** select one of the following options:
  - **Save** - Saves changes into the currently open Battlespace.
  - **Save As** - Creates a new Battlespace, or overwrites the existing one, based on the name you enter in the dialog.
8. If your mission requires communication with other DIS-compliant radio products, see [Configure DIS \(on page 137\)](#).

The mission is ready to use for VBS Radio communication.

## 5.2 Configure Communication Channels

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

### NOTE

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

The VBS Radio UI enables you to do the following:

- [Create Radio Channels \(below\)](#)
- [Edit Radio Channels \(on page 120\)](#)
- [Delete Radio Channels \(on page 121\)](#)

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

To assign Communication Channels to units or groups, see [Assign Channels and Radio Types \(on page 127\)](#).

### 5.2.1 Create Radio Channels

Create Radio Channels using the VBS Radio UI.

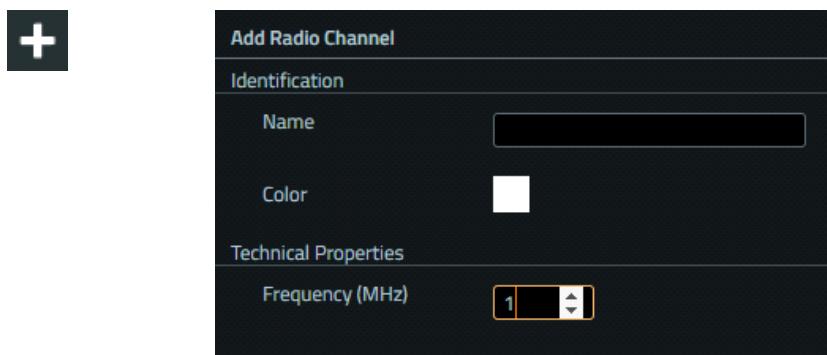
#### FEATURE NOTICE

This feature is part of VBS Radio Pro, a licensed product. For more information, contact [sales@bisimulations.com](mailto:sales@bisimulations.com).

**Follow these steps:**

1. In the VBS Editor, go to **Tools > Radio Admin** to open the VBS Radio UI.
2. In **Radios**, select **Simple Mode** or **Advanced Mode**, and click **Continue**.

3. Click the **plus** icon to open the **Add Radio Channel** panel.



4. Fill-in the properties.

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

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

Available Channels				
	Name	Freq.	Default Preset	Default Monitoring
<input type="checkbox"/>	Alpha_1	25 MHz	<input type="radio"/>	L <input type="checkbox"/> R <input type="checkbox"/>
<input type="checkbox"/>	Alpha_2	30 MHz	<input type="radio"/>	L <input type="checkbox"/> R <input type="checkbox"/>
<input type="checkbox"/>	Channel 1	2.1 MHz	<input type="radio"/>	L <input type="checkbox"/> R <input type="checkbox"/>
<input type="checkbox"/>	Channel 2	2.2 MHz	<input type="radio"/>	L <input type="checkbox"/> R <input type="checkbox"/>
<input type="checkbox"/>	Channel 3	2.3 MHz	<input type="radio"/>	L <input type="checkbox"/> R <input type="checkbox"/>
<input type="checkbox"/>	Channel 4	2.4 MHz	<input type="radio"/>	L <input type="checkbox"/> R <input type="checkbox"/>
<input type="checkbox"/>	Channel 5	2.5 MHz	<input type="radio"/>	L <input type="checkbox"/> R <input type="checkbox"/>
<input type="checkbox"/>	delta	80 MHz	<input type="radio"/>	L <input type="checkbox"/> R <input type="checkbox"/>
<input checked="" type="checkbox"/>	My New Channel	2.6 MHz	<input checked="" type="radio"/>	L <input type="checkbox"/> R <input type="checkbox"/>

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

For monitoring of radio channels during a mission, see [Monitoring VBS Radio in the VBS4 Instructor Manual](#).

## 5.2.2 Edit Radio Channels

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

### **WARNING**

The default Radio Channels are not editable.

**Follow these steps:**

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



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

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

6. Click **Save**.

The Radio Channel properties are updated.

### **TIP**

You can also edit Default Presets / Power / Frequency / Monitoring L (Left) / R (Right) properties after a radio has been assigned to a unit. For more information, see [Override Assigned VBS Radio Properties \(on page 130\)](#).

## 5.2.3 Delete Radio Channels

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

### ★ FEATURE NOTICE

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

**Follow these steps:**

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



The Radio Channel is removed from the channels list.

### ● NOTE

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

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

## 5.3 Configure Radio Types

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

### NOTE

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

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

### FEATURE NOTICE

Custom Radio Types are only available in VBS Radio Pro, a licensed product. For more information contact [sales@bisimulations.com](mailto:sales@bisimulations.com).

### NOTE

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

The VBS4 Radio UI enables you to do the following:

- [Create Radio Types \(on the next page\)](#)
- [Edit Radio Types \(on page 125\)](#)
- [Delete Radio Types \(on page 126\)](#)

To assign Radio Types to units, see [Assign Channels and Radio Types \(on page 127\)](#).

### NOTE

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

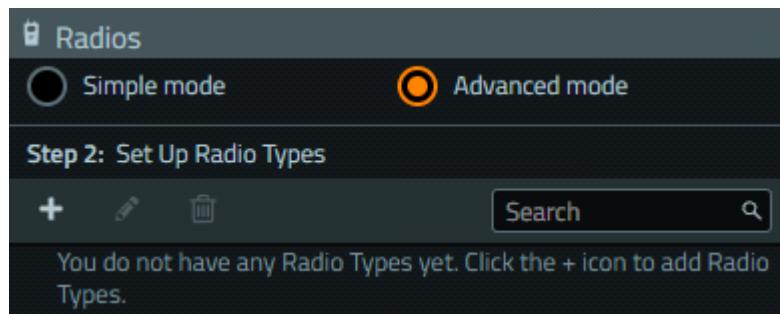
- **Save** - Saves changes into the currently open Battlespace.
- **Save As** - Creates a new Battlespace, or overwrites the existing one, based on the name you enter in the dialog.

## 5.3.1 Create Radio Types

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

**Follow these steps:**

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

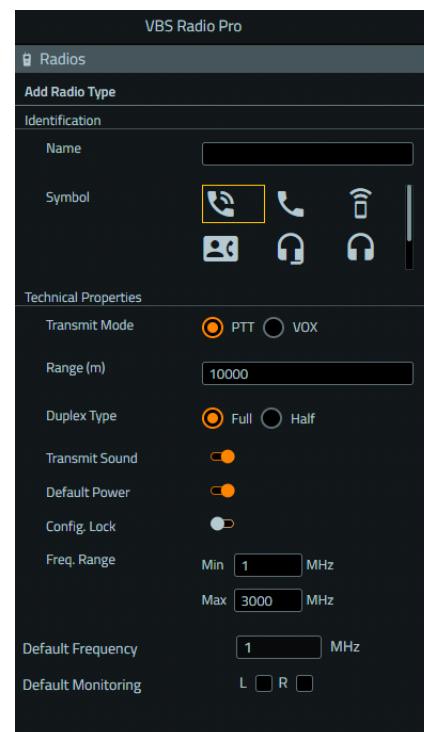


4. Click the **plus** icon to open the **Add Radio Type** panel, and configure the Radio Type properties (see [Radio Type Properties \(on the next page\)](#)).

**Config. Lock enabled**



**Config. Lock disabled**

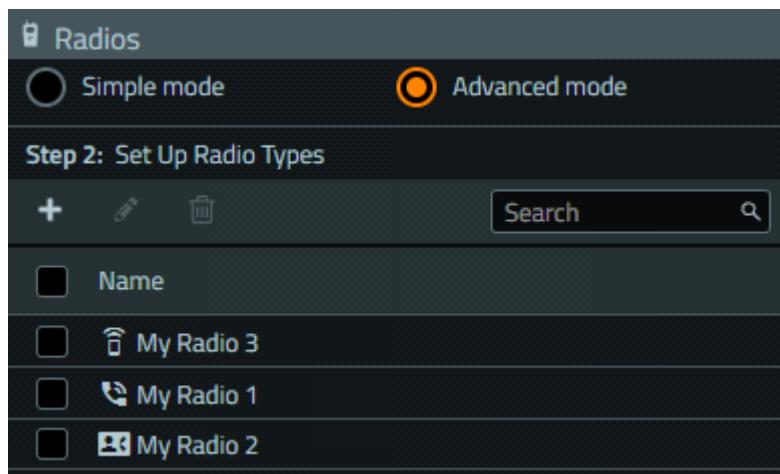


5. Select the Communication Channels you want to be available for the Radio Type you are creating.

6. **Optional:** Configure the Default Preset and Default Monitoring options for your selected channels. For more information, see [Configure Communication Channels \(on page 118\)](#).

7. Click **Save**.

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



## Radio Type Properties

Configure the following properties for specific radios.

Property	Description
Name	Enter a name for the Radio Type, as you want it to appear in the Radio UI.
Symbol	Click a <b>symbol</b> to specify a unique icon for the Radio Type. This is displayed next to units assigned with the Radio Type in the Assigned Units panel.
Transmit Mode	Select either the <b>PTT</b> (Push to Talk) or <b>VOX</b> (Voice-Operated Exchange) format. <div style="border: 2px solid red; padding: 5px; margin-top: 10px;"><b>⚠️ WARNING</b> Combining VOX with Half-Duplex (see <b>Duplex Type</b>) is not supported.</div>
Range (m)	Enter the communication range, in meters.

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

### 5.3.2 Edit Radio Types

Modify existing Radio Types.

**Follow these steps:**

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

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



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

The modified Radio Type is saved.

**TIP**

You can also edit Default Presets / Power / Frequency / Monitoring L (Left) / R (Right) properties after a radio has been assigned to a unit. For more information, see [Override Assigned VBS Radio Properties \(on page 130\)](#).

### 5.3.3 Delete Radio Types

Delete existing Radio Types.

**NOTE**

The default Radio Type cannot be deleted.

#### Follow these steps:

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



The Radio Type is deleted and removed from the list.

## 5.4 Assign Channels and Radio Types

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

### **i** NOTE

It is only possible to assign Radio Channels and Radio Types to playable units.

Assign Radio Types supporting at least one shared Communication Channel to multiple units to enable them to communicate with each other.

### **i** NOTE

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

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

### Follow these steps:

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

### **i** NOTE

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

3. In **Radios**, do one of the following:

- [Assign Radio Channels to Units \(below\)](#)
- [Assign Radio Types to Units \(on the next page\)](#)
- [Assign Radio Channels to Radio Types \(on the next page\)](#)

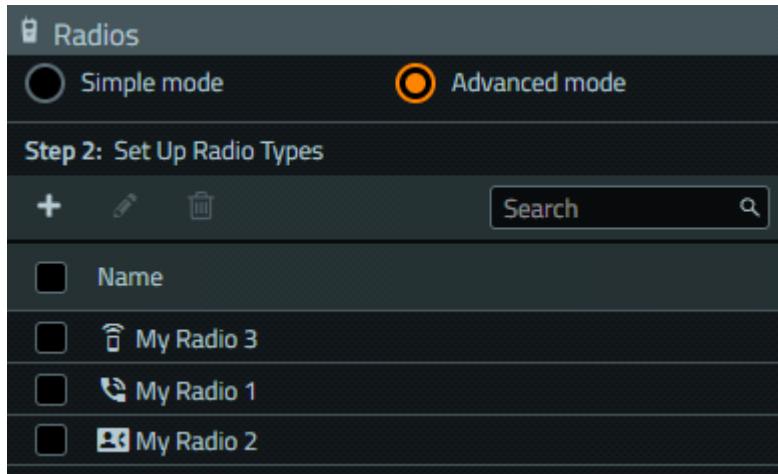
### Assign Radio Channels to Units

- a. Click **Simple Mode**, and check the **box** next to the channel you want to assign to the units.
- b. In the **Comms ORBAT** panel, check the **boxes** next to the units you want to assign the Radio Channel to. Alternatively, click **Select All** to apply the Radio Channel to all units in the scenario.
- c. Click **Assign**.

The Radio Channel is assigned to the selected units.

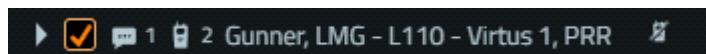
## Assign Radio Types to Units

- Click **Advanced Mode**, and click **Continue**.
- In **Set Up Radio Types**, check the **box** next to the Radio Types you want to assign to the units.



- In the **Comms ORBAT** panel, check the **boxes** next to the units you want to assign the Radio Type to.
- In the **Radios** panel, click **Assign**.

The Radio Type is assigned to the selected units, and the symbol you selected in [Create Radio Types \(on page 123\)](#) is displayed next to the unit names that have the Radio Type assigned.



## Assign Radio Channels to Radio Types

Do one of the following:

- Assign Radio Channels during Radio Type creation, see [Configure Radio Types \(on page 122\)](#).
- Assign Radio Channels during Radio Type editing, in **Channels** in the Edit Radio Type panel, see [Edit Radio Types \(on page 125\)](#).

### **NOTE**

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

## 5.4.1 Unassign Radio Types

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

- **Unassign from Units**

**Follow these steps:**

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



The Radio Type is unassigned from the unit.

- **Unassign from Radio Channels**

**Follow these steps:**

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



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

The Radio Types are unassigned from units / Radio Channels.

## 5.4.2 Override Assigned VBS Radio Properties

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

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

**Follow these steps:**

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



2. Make any changes.

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

### EXAMPLE



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

## 5.5 Advanced Settings and Presets

Advanced Settings enable Administrators to import channels from older versions of Radio, and apply [Degradation \(on page 133\)](#) settings.

### Follow these steps:

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



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

Setting	Description
<b>Terrain / Overcast / Rain</b>	<p>Click the buttons to expand each section, and use the sliders to adjust HF / VHF / UHF degradation level percentages for different frequency bands:</p> <ul style="list-style-type: none"><li>• Signal Degradation (SD) is set as a percentage, independently for each of the three frequency bands (HF, VHF, UHF).</li><li>• The default SD level is 25%, meaning the effective range of the transmitter is reduced by 15% of the original range (due to the non-linear effect of degradation), and noise starts at 25% of the maximum value.</li><li>• Changing the percentage level quadratically affects range and linearly affects noise.</li></ul>

For more information, see [Degradation \(on page 133\)](#).

4. Click **Save**.

VBS Radio applies the selected settings.

VoIP settings for the mission are shown in the Radios tab of the VBS Radio Pro panel (see [Setting Up VBS Radio \(on page 112\)](#)).

**NOTE**

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

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

## 5.5.1 Presets

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

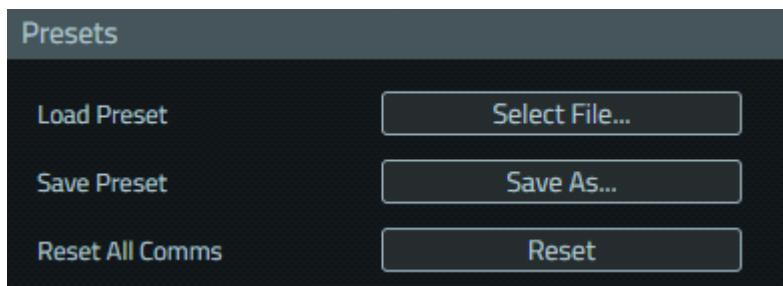
**NOTE**

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

Presets are loaded, and saved in the Presets panel.

**Follow these steps:**

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



## 2. Do any of the following:

- Click **Select File...** to open your Explorer and load a preset.
- Click **Save As...** to open your Explorer and save a preset.



### TIP

Presets are saved in the VBSRadioSettings Configuration File, as described in the VBS4 Administrator Manual.

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

## 3. Click **Back** to return to the main VBS Radio UI.

### 5.5.2 Degradation

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

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

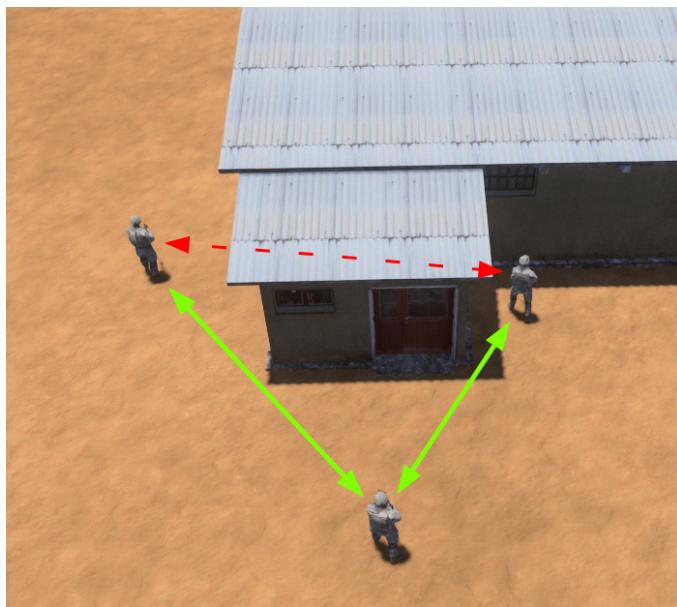
If the receiver is beyond the maximum range of the transmitter, there is no signal and no noise is heard.

#### Specific Degradation

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

- **Terrain**

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



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

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

- **Overcast**

Degradation due to overcast weather conditions shortens the effective signal range and increases noise, using a combination of the selected percentage value and the overcast level set in the [Weather Settings \(on page 285\)](#).

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

**NOTE**

The overcast level ranges from 0 to 1 (0 to 100%).

The degradation percentage (set using the slider) can range from 0% to 200% to allow for more control over the effect of overcast weather conditions.

- Rain

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

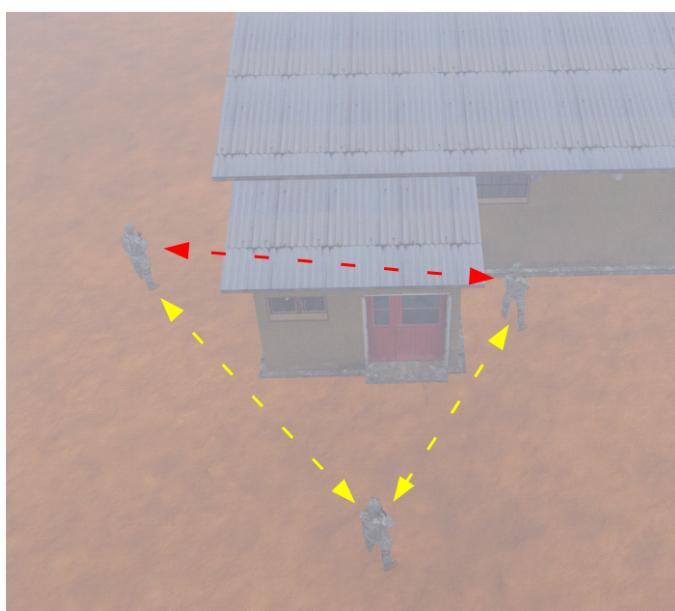
The final strength of rain degradation is calculated by multiplying the percentage value selected for degradation and the percentage value for rain.

**NOTE**

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

- Cumulative Effect

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



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

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

## Degradation Examples

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

## Degradation Examples

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

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

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

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

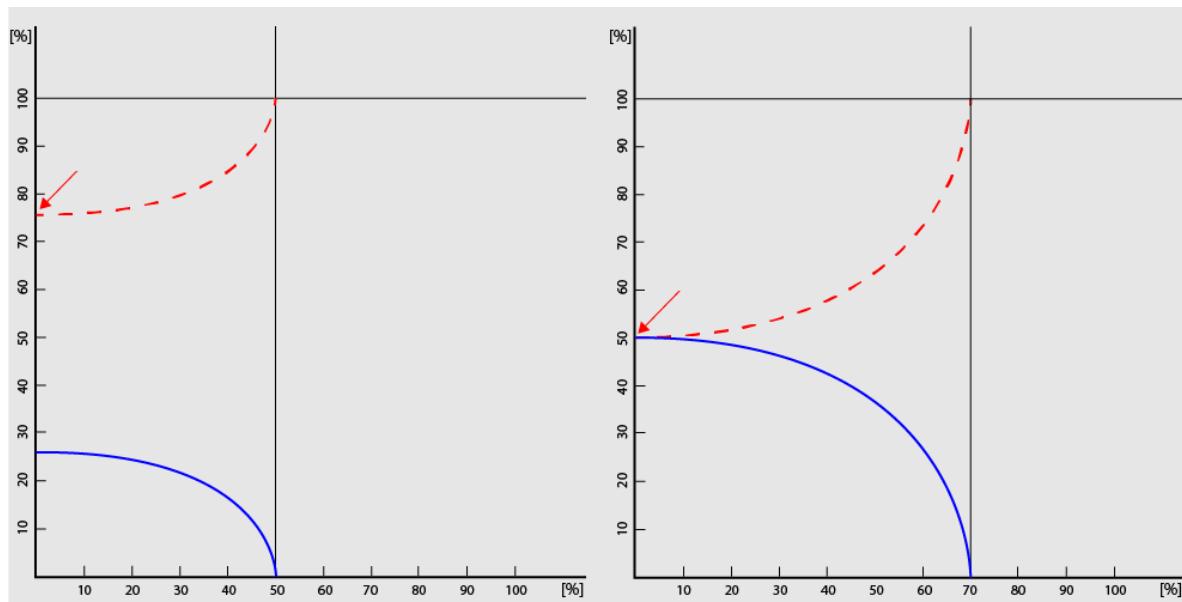
If a terrain degradation of 25% or higher is added, the final degradation is 100% or higher without line-of-sight, therefore communication is only possible with a line-of-sight.

## Degradation Formula

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

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

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



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

50% = Degraded range ~ 0.70 of original transmitter range

75% = Degraded range ~ 0.50 of transmitter range

## 5.6 Configure DIS

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

The default DIS settings are stored in the following files:

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

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

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

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

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

### `rprdisgateway.settings`

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



### WARNING

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

## 6. Integration Tools and Objects

VBS4 supports a wide variety of integration use cases to support more complex training scenarios or integrate with other products.

Many of these use cases require specific mission setup using Editor Objects or Tools to add the appropriate setup:

- [VBS Gateway UI \(on the next page\)](#)
- [JSBSim Flight Model \(on page 197\)](#)
- [Add IG Viewpoints to Scenarios \(on page 220\)](#)

## 6.1 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**

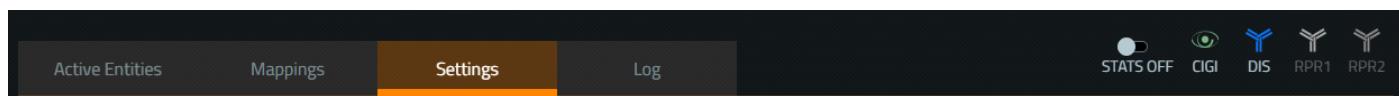
VBS Gateway supports Google Chrome, and should also work in Microsoft Edge and Mozilla Firefox.

### **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 \(on page 142\)](#)
- [Settings Page \(on page 148\)](#)
- [VBS Gateway Logging](#)

The Active Entities and Mappings pages both provide access to the [Mapping Dialog \(on page 143\)](#) to enable the creation and modification of model mappings.

The Active Entities and Mappings pages use table formats with [Content Sorting and Filtering \(on page 144\)](#) 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](#) in the VBS Gateway Manual.

In the event that communications are not functioning correctly, refer to [Configure VBS Gateway \(on page 150\)](#) or Communications Monitoring in the VBS Gateway Manual and review your configuration.

## 6.1.1 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 <sup>-1</sup> ) 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 <sup>-1</sup> 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 <sup>-1</sup> 33.08 m	0.00	Friendly		
	Remote DIS_1_3030_6059_2	Fuzzy	SISO <b>Fuzzy: 1 2 225 2 4 1 0</b> (original 1 2 225 2 0 0 0)	vbs_us_af_a10a_gnv_agm65_hydra_x US USAF Air - A-10A - GAU-8 - Hydra - AGM-65	1000031.28 : 999921.10	0.00 m s <sup>-1</sup> 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 <sup>-1</sup> 32.98 m	0.00	Friendly		
	Remote DIS_1_3030_6059_4	Fuzzy	SISO <b>Fuzzy: 1 1 225 1 1 1 1 0</b> (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 <sup>-1</sup> 33.00 m	0.00	Friendly		
	Remote DIS_1_3030_6059_3	Fuzzy	SISO <b>Fuzzy: 3 1 1 1 1 3 0 0 0</b> (original 3 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 <sup>-1</sup> 32.99 m	0.00	Friendly		

For the information on what is displayed in the Active Entities table, see [Active Entities Sorting and Filtering \(on page 144\)](#).

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 \(on page 143\)](#).

For more information, see Simulation Monitoring in the VBS4 Instructor Manual.

### 6.1.1.1 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 ×

Object Attributes	Munitions Mapping
ID:	[4 : 712]
URN:	
Side:	Friendly
Controller:	Local AI
Speed:	0.00 ms <sup>-1</sup>
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 \(on page 194\)](#).

## 6.1.2 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
Car	Incoming	Original	SISO 1 1 1 6 1 2 1 2	vbs_af_army_m1114_des_x	M1114 HMMWV	AF Army Wheeled - Desert	
Group	Incoming	Original	SISO 3 1 2 2 5 1 2 3 5 0 0	vbs2_us_mc_mgunner_w_m249_dim	Automatic Rifleman - M249 / Dim Trace	US USMC Woodland	
Car	Outgoing	Original	SISO 1 1 1 6 1 2 1 2	vbs_af_army_m1114_des_x	M1114 HMMWV	AF Army Wheeled - Desert	
Group	Outgoing	Original	SISO 3 1 2 2 5 1 2 3 5 0 0	vbs_us_mc_machinegunner_des_m_medium_mrw_no_e_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 \(on page 140\)](#)). 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 \(on page 192\)](#).

For information on what is displayed in the Mappings table, see [Mappings Sorting and Filtering \(on page 146\)](#).

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 \(on page 177\)](#).

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.

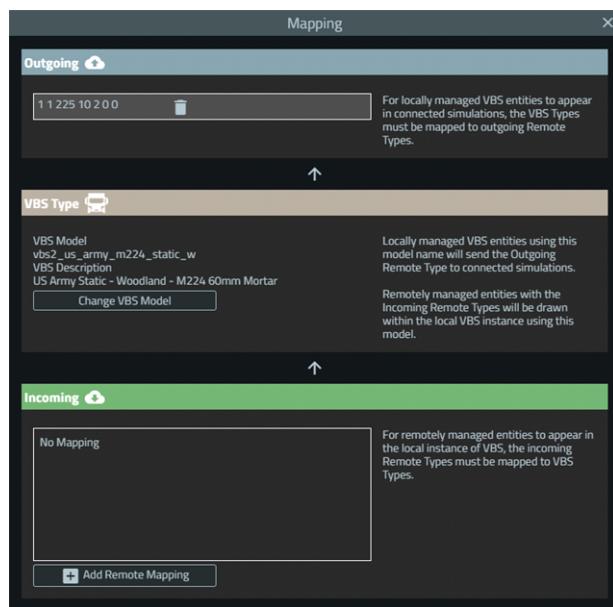
For more information, see [Import VBS4 Entities \(on page 178\)](#).

- 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 \(on page 180\)](#).

### 6.1.2.1 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 \(on page 177\)](#) and [Simulation Monitoring in the VBS Gateway Manual](#).

## 6.1.3 Content Sorting and Filtering

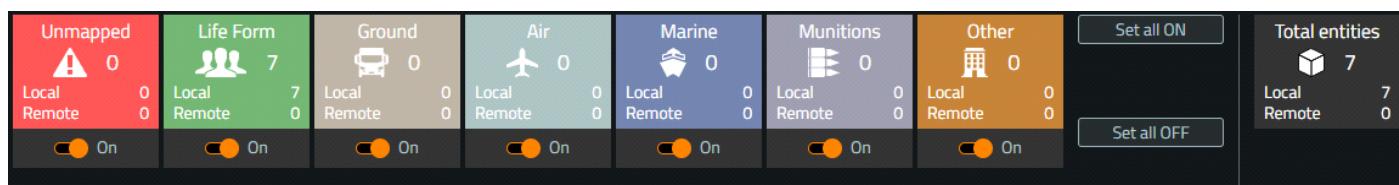
The Active Entities and Mappings pages and most input panels use column sorting and filters to enable the identification of specific content.

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 \(on page 146\)](#)

### 6.1.3.1 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 <sup>-1</sup> ) Altitude ASL (m)	Damage (%)	Side	+ Filter
										Apply

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

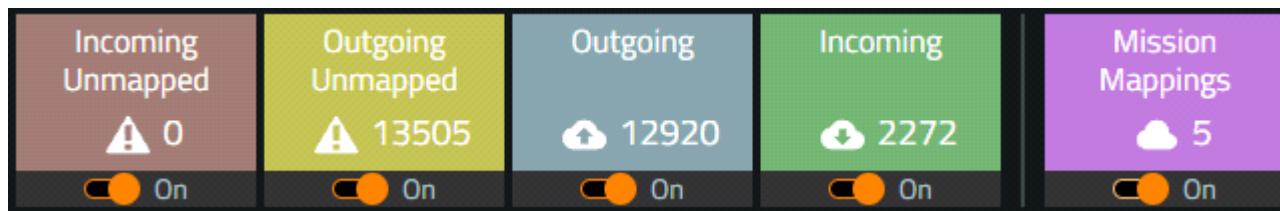
- Category columns such as **Type**, **Ownership**, **Fuzzy**, and **Side** use category selection filters.
- String columns such as **VBS Type** and **Remote Category / Remote Type** use dynamic search input filters.
- Numeric columns such as **Location** and **Speed** use Min and Max input filters.

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

Column	Description		
<b>Ownership</b>	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> <b>EXAMPLE</b></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 <a href="#">Entity Details Dialog (on page 194)</a>) and in Execute mode for local entities.</p>		
	Can be:		
	<ul style="list-style-type: none"> <li>• No Filter (no entity-ownership filter applied)</li> <li>• Local (the entity is local and managed by the local VBS4 instance)</li> <li>• Remote (the entity is remote and managed by either a remote VBS4 instance or another simulation product)</li> </ul>		
<b>Fuzzy</b>	Shows <b>Original</b> for original mappings, and <b>Fuzzy</b> for fuzzy / closest match ones (for more information, see <a href="#">Fuzzy Mapping (on page 156)</a> ). Can be: <ul style="list-style-type: none"> <li>• No Filter (no mapping filter is applied)</li> <li>• Fuzzy (fuzzy mapping is applied)</li> <li>• Original (exact mapping is applied)</li> </ul>		
<b>Remote Category / Type</b>	Specifies the standard and enumeration for this entity. Fuzzy mappings (see <a href="#">Fuzzy Mapping (on page 156)</a> ) appear in bold.		
<b>VBS Type</b>	VBS class name of the entity.		
<b>URN</b>	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.		
<b>Location</b>	Current map coordinates of the entity. The units used are internal to VBS4.		
<b>Speed / Altitude</b>	The first number indicates current speed of the entity in meters per second. The second number indicates the current altitude in meters.		
<b>Damage</b>	Percentage of maximum damage the entity has taken.		
<b>Side</b>	Side the entity belongs to. Can be: <table border="0" style="width: 100%;"> <tr> <td style="vertical-align: top; width: 50%;"> <ul style="list-style-type: none"> <li>• No Filter (no side filter is applied)</li> <li>• Opposing (OPFOR side only)</li> <li>• Friendly (BLUFOR side only)</li> </ul> </td> <td style="vertical-align: top; width: 50%;"> <ul style="list-style-type: none"> <li>• Neutral (neutral side only)</li> <li>• Other (any other side)</li> </ul> </td> </tr> </table>	<ul style="list-style-type: none"> <li>• No Filter (no side filter is applied)</li> <li>• Opposing (OPFOR side only)</li> <li>• Friendly (BLUFOR side only)</li> </ul>	<ul style="list-style-type: none"> <li>• Neutral (neutral side only)</li> <li>• Other (any other side)</li> </ul>
<ul style="list-style-type: none"> <li>• No Filter (no side filter is applied)</li> <li>• Opposing (OPFOR side only)</li> <li>• Friendly (BLUFOR side only)</li> </ul>	<ul style="list-style-type: none"> <li>• Neutral (neutral side only)</li> <li>• Other (any other side)</li> </ul>		

### 6.1.3.2 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:

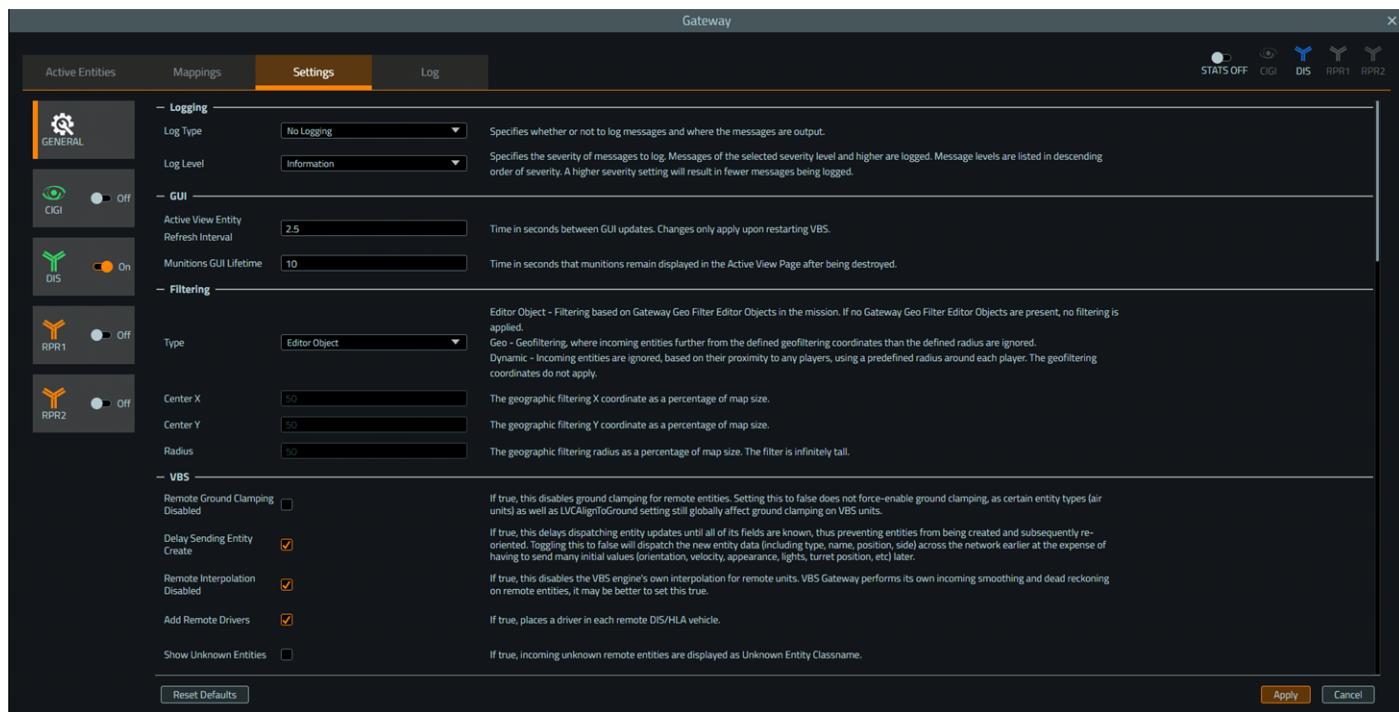
- Category columns such as **Type**, **Direction**, and **Fuzzy** use category selection filters.
- String columns such as **Remote Type**, **VBS Model**, **VBS Description**, and **VBS Category** use dynamic search input filters.

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

Column	Description
<b>Fuzzy</b>	Original / fuzzy match used in entity mapping (see <a href="#">Fuzzy Mapping (on page 156)</a> ). Can be: <ul style="list-style-type: none"><li>• No Filter (no original / fuzzy mapping filter is applied)</li><li>• Fuzzy (fuzzy mapping is applied)</li><li>• Original (original mapping is applied)</li></ul>
<b>Remote Type</b>	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: 10px 0;"> <b>EXAMPLE</b><p>DIS_1_152_303_17. The script reference name for local and remote entities can be edited from the Entity Details dialog (see <a href="#">Entity Details Dialog (on page 194)</a>) and in Execute mode for local entities.</p></div>	
<b>VBS Model</b>	VBS class name of the entity.
<b>VBS Description</b>	VBS description of the entity (the name of the entity, as it appears in various parts of the VBS4 UI - for example, see <a href="#">Adding Units (on page 344)</a> and <a href="#">Adding Vehicles (on page 599)</a> ).
<b>VBS Category</b>	VBS category (one level above <b>VBS Description</b> ) of the entity (the category of the entity, as it appears in various parts of the VBS4 UI - for example, see <a href="#">Adding Units (on page 344)</a> and <a href="#">Adding Vehicles (on page 599)</a> ).

## 6.1.4 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 in the VBS Gateway Manual.
- Simulation Administrators use Settings to modify simulation entity appearance settings. For more information, see Modify the Simulation Settings in the VBS Gateway Manual.

## 6.1.5 External Entities in VBS4

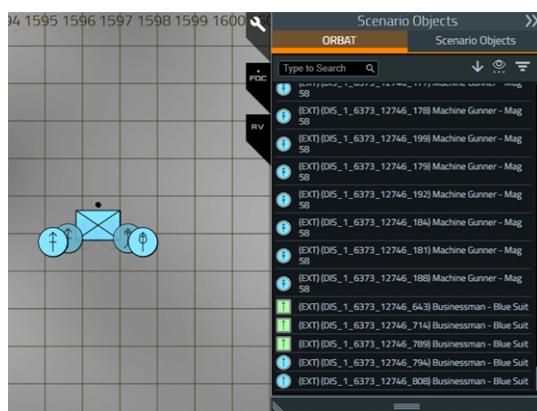
When VBS4 operates as part of a combined simulation, there are additional entities present in VBS4 that are controlled by the other simulation products.

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.



## 6.1.6 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 in the VBS Gateway Manual](#).
2. Open the VBS Gateway user interface.
3. Click **Settings** in the header to open the [Settings Page \(on page 148\)](#).
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 \(on page 161\)](#)
  - [Configure RPR1 and RPR2 Adapters \(on page 167\)](#)
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 \(on page 177\)](#).

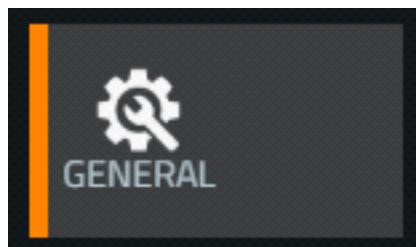
When you start your network mission, VBS Gateway transmits and receives messages with other simulation clients in the same network and exercise and updates the VBS Gateway User Interface displaying information about the shared simulation entities.

If your exercise requires use of MÄK RTI, see [Install and Configure MÄK RTI \(on page 173\)](#).

If your exercise requires use of Pitch RTI , see [Install and Configure Pitch pRTI \(on page 175\)](#).

### 6.1.6.1 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 \(on the next page\)](#)
- [VBS \(on page 153\)](#)
- [Fuzzy Mapping \(on page 156\)](#)
- [Dead Reckoning - Outgoing \(on page 157\)](#)
- [Dead Reckoning - Incoming \(on page 160\)](#)

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

### 6.1.6.1.1 Logging

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

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"> <li>• No logging (default)</li> <li>• Log to file</li> </ul> <p>Additional logging options are available in the <a href="#">Gateway_Settings.xml</a> file. See Log Files in the VBS Gateway Manual.</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 style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">• Critical</td> <td style="width: 50%;">• Information</td> </tr> <tr> <td>• Error</td> <td>• Debug</td> </tr> <tr> <td>• Warning</td> <td></td> </tr> </table>	• Critical	• Information	• Error	• Debug	• Warning	
• Critical	• Information						
• Error	• Debug						
• Warning							

### 6.1.6.1.2 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>

### 6.1.6.1.3 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"><li>• <b>Editor Object</b> - 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 <a href="#">Configure Gateway Geofiltering (on page 170)</a>.</li></ul> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"><b>NOTE</b><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"><li>• <b>Geo</b> - Geofiltering, where incoming entities further from the defined geofiltering coordinates than the defined radius are ignored.</li><li>• <b>Dynamic</b> - Incoming entities are ignored, based on their proximity to any players, using a predefined radius around each player. The geofiltering coordinates do not apply.</li></ul>
Center X	<p><b>Geo only:</b> 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><b>Geo only:</b> 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>

#### 6.1.6.1.4 VBS

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

VBS Settings	Description
Remote Ground Clamping	Select to disable ground clamping for remote entities.
Disabled	Deselecting this does not force-enable ground clamping, as certain entity types (air units) as well as the LVAlignToGround setting still globally affect ground clamping on VBS4 units.

VBS Settings	Description
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.
	<p> <b>NOTE</b></p> <p>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.</p>
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.
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.
	<p> <b>WARNING</b></p> <p>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>

VBS Settings	Description
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> <b>WARNING</b> 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 in the VBS Gateway Manual 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.
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> <b>NOTE</b> To configure which vehicle parts can be transmitted, see <a href="#">Configure Transmittable Vehicle Animations (on page 186)</a>.</p></div> <div style="border: 2px solid red; padding: 10px;"><p> <b>WARNING</b> 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><b>NOTE</b> To configure which vehicle parts can be transmitted, see <a href="#">Configure Transmittable Vehicle Animations (on page 186)</a>.</p> <p><b>WARNING</b> Some complex entity animations are not transmitted over VBS Gateway and are not visible on other computers in the scenario.</p>

#### 6.1.6.1.5 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 in the VBS Gateway Manual.

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.

### 6.1.6.1.6 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 <a href="#">Dead-Reckoning Algorithms (on page 159)</a> .
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"><li>• This value</li><li>• Its bounding box dimensions multiplied by its relative position threshold (whichever is smaller).</li></ul> <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"><li>• This value (times the entity's bounding box)</li><li>• The absolute position threshold</li></ul> <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 <b>PositionSendThreshold</b> or <b>RotationSendThreshold</b> are exceeded.

### 6.1.6.1.6.1 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.

### 6.1.6.1.7 Dead Reckoning - Incoming

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

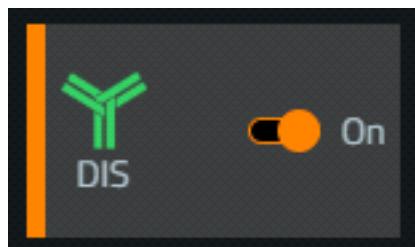
 **NOTE**

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.

### 6.1.6.2 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 \(on page 163\)](#)
- [Units Settings \(on page 163\)](#)
- [Debug Settings \(on page 164\)](#)
- [Connection Settings \(on page 164\)](#)

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 in the VBS Gateway Manual](#).

### 6.1.6.2.1 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 <b>auto</b> to generate an unused application ID.

### 6.1.6.2.2 ID Filtering Settings

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

General Settings	Description
Exercise ID	<p>Defines the exercise ID. VBS Gateway ignores DIS traffic that uses a different exercise ID.</p>
Filtering Type	<p>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.</p> <p>Can be:</p> <ul style="list-style-type: none"> <li>• None</li> <li>• Whitelist</li> <li>• Blacklist</li> </ul> <p>To add an application ID to the whitelist / blacklist, click <b>Add Application ID</b>, then enter the <b>Application ID</b> and <b>Alias</b>, and click <b>OK</b>.</p> <p>To delete an application ID from the whitelist / blacklist, click the <b>Trash icon</b> in the application ID row.</p> 

### 6.1.6.2.3 Units Settings

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

Units Settings	Description
Vertical Offset	<p>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.</p> <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"> <p><b>NOTE</b></p> <p>In order for this feature to be used, ground clamping must be disabled by selecting the Remote Ground Clamping Disabled option in <a href="#">Configure VBS Gateway (on page 150)</a>.</p> </div>
Delete Timeout	Maximum time interval (in seconds) between remote updates before an incoming entity is deleted in the local instance.

#### 6.1.6.2.4 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.

#### 6.1.6.2.5 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;"> <b>WARNING</b> 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 <a href="#">Configure DIS (on page 137)</a>.</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"> <li>• 0 is restricted to the same host.</li> <li>• 1 is restricted to the same subnet.</li> <li>• 32 is restricted to the same site.</li> <li>• 64 is restricted to the same region.</li> <li>• 128 is restricted to the same continent.</li> <li>• 255 is unrestricted.</li> </ul> <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"> <p><b>NOTE</b></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"> <li>• <b>Publish</b> 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.</li> <li>• <b>Subscribe</b> When selected, incoming packets for this entity type are handled as normal. When not selected, incoming packets for this entity type are ignored.</li> </ul> <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><b>NOTE</b></p> <p>Deselecting <b>Physical Entity</b> deselects all entity types except <b>Designator</b>, but this change is not reflected in the UI.</p> <p>Deselecting <b>Platform</b> 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 <b>Platform</b>. 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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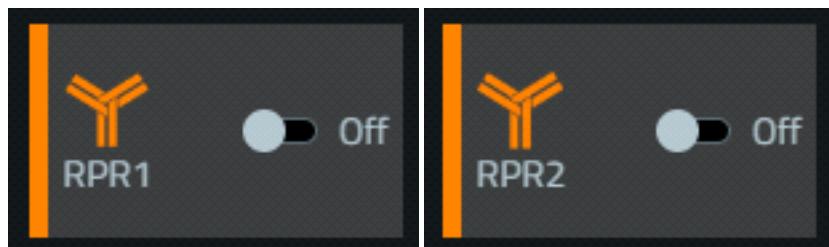
Connection Settings	Description
Interaction Filtering	Sets whether or not specific interaction types are broadcast and handled by this adapter. <ul style="list-style-type: none"><li>• <b>Publish:</b> When selected, interactions of this type are broadcast to other instances on the network. When not selected, packets for this interaction type are not broadcast.</li><li>• <b>Subscribe:</b> When selected, incoming packets for this interaction type are handled as normal. When not selected, incoming packets for this interaction type are ignored.</li></ul>

 **NOTE**

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

### 6.1.6.3 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 \(on page 169\)](#)

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 in the VBS Gateway Manual](#).

### 6.1.6.3.1 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"> <li>• None</li> <li>• Whitelist</li> <li>• Blacklist</li> </ul> To add an application ID to the whitelist / blacklist, click <b>Add Application ID</b> , then enter the <b>Application ID</b> and <b>Alias</b> , and click <b>OK</b> . To delete an application ID from the whitelist / blacklist, click the <b>Trash icon</b> in the application ID row.



### 6.1.6.3.2 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.

### 6.1.6.3.3 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 <b>auto</b> 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"> <li><b>Publish:</b> 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.</li> <li><b>Subscribe:</b> When selected, incoming packets for this entity type are handled as normal. When not selected, incoming packets for this entity type are ignored.</li> </ul>
<b>NOTE</b> Deselecting <b>Physical Entity</b> deselects all entity types except <b>Designator</b> , but this change is not reflected in the UI. Deselecting <b>Platform</b> 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 <b>Platform</b> . 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"> <li><b>Publish:</b> 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.</li> <li><b>Subscribe:</b> When selected, incoming packets for this interaction type are handled as normal. When not selected, incoming packets for this interaction type are ignored.</li> </ul>
<b>NOTE</b> Most weapons generate a PDU for both <b>WeaponFire</b> and <b>MunitionDetonation</b> .	

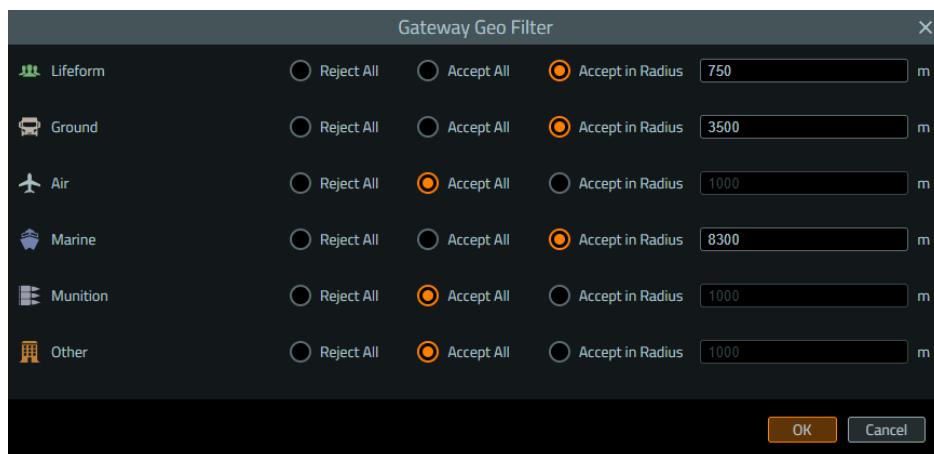
#### 6.1.6.4 Configure Gateway Geofiltering

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 \(on page 151\)](#).
- **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 \(on page 140\)](#). 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.

#### 6.1.6.4.1 Range Visualizations

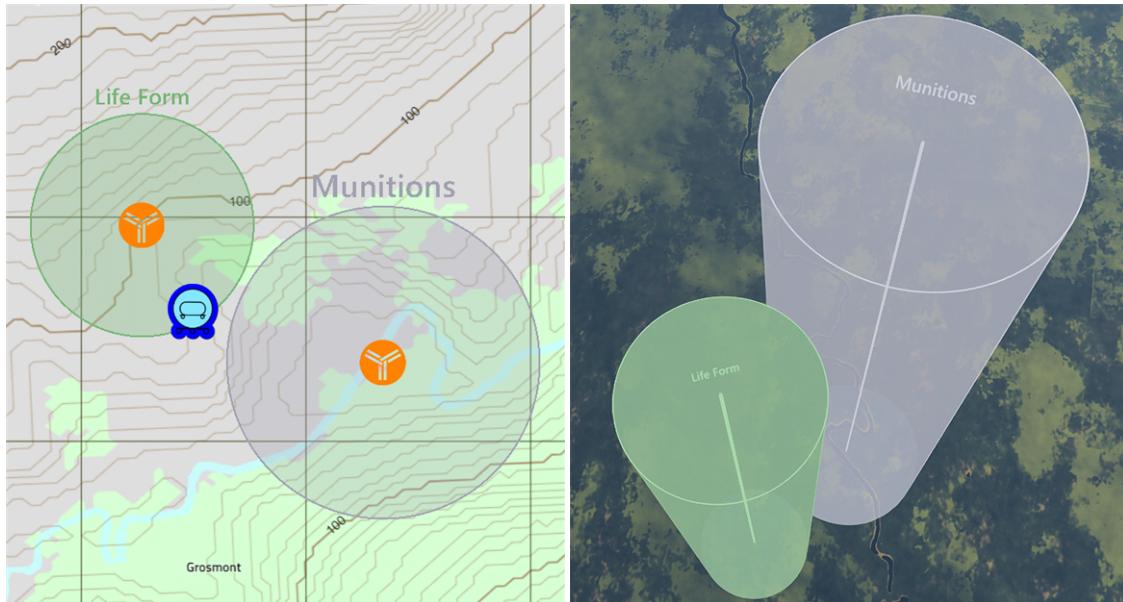
In VBS4, the radius of a VBS Gateway Geo Filter can be displayed as a range visualization.

##### 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-24: 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).

## 6.1.6.5 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.

#### 6.1.6.5.1 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`

 **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.

### 6.1.6.6 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.

#### 6.1.6.6.1 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 \(on page 168\)](#) in VBS Gateway on each computer you want to connect to the federation

Pitch pRTI is ready to use with VBS Gateway.

## 6.1.7 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.

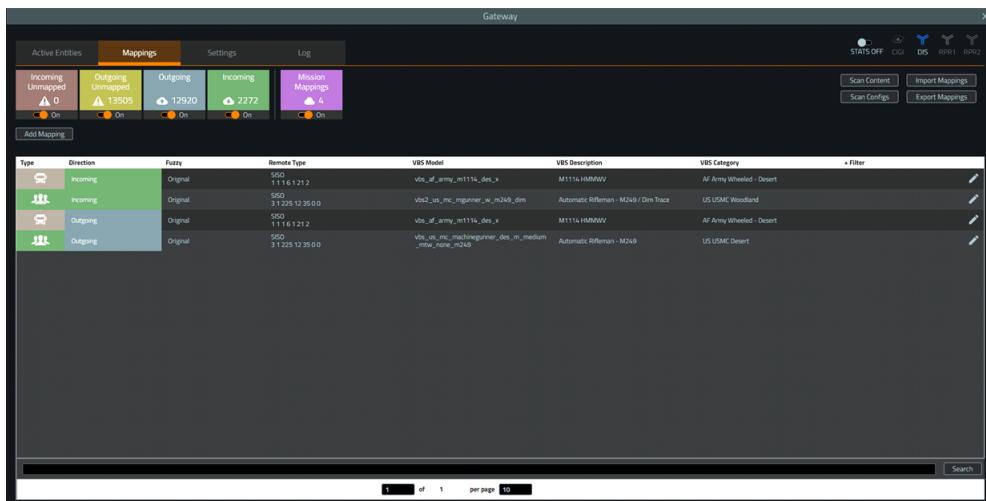
### **i** NOTE

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.
2. Open the VBS Gateway UI and select the **Mappings** tab.

In the [Mappings Page \(on page 142\)](#), 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 \(on page 180\)](#)

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

- See [Edit Incoming Entities \(on page 183\)](#) and [Add Entity Mappings \(on page 181\)](#)

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

- See [Edit Outgoing Entities \(on page 184\)](#) and [Add Entity Mappings \(on page 181\)](#)

Configure vehicle animations to transmit over HLA / DIS.

- See [Configure Transmittable Vehicle Animations \(on page 186\)](#).

## 6.1.7.1 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 \(on page 142\)](#).
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.

### 6.1.7.1.1 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.

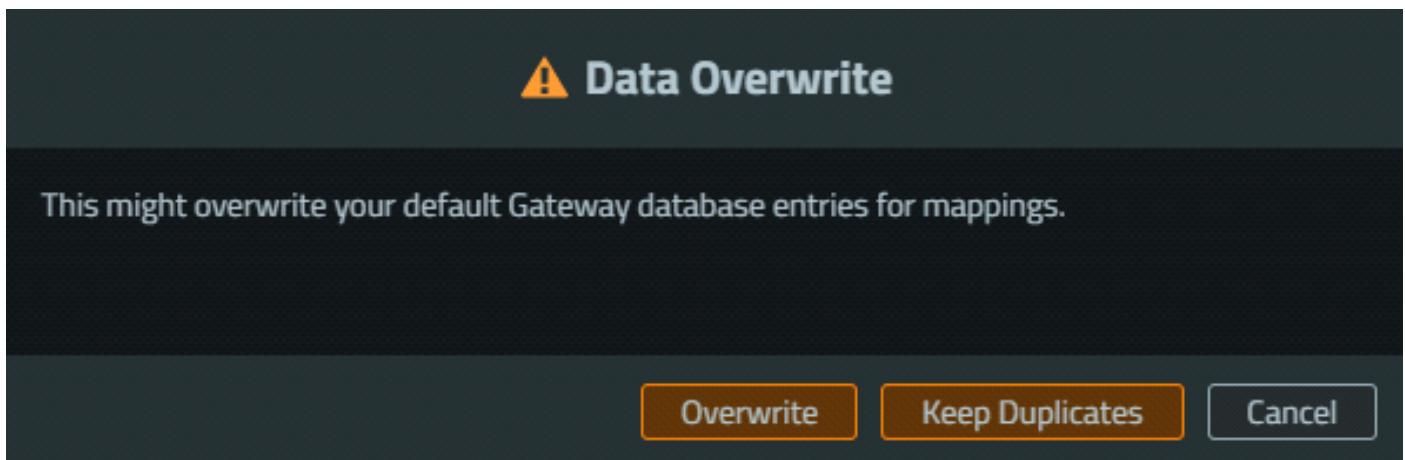
#### Scan Configs

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.

### 6.1.7.2 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 \(on page 142\)](#).
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\**

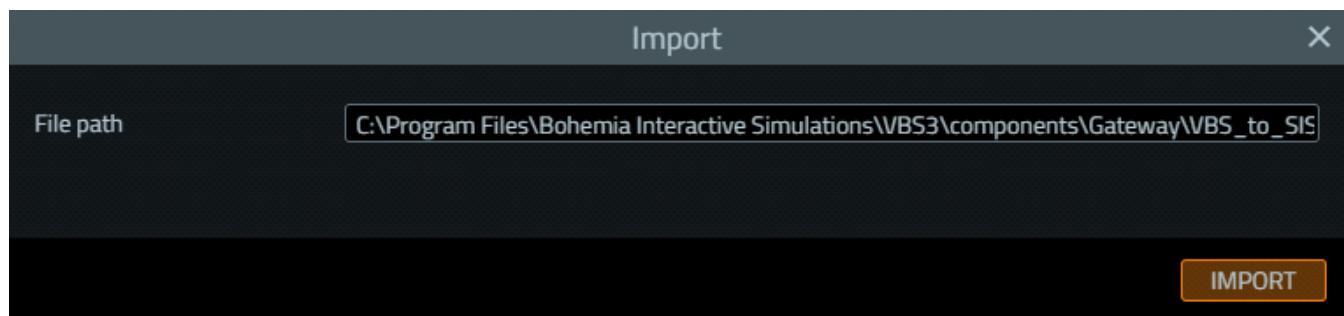
Use the exported file to transfer mappings to another instance of VBS Gateway with the Import function.

#### To Import Mapping Files:

1. Save your exported files to your hard drive.
2. Open the [Mappings Page \(on page 142\)](#).
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.

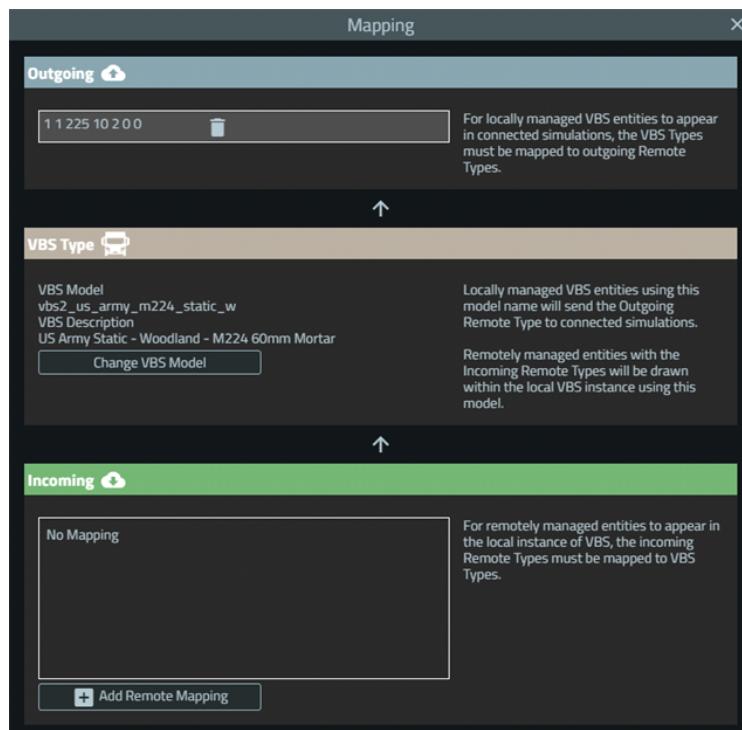
### 6.1.7.3 Add Entity Mappings

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 \(on page 142\)](#).
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.

### 6.1.7.4 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 \(on page 142\)](#) 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 \(on page 143\)](#) 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.

### 6.1.7.5 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 \(on page 142\)](#) 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 \(on page 143\)](#) 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.

### 6.1.7.6 Delete Entity Mappings

Mappings can be deleted from the Mappings page.

**Follow these steps:**

1. Open the [Mappings Page \(on page 142\)](#)
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

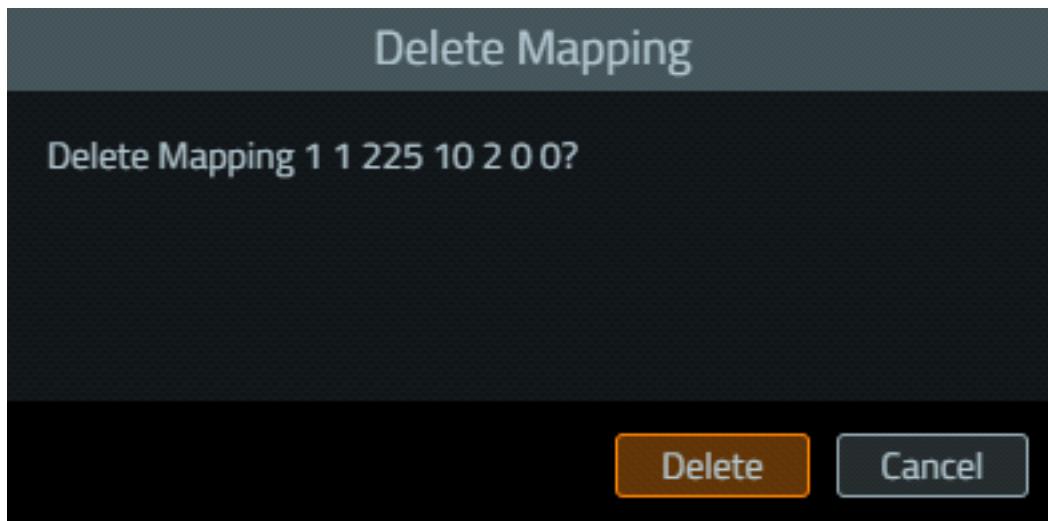


The [Mapping Dialog \(on page 143\)](#) opens.

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.

### 6.1.7.7 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 \(on page 151\)](#).



#### 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
<code>Model</code> String (Optional)	<p>Class name of the vehicle model.</p> <p><b>NOTE</b> If the parameter is left unspecified, the animations that are defined in the <code>Vehicle</code> parameter scope apply to all vehicles. All the scenario vehicles of the defined class transmit the defined animations.</p>
<code>SourceName</code> String (Required)	<p>Animation-source name.</p> <p><b>TIP</b> You can get the list of available vehicle animations by using the <code>getAnimations</code> (<a href="https://sqf.bisimulations.com/display/SQF/getAnimations">https://sqf.bisimulations.com/display/SQF/getAnimations</a>) SQF command, and then get the animation-source names by using the <code>getAnimInfo</code> (<a href="https://sqf.bisimulations.com/display/SQF/getAnimInfo">https://sqf.bisimulations.com/display/SQF/getAnimInfo</a>) SQF command.</p>
<code>TypeClass</code> Integer (Required)	<p>Articulated part type class, which identifies the mapped animation.</p> <p><b>NOTE</b> 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 in the VBS4 Administrator Manual).</p>
<code>TypeMetric</code> Integer (Required)	<p>Articulated part type metric.</p> <p><b>NOTE</b> 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 in the VBS4 Administrator Manual).</p>

XML Parameters	Description
<b>ExternalInterval</b> Struct <b>(Optional)</b>	<p>Controls the animation phases:</p> <ul style="list-style-type: none"> <li>• <b>MinValue</b> (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</li> <li>• <b>MaxValue</b> (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</li> </ul>

### **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>
```

## 6.1.8 Mapping Tables

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

The screenshot shows the 'Mappings' tab in the VBS Gateway interface. At the top, there are four status indicators: 'Incoming Unmapped' (0), 'Outgoing Unmapped' (13505), 'Outgoing' (12920), and 'Incoming' (2272). Below these are buttons for 'Mission Mappings' (4) and 'Add Mapping'. On the right, there are buttons for 'Scan Content', 'Import Mappings', 'Scan Configs', and 'Export Mappings'. The main area is a table with columns: Type, Direction, Fuzzy, RemoteType, VBS Model, VBS Description, VBS Category, and a 'Filter' button. The table contains four rows of data:

Type	Direction	Fuzzy	RemoteType	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 5 0 0	vbs2_us_mc_mgunner_w_m249_drm	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 5 0 0	vbs_us_mc_machinegunner_des_m_medium _rtw_none_m249	Automatic Rifleman - M249	US USMC Desert	

At the bottom, there are pagination controls (1 of 1 per page 10) and a search bar.

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

The dialog has two tabs: 'Outgoing' and 'Incoming'. The 'Outgoing' tab is active, showing a list of mappings for 'vbs2\_us\_army\_m224\_static\_w'. It includes fields for 'VBS Model' (vbs2\_us\_army\_m224\_static\_w), 'VBS Description' (US Army Static - Woodland - M224 60mm Mortar), and a 'Change VBS Model' button. A note states: 'For locally managed VBS entities to appear in connected simulations, the VBS Types must be mapped to outgoing Remote Types.' The 'Incoming' tab shows a note: 'For remotely managed entities to appear in the local instance of VBS, the incoming Remote Types must be mapped to VBS Types.' A 'Add Remote Mapping' button is at the bottom.

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 \(on page 177\)](#).

VBS Gateway enables the transfer of mapping tables between VBS Gateway instances. For more information, see [Export / Import Mapping Files \(on page 180\)](#).

VBS Gateway uses SISO-compliant enumerations by default. Import VBS to VBS version mappings if required. For more information, see [Export / Import Mapping Files \(on page 180\)](#).

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.

### 6.1.8.1 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 \(on page 152\)](#) part of the General Settings section of the [VBS Gateway UI \(on page 139\)](#). 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 \(on page 142\)](#).

Munitions may also be mapped from the [Entity Details Dialog \(on page 194\)](#). The Munitions Mapping tab displays the munitions equipped by the unit.

Click the **Edit** icon to open the [Mapping Dialog \(on page 143\)](#) 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 \(on page 151\)](#)), 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.

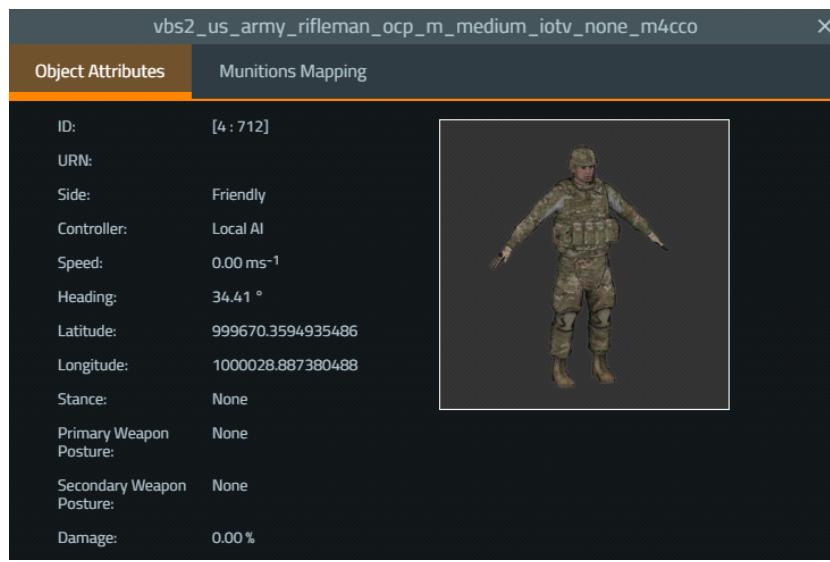
Munitions that detonate into smaller munitions, such as flechette rounds, are displayed normally. However, subsequent munitions spawned from the original are displayed as local, even if the parent is remote.

## 6.1.9 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 \(on page 196\)](#)



### 6.1.9.1 Object Attributes

The Object Attributes panel provides the following information:

Object Attribute	Type	Description
<b>Heading</b>	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. <b>Example:</b> DIS_1_152_303_17
<b>ID</b>	Both	Indicates the application that is generating the entity and an identifying enumeration for the entity.
<b>URN</b>	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.
<b>Side</b>	Both	The side the entity belongs to.
<b>Controller</b>	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.
<b>Manned</b>	Vehicle	Shows current number of personnel aboard and maximum personnel capacity.
<b>Speed</b>	Both	The current speed of the entity in meters per second.
<b>Heading</b>	Both	The current direction of the entity.
<b>Latitude / Longitude</b>	Both	The current coordinates of entity. The units used are internal to VBS4.
<b>Stance</b>	Unit	Indicates the stance the entity is currently in.
<b>Primary / Secondary Weapon Posture</b>	Unit	Indicates if the weapon is deployed, raised, or stowed.
<b>Damage</b>	Both	The percentage of maximum damage the entity has taken.
<b>Powered</b>	Vehicle	Indicates whether the entity has power.
<b>Mobility Kill</b>	Vehicle	Indicates whether the entity is immobilized.
<b>Firepower Kill</b>	Vehicle	Indicates whether the entity weapons are disabled.
<b>Catastrophic Kill</b>	Vehicle	Indicates whether the entity is completely destroyed.
<b>Smoking</b>	Vehicle	Indicates whether entity damage is causing smoke.
<b>Flaming</b>	Vehicle	Indicates whether entity damage is causing fire.

### 6.1.9.2 Munitions Mapping

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

Name	Category	Description	+ Filter
vbs2_ammo_g_m67_frag	Munition	m67 Frag	
vbs2_ammo_b_556x45_ball	Munition	5.56x45mm	

Search    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 \(on page 143\)](#) for the munition.



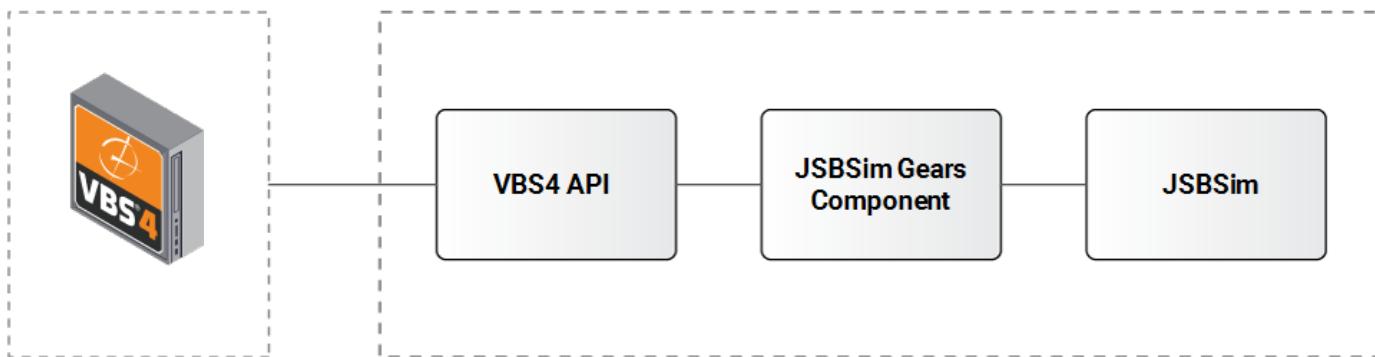
## 6.2 JSBSim Flight Model

JSBSim is an open-source, platform-independent flight dynamics model. It uses aircraft configuration files containing data about the physical details of the aircraft, its engine(s), and other systems (such as electronics) to model flight physics with a high level of fidelity. A JSBSim-linked aircraft can be connected to VBS4.

The communication between a JSBSim-linked aircraft and VBS4 has the following aspects:

- VBS4 uses the VBS API to directly communicate with the JSBSim Gears component.
- The JSBSim Gears component serves as a JSBSim translator, which makes the flight data usable by JSBSim.
- JSBSim uses the information contained in the configuration file and atmospheric conditions to calculate how the aircraft responds to input.
- The output data created by JSBSim is passed to VBS4, which updates the position and state of the aircraft. This process repeats while the aircraft is piloted by a user.

**Image-25: VBS4 and JSBSim communication**



**NOTE**

The JSBSim version delivered with VBS4 24.1.1 is cb4323d5ee1154aa84fb6d31e6a7981f8e890233, date 2017-06-04. You can use new / other versions at your own risk (for example, it may not be possible to apply the [changes.diff](#) patch - see [Custom Version of JSBSim \(on page 211\)](#)).

This section has the following topics:

- [Enabling and Configuration \(on the next page\)](#)
- [Aircraft Controls \(on page 199\)](#)
- [Model Animations \(on page 202\)](#)
- [Logging \(on page 203\)](#)
- [Additional SQF Commands \(on page 206\)](#)
- [Custom Atmosphere \(on page 208\)](#)
- [Custom Version of JSBSim \(on page 211\)](#)
- [JSBSim Simulation Model Notes \(on page 212\)](#)
- [JSBSim API \(on page 213\)](#)

## 6.2.1 Enabling and Configuration

To enable JSBSim, you require a JSBSim-linked aircraft with a JSBSim XML configuration file.

**Follow these steps:**

1. Open VBS Editor.
2. Place an aircraft on the map.
3. In the aircraft **Object Properties** dialog, click **Advanced**.
4. In **JSBSim Flight Model**, select the wanted JSBSim configuration file.

The aircraft is now linked to JSBSim.

Alternatively, you can use the following SQF command, to enable JSBSim:

```
aircraft setObjectSimulation ["Partial", "JSBSim", "config_file"]
```

- **aircraft** - The aircraft object name.
- **config\_file** - The XML configuration file name.

### 6.2.1.1 Aircraft Configuration Files

VBS4 comes with the following JSBSim aircraft configurations:

- Rafale C (based on the F-16, provided with JSBSim).



#### NOTE

This aircraft model is an example and is not intended to be accurate.

The aircraft configuration files need to be placed in the following folders:

**\VBS\_Installation\Components\JSBSim\**

- **\aircraft\** - Contains the XML configuration files defining the flight models for each aircraft.
- **\engine\** - Contains the XML configuration files defining the engine speed simulation.
- **\scripts\** - Contains the XML configuration files defining event-based actions (for example, auto trim).
- **\systems\** - Contains the XML configuration files defining advanced functionality, such as autopilot.

Any aircraft configuration files added to these folders appears in the **Advanced** settings of the aircraft Editor Object.

For information on creating aircraft configuration files, see chapter 3 (**Authoring Configuration Files**) of the [JSBSim Reference Manual](http://jsbsim.sourceforge.net/JSBSimReferenceManual.pdf) (<http://jsbsim.sourceforge.net/JSBSimReferenceManual.pdf>).

## 6.2.2 Aircraft Controls

To use a JSBSim-linked aircraft in VBS4, you need to configure several types of controls:

- [Flight Controls \(below\)](#)
- [Engine Controls \(below\)](#)
- [Trim Controls \(below\)](#)
- [Brake Controls \(on the next page\)](#)

### 6.2.2.1 Flight Controls

A JSBSim-linked aircraft uses the standard Fixed Wing Aircraft Controls (see Fixed Wing Aircraft Controls in the VBS4 Trainee Manual), with the following exceptions:

- Engines can be turned on / off.
- Parking brake and wheel brakes.
- Trim surfaces are controllable.
- Flaps are analog.
- Speedbrake and spoilers (no animation) are controllable.

### 6.2.2.2 Engine Controls

The on / off toggle for fixed-wing aircraft engines is not bound to the keyboard by default in VBS4.

**To bind the engine toggle, follow these steps:**

1. In the VBS4 Tool Bar, click the **Settings Icon**.
2. Click the **CONTROLS** tab.
3. Select **User Defined 20** and press a key of your choice.

The key bound to this control toggles the aircraft engine on / off, when piloting a JSBSim-linked aircraft.

### 6.2.2.3 Trim Controls

Trim can be adjusted for elevator, aileron, and rudder trim control surfaces. Trim values are set to 0 by default, and can be manually adjusted, if mapped to an analog controller.

These controls are not bound by default.

**To bind the trim controls, follow these steps:**

1. In the VBS4 Tool Bar, click the **Settings Icon**.
2. Click the **CONTROLS** tab.

3. Trim controls (elevator, aileron, and rudder) must be configured for an analog controller.

Select the following controls from the list for each trim control, and press a key to bind to:

Control	Description
User Defined 13	Increase elevator trim.
User Defined 14	Decrease elevator trim.
User Defined 15	Increase aileron trim.
User Defined 16	Decrease aileron trim.
User Defined 17	Increase rudder trim.
User Defined 18	Decrease rudder trim.

These controls adjust trim control surfaces, when piloting a JSBSim-linked aircraft.

#### 6.2.2.4 Brake Controls

The wheel brakes and parking brake are not bound to the keyboard by default for fixed-wing aircraft in VBS4.

**To bind the parking brake and wheel brakes, follow these steps:**

1. In the VBS4 Tool Bar, click the **Settings Icon**.
2. Click the **CONTROLS** tab.
3. Select **Helicopter controls** from the **CONFIGURE CONTROLS** drop-down list.
4. Select **Helicopter Wheel Brakes On / Off** and press a key of your choice.

This key functions as the parking brake. Press it to disengage the parking brake upon entry to the aircraft.

5. Select **Helicopter Wheel Brake** and press a key of your choice.

This key functions as the wheel brake for the aircraft. Hold it to stop / slow the aircraft, while on the ground.

In addition, you can bind the speedbrake and spoiler controls (they are not bound by default in VBS4).

**Follow these steps:**

1. In the VBS4 Main Menu, select **OPTIONS**.
2. Select **CONTROLS**.

3. Select the following controls, and press a key of your choice for each:

Control	Description
<b>User Defined 12</b>	Spoilers.
<b>User Defined 19</b>	Speedbrake.

The JSBSim-linked aircraft can brake.

## 6.2.3 Model Animations

JSBSim supports the following aircraft model animations:

### Exterior Animations:

- Gear
- Front Wheel
- Rudder
- Flaps
- Elevators
- Ailerons
- Spoilers (not available in VBS4 aircraft, can be created for a custom aircraft, imported into VBS4)
- Speedbrakes
- Engine Nozzle
- Afterburner

### Cockpit Animations:

- RPM
- Altimeter
- Artificial Horizon
- Heading

## 6.2.4 Logging

You can log the flight data in a log file. There are two types of logging available:

- JSBSim Logging (below)
- VBS Logging (on page 205)

### 6.2.4.1 JSBSim Logging

JSBSim can log flight data for linked aircraft. JSBSim provides data groups that can be added to the output, and turned on / off in log files, to simplify the logging setup process. Any of the individual properties from the aircraft configuration file can be added to the log output as well.

JSBSim can output data in a variety of ways, but this guide covers logging data in a file on the computer running JSBSim, by adding an output section to the aircraft configuration file. For more information, see chapter 3.1.11 (Output) in the [JSBSim Reference Manual](http://jsbsim.sourceforge.net/JSBSimReferenceManual.pdf) (<http://jsbsim.sourceforge.net/JSBSimReferenceManual.pdf>).

You can enable JSBSim logging in the following ways:

- A global configuration XML file.
- An aircraft configuration XML file.

The global configuration XML file is called `JSBSimOutput.xml`, and should be placed in:

`\data_folder\Components\JSBSim\`, in the JSBSim root folder.

If `JSBSimOutput.xml` is not present or it is malformed, the JSBSim Gears component for VBS4 outputs a warning and does not initialize global logging.

When using an aircraft configuration XML, add an XML tag called `<output>` to the XML file. This way, every logging setting is used just for that particular aircraft, and does not affect other aircraft.

Both `JSBSimOutput.xml` and the `<output>` XML tag can be used simultaneously, so that one can, for instance, log general data using the global XML file, and log aircraft-specific data using the aircraft configuration XML file.

#### Follow these steps:

1. Open `JSBSimOutput.xml` or the aircraft configuration XML file.
2. Start the output section with a line containing:

```
<output name="log file name" type="CSV" rate="logging rate, in Hz">
```



#### EXAMPLE

```
<output name="rafale_datalog.csv" type="CSV" rate="1">
```

3. Add a line for each data group you want to log, and set it to on

For the complete list of data groups, see page 60 of the [JSBSim Reference Manual](http://jsbsim.sourceforge.net/JSBSimReferenceManual.pdf) (<http://jsbsim.sourceforge.net/JSBSimReferenceManual.pdf>).



### EXAMPLE

```
<position> ON </position>
```

4. Add a line for each property you want to log.



### EXAMPLE

```
<property> flight-path/gamma-rad </property>
```

5. End the output section with: `</output>`

6. Save the configuration XML file.

When this configuration XML file is linked to an aircraft used in a VBS4 mission, the specified data is logged in the specified log file. The log file is located in the VBS4 installation folder.

### Example Output Section:

```
<output name="rafale_datalog.csv" type="CSV" rate="1">
  <rates> ON </rates>
  <velocities> ON </velocities>
  <forces> ON </forces>
  <moments> ON </moments>
  <position> ON </position>
  <fcs> ON </fcs>
  <propulsion> OFF </propulsion>
  <aerosurfaces> ON </aerosurfaces>
  <fcs> ON </fcs>
  <ground_reactions> ON </ground_reactions>
  <property> aero/qbar-psf </property>
  <property> attitude/phi-rad </property>
  <property> position/h-s1-ft </property>
  <property> velocities/vc-kts </property>
  <property> fcs/throttle-cmd-norm </property>
  <property> fcs/elevator-cmd-norm </property>
  <property> fcs/pitch-trim-cmd-norm </property>
  <property> propulsion/total-fuel-lbs </property>
  <property> flight-path/gamma-rad </property>
  <property> accelerations/n-pilot-z-norm </property>
</output>
```

### 6.2.4.2 VBS Logging

The JSBSim Gears component for VBS4 provides an additional logging system, using the **componentFunction** SQF command, to turn logging on / off:

- Turn on and log into the specified log file:

```
componentFunction ["JSBSim", "Logging [log_file_name.csv]"]
```

- Turn off:

```
componentFunction ["JSBSim", "Logging []"]
```

The data is logged into a CSV file, where the columns are:

- First column - Day time in VBS4.
- Second column - Current Windows time.
- Third column - Mission time (since the mission started).
- Other columns - Input values set to JSBSim, and all received values from JSBSim used by VBS4.

## 6.2.5 Additional SQF Commands

The following additional SQF commands can be used with the `componentFunction` SQF command:

SQF Command	Description
<code>GetProperty</code>	Returns the given property as a string, if JSBSim is active. If JSBSim is not active, " <code>"ERROR"</code> " is returned.
	<div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <b>EXAMPLE</b><pre>_ret = componentFunction ["JSBSim", "GetProperty [fcs/pitch-trim-cmd-norm]"]</pre></div>
<code>SetProperty</code>	Sets the given property, if JSBSim is active.
	<div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <b>EXAMPLE</b><pre>_ret = componentFunction ["JSBSim", "SetProperty [fcs/pitch-trim-cmd-norm, 0.6]"]</pre></div>
<code>IsJSBSimUsed</code>	Returns true when the JSBSim model is used, false otherwise.
	<div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <b>EXAMPLE</b><pre>_ret = componentFunction ["JSBSim", "IsJSBSimUsed []"]</pre></div>
<code>SetDisplayLogging</code>	Enables the verbose mode for JSBSim. <ul style="list-style-type: none"><li>Simulation values (such as speed, velocity, and so on) are displayed in the <code>hint</code> window, and are updated each frame.</li><li>JSBSim status messages are displayed in the <code>chat</code> window.</li><li>Default value is false.</li></ul>
	<div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <b>EXAMPLE</b><pre>_ret = componentFunction ["JSBSim", "SetDisplayLogging [true]"]</pre></div>

## SQF Command Description

### RunScript

Executes a JSBSim script. This script must be inside the `<JSBSim Component>/scripts` folder. JSBSim outputs a warning, if something goes wrong during the script execution.



#### NOTE

Due to a JSBSim limitation, only one script per simulation can be executed. You can reload the same script (or a different one) only after the mission ends; or after disabling the JSBSim simulation, and then re-enabling it again.



#### EXAMPLE

```
componentFunction["JSBSim","RunScript  
[sampleAtmosphere.xml]"]
```

Native property names for JSBSim can be found in the [JSBSim Reference Manual](http://jsbsim.sourceforge.net/JSBSimReferenceManual.pdf) (<http://jsbsim.sourceforge.net/JSBSimReferenceManual.pdf>). In addition to native property names, custom properties that are defined inside a flight model configuration file can also be referenced by these script calls.

## 6.2.6 Custom Atmosphere

JSBSim can run scripts (in XML format). Commands are specified using the Scripting Directives for JSBSim.

A script XML file can have a test condition (or conditions), which can be set up using events. When the condition evaluates to true, the specified actions are taken. An event can be persistent, which means that at all times, when the test condition evaluates to true, the specified set actions take place. When the set of tests evaluates to true for a given condition, an item may be set to another value.

It is possible to create a custom atmosphere using scripts, by overriding three JSBSim properties:

- Temperature (atmosphere / override / temperature).
- Pressure (atmosphere / override / pressure).
- Density (atmosphere / override / density).

Other atmospheric parameters, such as speed of sound and viscosity, are automatically calculated by JSBSim using the following formulas:

$$V = SHR * R * T$$

Where:

- $V$  - Speed of sound
- $SHR$  - Sensible Heat Ratio
- $R$  - Gas constant, equals to 1716.56
- $T$  - Temperature (in Rankine)

$$Vis = (B * T^{1.5}) / (S + T)$$

Where:

- $Vis$  - Viscosity
- $B$  - Equals to 2.269690E-08
- $T$  - Temperature (in Rankine)
- $S$  - Equals to 198.72 (in Rankine)

Here is an example of a script file that configures a custom atmosphere:

```
<?xml version="1.0" encoding="UTF-8"?>
<?xml-stylesheet type="text/xsl" href="http://jsbsim.sf.net/JSBSimScript.xsl"?>
<runcscript xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:noNamespaceSchemaLocation="http://jsbsim.sf.net/JSBSimScript.xsd"
  name="custom atmosphere">
  <description>This is a sample custom atmosphere</description>
```

```
<run start="0.0" end="1.79769e+308" dt="0.01">
    <!--Properties to override-->
    <property>atmosphere/override/temperature</property>
    <property>atmosphere/override/pressure</property>
    <property>atmosphere/override/density</property>
    <!--Events that define the atmosphere model-->
    <event name="Sample Atmosphere - override temperature"
        persistent="true" continuous="true">
        <condition>simulation/sim-time-sec ge 0.0</condition>
        <set name="atmosphere/override/temperature">
            <function name="atmosphere/override/temperature-function">
                <sum>
                    <table>
                        <independentVar>position/h-sl-meters</independentVar>
                        <!--Temperatures in Rankine ( -459,67 °F = 0 °R = -273,15 °C )-->
                        <tableData>
                            0.0 518.67
                            500.0 512.82
                            1000.0 506.97
                            1500.0 501.12
                            2000.0 495.27
                            2500.0 489.42
                            3000.0 483.57
                        </tableData>
                    </table>
                </sum>
            </function>
        </set>
    </event>
    <event name="Sample Atmosphere - override pressure"
        persistent="true" continuous="true">
        <condition>simulation/sim-time-sec ge 0.0</condition>
        <set name="atmosphere/override/pressure">
            <function name="atmosphere/override/pressure-function">
                <sum>
                    <table>
                        <independentVar>position/h-sl-meters</independentVar>
                        <!--Pressures are expressed in psf-->
                        <tableData>
                            0.0 2116.22
                            500.0 1993.74
                            1000.0 1877.07
                            1500.0 1765.99
                            2000.0 1660.29
                            2500.0 1559.78
                            3000.0 1464.25
                        </tableData>
                    </table>
                </sum>
            </function>
        </set>
    </event>
```

```
</table>
</sum>
</function>
</set>
</event>
<event name="Sample Atmosphere - override density" persistent="true"
continuous="true">
<condition>simulation/sim-time-sec ge 0.0</condition>
<set name="atmosphere/override/density">
<function name="atmosphere/override/density-function">
<sum>
<table>
<independentVar>position/h-sl-meters</independentVar>
<!--Densities are expressed in slugs/ft^3--&gt;
&lt;tableData&gt;
  0.0  0.0023768924
  500.0  0.002264877704
  1000.0  0.002156937685
  1500.0  0.00205300151595
  2000.0  0.001952913003
  2500.0  0.0018566129645
  3000.0  0.0017639878933
&lt;/tableData&gt;
&lt;/table&gt;
&lt;/sum&gt;
&lt;/function&gt;
&lt;/set&gt;
&lt;/event&gt;
&lt;/run&gt;
&lt;/runscript&gt;</pre>
```

The altitude (first column in `tableData` section) can be expressed by using different JSBSim properties:

- Position / h-sl-meters (above sea level, in meters)
- Position / h-sl-ft (above sea level, in feet)
- Position / h-agl-ft (above ground level, in feet)
- Position / h-agl-km (above ground level, in kilometers)

The `start`, `end`, and `dt` attributes of the `<run>` tag are all mandatory - `start` and `dt` can be overwritten by VBS4, so the only important attribute here is `end`, which affects the script execution duration - the amount of seconds (after the mission start) the script is supposed to run. For example, if you set `end` to 10 seconds, and you run the script 5 seconds after the mission start, it runs for 5 seconds only. Set it to the highest value possible (1.79769e+308). Otherwise, the model runs only for a limited amount of time.

## 6.2.7 Custom Version of JSBSim

In order to use a custom version of the JSBSim library, it is necessary to apply certain changes first.

**Follow these steps:**

1. Navigate to <https://github.com/JSBSim-Team/jsbsim>.
2. Select **Clone or download > Download ZIP** to download the JSBSim sources.
3. Apply the `changes.diff` patch file in the following folder:

`\VBS_Installation\Components\JSBSim\`

Using a revision control system (for example, TortoiseGit).

The source code is updated, based on the code difference in `changes.diff`, and the custom JSBSim version becomes compatible with VBS4.

4. Apply any additional changes you want to the custom version of JSBSim.
5. Build the new `JSBSimFlightModel.dll` and place it in the following folder:

`\VBS_Installation\Components\JSBSim\`

 **NOTE**

It is recommended to back up the original `JSBSimFlightModel.dll`.

6. Optionally, if you build the new `JSBSimFlightModel.dll` with symbols (debug / release build, with debug information), you can debug the new `JSBSimFlightModel.dll` by attaching it to the VBS4 process, while it is running.

A custom version of JSBSim is created.

## 6.2.8 JSBSim Simulation Model Notes

This section contains general information on the JSBSim simulation model.

### Mass

The masses of aircraft weapons, ammunition, and the crew and their weapons and ammunition is automatically added to the JSBSim model aircraft - "`emptywt`" from the aircraft XML configuration file is automatically updated, it can be checked in-game using SQF:

```
componentFunction ["JSBSim", "GetProperty [inertia/empty-weight-lbs]"]
```

The masses of other objects in the inventory are not supported.

### Spoilers

JSBSim-linked aircraft support spoilers, even though there is currently no VBS4 aircraft with spoiler animations. This means that it is possible to control spoilers (given that the aircraft has them), but there is no visual feedback (no corresponding animation).

### Known Limitations

- Autoland User Action is available for JSBSim aircraft, but is not working.
- Fuel amount of JSBSim aircraft can only be changed by using the `componentFunction` SQF command, with `SetProperty`.

## 6.2.9 JSBSim API

This topic lists all the classes and relative methods of JSBSim used by the VBS4 JSBSim Component.

### 6.2.9.1 Class JSBSim::FGFCS

Class Method	Description
<code>GetDsbPos</code>	Returns the speedbrake in the range from 0 to 1.0. Used to control the speedbrake animation in VBS4.
<code>GetDspPos</code>	Returns the spoiler position. Used to control the spoiler animation in VBS4.
<code>GetGearPos</code>	Returns the gear position (0 up, 1 down). Used to control the landing gear animation in VBS4.
<code>SetGearCmd</code>	Sets the gear extend / retract command. Used to set the landing gear position in the JSBSim simulation.
<code>SetGearPos</code>	Sets the gear extend / retract position. Used to set the landing gear position in the JSBSim simulation.
<code>SetDfPos</code>	Sets the flaps position in radians. Used to set the flaps position in the JSBSim simulation.
<code>SetDfCmd</code>	Sets the flaps command in percentage. Used to set the flaps position in the JSBSim simulation.
<code>SetDeCmd</code>	Sets the elevator command in percentage. Used to set the elevator position in the JSBSim simulation.
<code>SetDrCmd</code>	Sets the rudder command in percentage. Used to set the rudder position in the JSBSim simulation.
<code>SetDaCmd</code>	Sets the aileron command. Used to set the aileron position in the JSBSim simulation.
<code>SetDsCmd</code>	Sets the steering command in percentage. Used to set the steering position in the JSBSim simulation.
<code>SetDsbCmd</code>	Sets the speedbrake command in percentage. Used to set the speedbrake position in the JSBSim simulation.
<code>SetDspCmd</code>	Sets the spoilers command in percentage. Used to set the spoilers position in the JSBSim simulation.

Class Method	Description
<code>SetCBrake</code>	<p>Sets the center brake group in percentage (0.0 - 1.0). Used to set the brake position in the JSBSim simulation.</p>
<code>SetLBrake</code>	<p>Sets the left brake group in percentage (0.0 - 1.0). Used to set the brake position in the JSBSim simulation.</p>
<code>SetRBrake</code>	<p>Sets the right brake group in percentage (0.0 - 1.0). Used to set the brake position in the JSBSim simulation.</p>
<code>SetThrottleCmd</code>	<p>Sets the throttle command for the specified engine. Used to set the throttle position in the JSBSim simulation.</p>
<code>SetFeatherCmd</code>	<p>Sets the propeller feather command for the specified engine. Used to set the propeller feather position in the JSBSim simulation.</p>
<code>SetPropAdvanceCmd</code>	<p>Sets the propeller pitch command for the specified engine. Used to set the propeller pitch position in the JSBSim simulation.</p>
<code>SetMixtureCmd</code>	<p>Sets the mixture command for the specified engine. Used to set the engine mixture in the JSBSim simulation.</p>
<code>SetPitchTrimCmd</code>	<p>Sets the pitch trim command. Used to set the pitch trim position in the JSBSim simulation.</p>
<code>SetYawTrimCmd</code>	<p>Sets the rudder trim command. Used to set the rudder trim position in the JSBSim simulation.</p>
<code>SetRollTrimCmd</code>	<p>Sets the aileron trim command. Used to set the aileron trim position in the JSBSim simulation.</p>

## 6.2.9.2 Class JSBSim::FGPropulsion

Class Method	Description
<code>GetEngine(index)</code>	Retrieves an engine object pointer from the list of engines. Used to retrieve JSBSim Engine object.
<code>InitRunning</code>	Sets up the engines as running. Used to turn engines on in the JSBSim simulation.
<code>SetCutoff</code>	Sets up the engines as stopped. Used to turn engines off in the JSBSim simulation.
<code>GetNumTanks</code>	Retrieves the number of tanks defined for the aircraft. Used for fuel handling.
<code>GetTank(index)</code>	Retrieves a tank object pointer from the list of tanks. Used for fuel handling.
<code>GetNumEngines</code>	Retrieves the number of engines defined for the aircraft. Used to get the number of engines of the JSBSim aircraft.

## 6.2.9.3 Class JSBSim::FGEEngine

Class Method	Description
<code>SetStarved</code>	Sets the engine initial condition to starved. Used to set the initial condition of the engine for the JSBSim aircraft.
<code>SetStarter</code>	Sets the engine initial condition to starter. Used to set the initial condition of the engine for the JSBSim aircraft.
<code>SetRunning</code>	Sets the engine initial condition to running. Used to set the initial condition of the engine for the JSBSim aircraft.

## 6.2.9.4 Class JSBSim::FGGroundReactions

Class Method	Description
<code>GetNumGearUnits</code>	Used to retrieve the number of wheels.
<code>GetGearUnit(index)</code>	Used to retrieve the wheel object.

## 6.2.9.5 Class JSBSim::FGPropagate

Class Method	Description
<code>SetTerrainElevation</code>	Sets the initial terrain elevation. Used to set the VBS4 terrain elevation in the JSBSim simulation.
<code>GetAltitudeASLmeters</code>	Returns the current altitude above sea level. Used to obtain the transformation in the JSBSim simulation.
<code>GetLatitudeDeg</code>	Returns the latitude. Used to obtain the transformation in the JSBSim aircraft.
<code>GetLongitudeDeg</code>	Returns the longitude. Used to obtain the transformation in the JSBSim aircraft.
<code>GetEuler</code>	Retrieves the Euler angles that define the vehicle orientation. Used to obtain the transformation in the JSBSim aircraft.
<code>GetVel</code>	Gets the velocity. Used to obtain the velocity of the JSBSim aircraft.

## 6.2.9.6 Class JSBSim::FGTank

Class Method	Description
<code>GetCapacity</code>	Returns the capacity of the tank. Used for fuel handling.
<code>GetContents</code>	Returns the contents of the tank. Used for fuel handling.
<code>SetContents</code>	Sets the contents of the tank. Used for fuel handling.

## 6.2.9.7 Class JSBSim::FGLGear

Class Method	Description
<code>GetWOW</code>	Returns the Weight On Wheels flag value. Used to determine if the JSBSim aircraft has land contact.

## 6.2.9.8 Class JSBSim::FGMassBalance

Class Method	Description
GetEmptyWeight	Used for mass handling.
SetEmptyWeight	Used for mass handling.

## 6.2.9.9 Class JSBSim::FGInitialCondition

Class Method	Description
SetLatitudeDegIC	Sets the initial latitude. Used to set up the initial conditions of the JSBSim aircraft.
SetLongitudeDegIC	Sets the initial longitude. Used to set up the initial conditions of the JSBSim aircraft.
SetAltitudeASLftIC	Sets the initial altitude. Used to set up the initial conditions of the JSBSim aircraft.
SetPsiDegIC	Sets the heading angle initial condition in degrees. Used to set up the initial conditions of the JSBSim aircraft.
SetPhiDegIC	Sets the roll angle initial condition in degrees. Used to set up the initial conditions of the JSBSim aircraft.
SetThetaDegIC	Sets the pitch angle initial condition in degrees. Used to set up the initial conditions of the JSBSim aircraft.
SetTerrainElevationFtIC	Sets the initial terrain elevation. Used to set up the initial conditions of the JSBSim aircraft.
SetVEastFpsIC	Sets the initial local axis east velocity. Used to set up the initial conditions of the JSBSim aircraft.
SetVDownFpsIC	Sets the initial local axis down velocity. Used to set up the initial conditions of the JSBSim aircraft.
SetVNorthFpsIC	Sets the initial local axis north velocity. Used to set up the initial conditions of the JSBSim aircraft.

## 6.2.9.10 Class JSBSim::FGPropertyManager

Class Method	Description
<b>HasNode</b>	Tests whether a given node exists. JSBSim properties are stored in a tree data structure, where a node represents a property. Used to Get / Set a JSBSim property.
<b>GetNode</b>	Returns a node. Used to Get / Set a JSBSim property.

## 6.2.9.11 Class JSBSim::SGPropertyName

Class Method	Description
<b>getStringValue</b>	Returns a string value for the given node. Used to Get / Set a JSBSim property.
<b>setStringValue</b>	Sets a string value for the given node. Used to Get / Set a JSBSim property.

## 6.2.9.12 Class JSBSim::FGFDMExec

Class Method	Description
<b>GetGroundReactions</b>	Returns a pointer to an <b>FGGroundReactions</b> object. See <a href="#">Class JSBSim::FGGroundReactions (on page 215)</a> .
<b>GetFCS</b>	Returns a pointer to an <b>FGFCS</b> object. See <a href="#">Class JSBSim::FGFCS (on page 213)</a> .
<b>GetPropagate</b>	Returns a pointer to an <b>FGPropagate</b> object. See <a href="#">Class JSBSim::FGPropagate (on page 216)</a> .
<b>GetPropertyManager</b>	Returns a pointer to an <b>FGPropertyManager</b> object. See <a href="#">Class JSBSim::FGPropertyManager (above)</a> .
<b>GetPropulsion</b>	Returns a pointer to an <b>FGPropulsion</b> object. See <a href="#">Class JSBSim::FGPropulsion (on page 215)</a> .
<b>GetMassBalance</b>	Returns a pointer to an <b>FGAircraft</b> object. See <a href="#">JSBSim::FGAircraft</a> .

Class Method	Description
<code>GetIC</code>	Returns a pointer to an <code>FGInitialCondition</code> object. See <a href="#">Class JSBSim::FGInitialCondition (on page 217)</a> .
<code>LoadModel</code>	Loads an aircraft model. Used to load the XML model of the aircraft.
<code>LoadScript</code>	Loads a script. Used to load a JSBSim script (for example, to load a custom atmosphere).
<code>Run</code>	Executes each scheduled model in succession. Runs the JSBSim simulation.
<code>RunIC</code>	Initializes the simulation from the initial condition object. Sets the initial conditions.
<code>SetDebugLevel</code>	Sets the debug level. Used for debugging purposes.
<code>Setdt</code>	Sets the integration time step for the simulation executive. Used to match the simulation step between VBS4 and JSBSim.
<code>Setsim_time</code>	Sets the current simulation time. Used to match the simulation time between VBS4 and JSBSim.
<code>SetAircraftPath</code>	Sets the path to the aircraft configuration file directories. Used to set the path, where the JSBSim model files are located.
<code>SetEnginePath</code>	Sets the path to the engine configuration file directories. Used to set the path, where the JSBSim model files are located.
<code>SetSystemsPath</code>	Sets the path to the systems configuration file directories. Used to set the path, where the JSBSim model files are located.
<code>SetOutputDirectives</code>	Sets the output (logging) mechanism for the simulation run. Used for logging.
<code>GetOutput</code>	Retrieves the current output file name. Used for logging.

## 6.3 Add IG Viewpoints to Scenarios

VBS uses an IG View Object to define a viewpoint in the scenario. The view object is usually linked to a unit or vehicle, and uses a configuration file to determine which IG clients to broadcast to and their individual view perspectives.

Add an IG View Object for each viewpoint that you want to broadcast.

### NOTE

Adding / deleting the IG View Editor Object in VBS Editor during a multiplayer scenario may not be reflected on other clients.

#### Follow these steps:

1. Open the Scenario to edit in VBS Editor in Prepare mode.
2. Select **IG View Object** from the Editor Objects List.
3. Right-click a location on the map, and select **New Object**.  
The **IG View Object Properties** panel opens.
4. Select the appropriate **View Configuration File**.
5. Click **OK** to add the IG View Object to the map.

Configuration Files	Description
1-Channel Lifeform	A single channel meant to attach to a lifeform, offset at eye-level.
3-Channel AH-64 - Attach Example	3 channels, ID 0-2, offset to display the cockpit view of the AH-64.
3-Channel Lifeform	3 channels, ID 0-2, meant to attach to a lifeform, offset at eye-level.
3-Channel M1A1 - Attach Example	3 channels, ID 0-2, with views attached to various memory points on an M1A1.
3-Channel M1A1 - Main Turret	3 channels, ID 0-2, configured in a widescreen format; attached to the tip of the main turret of an M1A1.
3-Channel Third Person - Far	3 channels, ID 0-2, configured in a widescreen format; meant to attach to a lifeform, offset 50 meters behind the unit.
3-Channel Third Person - Near	3 channels, ID 0-2, configured in a widescreen format; meant to attach to a lifeform, offset 15 meters behind the unit.
3-Channel Third Person - Top Down	3 channels, ID 0-2, configured in a widescreen format; meant to attach to a lifeform, offset 50 meters above the unit looking down.
4-Channel Lifeform (FOV)	4 channels, ID 0-3, configured in a square format; meant to demonstrate advanced frustum control.

Configuration Files	Description
4-Channel Lifeform (YPR)	4 channels, ID 0-3, configured in a square format; meant to demonstrate rotation control.
14-Channel Scalable	14 channels, ID 0-13, used to demonstrate view groupings and scalable configuration.
Custom	Add your own View Configuration files as described in <a href="#">Create IG View Configuration Files (on page 226)</a> .

**WARNING**

The required view configuration file must exist in the following folder:

`\VBS_Installation\Settings\CIGI\Views\`

**Link the IG View Object to the entity that represents its viewpoint:**

1. Right-click the **IG View Object**.
2. Select the appropriate **Link To** option.
3. Click the required entity.

When the scenario runs, the viewpoint defined by the IG View Object moves with the linked entity, and VBS broadcasts the defined views to the specified IG clients.

### 6.3.1 Multiple IG View Objects

Use of multiple IG View Objects in a scenario requires the creation of additional IG view configuration files. In many cases, existing configuration files can be copied, renamed, and edited.

The following example covers a scenario in which 3 IG view objects are attached to entities in a scenario, with the `1-Channel_Lifeform.xml` configuration file as the base for the configuration file for each view object.

**Follow these steps:**

1. On the host computer, open the Views directory located in:

`\VBS_Installation\Settings\CIGI\Views\`

2. Select `1-Channel_Lifeform.xml` and right-click on it.

Copy it and paste it twice (for a total of 3 instances of the `1-Channel_Lifeform.xml` file).

3. Rename the configuration files to:

- `1-Channel_Lifeform-0.xml`
- `1-Channel_Lifeform-1.xml`
- `1-Channel_Lifeform-2.xml`

4. Open **1-Channel\_Lifeform-0.xml** with a text editor.
5. Go to line 4 (**<ViewGroup>** parameter) and change **<ID>1</ID>** to **<ID>100</ID>**.

**i NOTE**

This value is arbitrary, but must be unique for each view in the IG project.

6. Go to line 15 (**<View>** parameter) and change **<ID>1</ID>** to **<ID>0</ID>**.
7. Go to line 16 (**<View>** parameter) and change **<GroupID>1</GroupID>** to **<GroupID>100</GroupID>**.

**i NOTE**

This value must match the value set on line 4.

```
<?xml version="1.0"?>
<View_Config>
  <ViewGroup>
    <ID>100</ID> <!-- Matches the <View> GroupID -->
    <AttachTo>0</AttachTo>
    <Yaw_Offset>0</Yaw_Offset>
    <Pitch_Offset>0</Pitch_Offset>
    <Roll_Offset>0</Roll_Offset>
    <X_Offset>0</X_Offset>
    <Y_Offset>0</Y_Offset>
    <Z_Offset>0</Z_Offset>
    <Precipitation_Radius>1</Precipitation_Radius>
  </ViewGroup>
  <View>
    <ID>0</ID> <!-- Matches filename number (0 in this case) -->
    <GroupID>100</GroupID> <!-- Matches the <ViewGroup> ID -->
    <AttachTo>0</AttachTo>
```

8. Save and close the file.
9. Open **1-Channel\_Lifeform-1.xml** with a text editor.
10. Go to line 4 (**<ViewGroup>** parameter) and change **<ID>1</ID>** to **<ID>200</ID>**.

**i NOTE**

This value is arbitrary, but must be unique for each view in the IG project.

11. Go to line 16 and change `<GroupID>1</GroupID>` to `<GroupID>200</GroupID>`.

**NOTE**

This value must match the value set on line 4 (`<ViewGroup>` parameter).

**NOTE**

Because the default value for `<ID>` on line 15 is 1, no change needs to be made to that setting in `1-Channel Lifeform-1.xml`.

12. Save and close the file.
13. Open `1-Channel Lifeform-2.xml` with a text editor.
14. Go to line 4 and change `<ID>1</ID>` to `<ID>300</ID>`.

**NOTE**

This value is arbitrary, but must be unique for each view in the IG project.

15. Go to line 15 (`<View>` parameter) and change `<ID>1</ID>` to `<ID>2</ID>`.
16. Go to line 16 and change `<GroupID>1</GroupID>` to `<GroupID>300</GroupID>`.

**NOTE**

This value must match the value set on line 4.

17. Save and close the file.
18. Launch VBS4 and the VBS Blue IG clients.
19. Enter a mission.
20. Open VBS Editor in Execute (RTE) mode.
21. Place an IG View Object in the scenario.

The **Object Properties** panel appears.

22. Select `1-Channel Lifeform-0.xml` from the **Configuration Files** drop-down and click **OK**.
23. Place an entity in the scenario.
24. Link the IG View Object to the entity.
25. Create and link 2 more IG View Objects and entities by repeating steps 21-24, but select `1-Channel Lifeform-1.xml` and then `1-Channel Lifeform-2.xml` when placing the IG View Objects.

26. For each VBS Blue IG instance, set the View Configuration file to include the View IDs (`<View><ID>`) established above:

- Open the xml file located in the `\IG_Installation` folder:

`\data\BlueProduct\DefaultViewConfig.xml`

- Set the required `<View><ID>` parameter to match all View IDs created for the VBS4 host.
- Set any **Optional Fields**, as needed.

**NOTE**

For a more detailed procedure for setting up the VBS Blue IG View configuration file, see Views and Render Targets in the VBS Blue IG Manual.

### 6.3.2 Edit IG View Configurations

The IG View Editor allows users to modify the settings of IG View Configuration files in real-time, and is accessible in Execute (RTE) mode and C2 modes. The parameters contained in IG View configurations are explained in the [Create IG View Configuration Files \(on page 226\)](#) topic.

Access the **IG View Editor** from the VBS Editor **Tools** menu.



### Follow these steps:

1. Select the desired configuration file from the **View Config File** drop-down menu.
2. Enter the desired values into any fields you need to modify.  
For more information, see [View Parameters \(on page 227\)](#).
3. Click **Save Changes**.

If the edited IG View Configuration file is currently in use by an IG View object, the view linked to that IG View object refreshes to display the view with updated parameters.

### 6.3.3 Sensors

IG views can be modified to display as various types of sensors. Explore the following script commands to modify sensor views:

- [\*\*IG\\_ViewSetSensor\*\*](#) - Use this SQF command to change the sensor type for each defined view individually.

A detailed explanation and example usage can be found in the VBS Scripting Reference:

[IG\\_ViewSetSensor](https://sqf.bisimulations.com/display/SQF/IG_ViewSetSensor) ([https://sqf.bisimulations.com/display/SQF/IG\\_ViewSetSensor](https://sqf.bisimulations.com/display/SQF/IG_ViewSetSensor))

- [\*\*IG\\_ViewSetSensorParameters\*\*](#) - Use this SQF command to further modify parameters of each sensor.

A detailed explanation and example usage can be found in the VBS Scripting Reference:

[IG\\_ViewSetSensorParameters](https://sqf.bisimulations.com/display/SQF/IG_ViewSetSensorParameters) ([https://sqf.bisimulations.com/display/SQF/IG\\_ViewSetSensorParameters](https://sqf.bisimulations.com/display/SQF/IG_ViewSetSensorParameters))

## 6.3.4 Create IG View Configuration Files

VBS uses XML files to configure each viewpoint with multiple view perspectives for multiple IG clients. Each configuration defines a single viewpoint in VBS, that may contain multiple view perspectives.

View configuration files must be placed in the following folder:

`\VBS_Installation\Settings\CGI\Views\`

Within the file, the viewpoint is defined by a `<View_Config>` tag which contains `<View>` tags for each perspective. The property tags within view define the orientation, angle, position, and size of the view as well as the IG client to broadcast to.

**Follow these steps:**

1. Open a new `.xml` file in a text editor.
2. Add `<View_Config>` and `</View_Config>` tags as the first and last lines of the file respectively.
3. Add a `<View>` and `</View>` tag for each perspective that the configuration needs to broadcast to an IG client.
4. Within each `<View>` tag, specify [View Parameters \(on the next page\)](#) to define its perspective.
5. Save the file to the `\Views\` folder:

`\VBS_Installation\Settings\CGI\Views\`

6. Copy this file to the same `\Views\` folder for all VBS instances in the network running in administrator mode.

This configuration file must also be saved into the `\Views\` folder for any host device acting as the **vbsHostNet** for the IG client. The **vbsHostNet** device will likely be the **Dedicated Server** or **VWS** on a VBS network deployment, where applicable.



### WARNING

Each defined view must correspond to a configured View on an IG Client.

To define view configurations on VBS Blue IG Clients, see Views and Render Targets in the VBS Blue IG Manual.

For more information about configuring the IG Client, see Quick Start: VBS Blue IG with VBS4 Host in the VBS4 Administrator Manual.

The View Configuration file is ready to use to define an IG View Object as described in [Add IG Viewpoints to Scenarios \(on page 220\)](#).

### 6.3.4.1 View Parameters

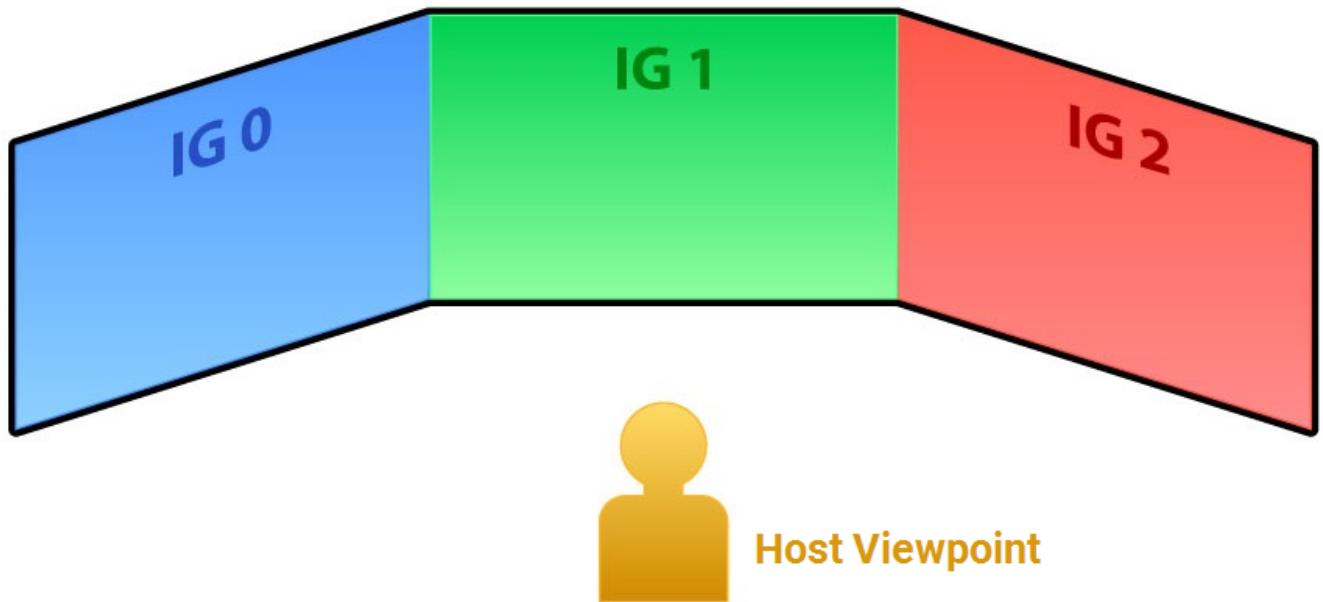
Modify the following parameters of a Viewpoint `.xml` file to define each View perspective:

XML Element	Description
<code>&lt;ID&gt;</code>	The unique ID for the IG client, between 0 and 65535.
<code>&lt;AttachTo&gt;</code>	<p>This determines which part of the object / vehicle to use to attach the view:</p> <ul style="list-style-type: none"> <li>0 - hull</li> <li>1 - main turret (azimuth)</li> <li>2 - main turret (elevation)</li> <li>3 - commander turret (azimuth)</li> <li>4 - commander turret (elevation)</li> <li>5 - loader turret (azimuth)</li> <li>6 - loader turret (elevation)</li> <li>7 - first-person view (Use when attaching to a unit.)</li> </ul> <p>Not all vehicles have these parts. Attaching to an invalid part locks the camera to the entity origin with the camera orientation facing north.</p>
<code>&lt;AttachToBone&gt;</code>	Specifies a bone by name to attach the view to. This field is ignored if empty or not present.
<code>&lt;GroundClampType&gt;</code>	<ul style="list-style-type: none"> <li>0 - Default - Default ground clamping applied as currently configured in the IG settings.</li> <li>1 - None - Ground clamping disabled.</li> <li>2 - Clamp - Height ground clamping only.</li> <li>3 - Conform - Conformal ground clamping only.</li> <li>4 - ClampAndConform - Height and conformal ground clamping.</li> </ul>
<code>&lt;SmoothType&gt;</code>	<ul style="list-style-type: none"> <li>0 - Default - Default smoothing applied as currently configured in the IG settings.</li> <li>1 - Disabled - Smoothing disabled.</li> <li>2 - Enabled - Smoothing enabled.</li> </ul>
<div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"> <span style="color: #0070C0; font-size: 1.5em; border: 1px solid #0070C0; border-radius: 50%; padding: 5px 10px; margin-right: 10px;">i</span> <b>NOTE</b> <p>These parameters are used to override ground clamping and smoothing values set in VBS Blue IG Settings. They only take effect when the IG View Object is attached to a vehicle (so no effect if the view object is not attached to anything or is attached to a lifeform).</p> </div>	

XML Element	Description
<ParentDrawMode>	<p>Specifies the displayed draw mode of the vehicle the IG View Object is attached to. This has no effect if the view obj is unattached. (For example, if the view is attached to a tank and the <b>Pilot</b> draw mode is provided, then the tank will be rendered in the Pilot draw mode for this view).</p> <p>0 - Normal - The default view geometry that a vehicle is created with.</p> <p>1 - Pilot - The visual geometry that can be seen from the pilot / driver position of a vehicle.</p> <p>2 - Gunner - The visual geometry that can be seen from the gunner position of a vehicle.</p> <p>3 - Cargo - The visual geometry that can be seen from the cargo position of a vehicle.</p>
<CrewPosition>	<p>Specifies a crew position by ID to attach the view to. This has no effect if the view obj is unattached.</p> <p>0 - Pilot / driver, the remaining indices are vehicle-dependent.</p> <p>-1 - None</p>
<FOV_Left>	Left half-angle of the view frustum in degrees.
<FOV_Right>	Right half-angle of the view frustum in degrees.
<FOV_Bottom>	Bottom half-angle of the view frustum in degrees.
<FOV_Top>	Top half-angle of the view frustum in degrees.
<FOV_Near>	Near clipping plane of the view frustum.
<FOV_Far>	Far clipping plane of the view frustum.
<Yaw_Offset>	Angle of clockwise rotation around the Up vector in degrees.
<Pitch_Offset>	Angle of clockwise rotation around the Left vector in degrees.
<Roll_Offset>	Angle of clockwise rotation around the Forward vector in degrees.
<X_Offset>	Distance from the entity origin along the Right vector in meters.
<Y_Offset>	Distance from the entity origin along the Forward vector in meters.
<Z_Offset>	Distance from entity origin along the Up vector in meters.

### 6.3.4.2 Viewpoint Example

A viewpoint with three perspectives, each displaying 50 degrees of a 150 degree field of view:



`<View_Config>` and `<View>` definitions:

```
<View_Config>
  <View>
    <ID>0</ID>
    <AttachTo>0</AttachTo>
    <FOV_Left>-25</FOV_Left><!-- negative, based on forward orientation -->
    <FOV_Right>25</FOV_Right><!-- positive, based on forward orientation -->
    <FOV_Bottom>-15</FOV_Bottom><!-- negative, based on forward orientation -->
    <FOV_Top>15</FOV_Top><!-- positive, based on forward orientation -->
    <FOV_Near>0</FOV_Near>
    <FOV_Far>0</FOV_Far>
    <Yaw_Offset>-50</Yaw_Offset>
    <Pitch_Offset>0</Pitch_Offset>
    <Roll_Offset>0</Roll_Offset>
    <X_Offset>-0.85</X_Offset>
    <Y_Offset>-0.1</Y_Offset>
    <Z_Offset>1.55</Z_Offset>
  </View>
  <View>
    <ID>1</ID>
    <AttachTo>0</AttachTo>
    <FOV_Left>-25</FOV_Left><!-- negative, based on forward orientation -->
    <FOV_Right>25</FOV_Right><!-- positive, based on forward orientation -->
    <FOV_Bottom>-15</FOV_Bottom><!-- negative, based on forward orientation -->
```

```
<FOV_Top>15</FOV_Top><!-- positive, based on forward orientation -->
<FOV_Near>0</FOV_Near>
<FOV_Far>0</FOV_Far>
<Yaw_Offset>0</Yaw_Offset>
<Pitch_Offset>0</Pitch_Offset>
<Roll_Offset>0</Roll_Offset>
<X_Offset>-0.85</X_Offset>
<Y_Offset>-0.1</Y_Offset>
<Z_Offset>1.55</Z_Offset>
</View>
<View>
  <ID>2</ID>
  <AttachTo>0</AttachTo>
  <FOV_Left>-25</FOV_Left><!-- negative, based on forward orientation -->
  <FOV_Right>25</FOV_Right><!-- positive, based on forward orientation -->
  <FOV_Bottom>-15</FOV_Bottom><!-- negative, based on forward orientation -->
  <FOV_Top>15</FOV_Top><!-- positive, based on forward orientation -->
  <FOV_Near>0</FOV_Near>
  <FOV_Far>0</FOV_Far>
  <Yaw_Offset>50</Yaw_Offset>
  <Pitch_Offset>0</Pitch_Offset>
  <Roll_Offset>0</Roll_Offset>
  <X_Offset>-0.85</X_Offset>
  <Y_Offset>-0.1</Y_Offset>
  <Z_Offset>1.55</Z_Offset>
</View>
</View_Config>
```

## 6.3.5 Enabling DIS Entities

VBS scenarios broadcasting to VBS Blue IG may also be communicating with other DIS-compliant simulation products hosting external entities.

Enabling DIS entity traffic within a VBS host and VBS Blue IG configuration requires the **interopForwarding** option to be enabled.

**Follow these steps:**

1. With a text editor, open the **VBS4.xml** file in the AppData Local folder at:

- Default VBS4 Profile location:

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

- Other VBS4 Profile location:

`Path\Settings\VBS4.xml`

Where `Path` is specified using the `-profiles=Path` command-line option.

For more information, see Command Line and Launcher Options in the VBS4 Administrator Manual.

2. Modify the existing **interopForwarding** entry or add if not present.

Use the following snippet to the `<Uncategorized>` section of the XML file:

```
<Value>
    <Name>interopForwarding</Name>
    <Value>1</Value>
</Value>
```

3. Save and close the file.

## 7. Terrain Tools and Objects

VBS4 enables the addition of terrain hazards and features using the Editor.

### FEATURE NOTICE

The terrain generation system in VBS4 uses VBS Blue technology. This makes the following VBS3 Editor Tools unavailable in VBS4:

- Terrain Modification Tool
- Flood Modification Tool
- Water Current
- Using Biotopes
- Promote or Remove Visitor Placed Objects

To modify the terrain in VBS4, see VBS Geo Overview in the VBS Geo Manual.

Add terrain hazards and features using the appropriate Editor Objects and Tools:

- [Concertina Wire \(on the next page\)](#)
- [Destructible Trees \(on page 237\)](#)
- [Earthworks \(Berms\) \(on page 238\)](#)
- [Glint Object \(on page 240\)](#)
- [Hazardous Area \(on page 243\)](#)
- [Placing Improvised Explosive Devices \(on page 249\)](#)
- [Light Source \(on page 261\)](#)
- [Placing Mines \(on page 263\)](#)
- [Secondary Damage \(on page 267\)](#)
- [Shopping Center \(on page 269\)](#)
- [Sound Source \(on page 272\)](#)
- [Training Targets \(on page 273\)](#)
- [Water Current \(on page 275\)](#)
- [Customizable Signs \(on page 276\)](#)

## 7.1 Concertina Wire

Concertina wire can be used to slow down vehicles that collide with it. For example, it is deployed at vehicle checkpoints (see Vehicle Checkpoints in the VBS4 Trainee Manual).

When a vehicle drives through concertina wire, it slows down as a result of entanglement with the wire.

Generally, the heavier the vehicle and the faster it is traveling, the further it takes to slow down to the limited speed after becoming fouled by the wire. Multiple rows of concertina wire compound the effect.

### NOTE

Concertina wire objects joined end to end are treated as one continuous row of wire (having no gaps).

To untangle the vehicle, it must be repaired (for more information, see [Vehicle Repair \(on page 652\)](#)).

Concertina wire objects are found in the Mission Editor as:

- **(F8) Objects > Objects - Traffic Control > Fence Concertina - Collapsible**
- **(F8) Objects > Objects - Traffic Control > Fence Concertina - Collapsed**

### 7.1.1 Customize Slowing Distance and Tangled Speed

After a vehicle hits a concertina wire, it travels a certain distance, before reaching the tangled speed limit (default: 5 km/h).

The concertina wire feature uses a cycle concept, where the speed and weight of a vehicle is converted into a number of cycles to perform the deceleration in. Therefore, the bigger and faster a vehicle is, the further it penetrates. One cycle roughly equates to 10m of distance.

The number of cycles (each cycle corresponding to 10m) is derived from both the speed and the weight of the vehicle:

```
cycles = speed (km) * weight (kg) * VBS_TANGLED_MULTIPLIER (0.01) / 1000
```

**VBS\_TANGLED\_MULTIPLIER** is one of the variables can be altered using the [setVariable](#) (<https://sqf.bisimulations.com/display/SQF/setVariable>) script command.



## EXAMPLE

### Personal Vehicle (Skoda Octavia)

Weight: 1910 kg

Speed: 50 km/h

$$1910 * 50 / 100\,000 = 0.955 \text{ cycles} = 9.5\text{m}$$

### Medium Vehicle (Ford Transit)

Weight: 2615 kg

Speed: 50 km/h

$$2615 * 50 / 100\,000 = 1.3 \text{ cycles} = 13\text{m}$$

### Heavy Vehicle (MAN TGL 7.180)

Weight: 7421 kg

Speed: 50 km/h

$$7421 * 50 / 100\,000 = 3.7 \text{ cycles} = 37\text{m}$$

The main variables that can be adjusted are:

Name	Default	Description
VBS_TANGLED_MIN_PERIOD	1	Minimum number of deceleration cycles.
VBS_TANGLED_MAX_PERIOD	6	Maximum number of deceleration cycles.
VBS_TANGLED_DIV_PERIOD	1	Time in seconds between each deceleration cycle.
VBS_TANGLED_MIN_SPEED	5	Allowed minimum speed once the entanglement has taken full effect.
VBS_TANGLED_MULTIPLIER	0.01	Converts the vehicle force into cycles taken to apply full decelerate (see VBS_TANGLED_MIN_PERIOD).
VBS_TANGLED_DAMAGE	0.2	Damage inflicted on the vehicles wheels.

## 7.1.2 Examples

To apply the maximum amount of deceleration to a specific vehicle, you can change the following:

```
_vehicle setVariable [ "VBS_TANGLED_MULTIPLIER", 0 ]
```

To increase the distance traveled after penetrating the concertina wire for a specific vehicle:

```
_vehicle setVariable [ "VBS_TANGLED_MULTIPLIER", 0.001 ]
```

The above will now slow a medium sized car down to the minimum speed over a distance of roughly 60m rather than 30m.

### Further Variables

Name	Type	Description
VBS_ENTANGLED	Boolean	Set to true as soon as a vehicle has become entangled.
VBS_ENTANGLE_IMMUNITY	Boolean	Set to true will make the vehicle impervious to C-Wire.
VBS_ENTANGLE_DAMAGE	Scalar	Applied to the C-Wire object to override the config value for minimum amount of damage required to entangle non-PhysX vehicles.
VBS_ENTANGLE_FORCE	Scalar	Applied to the C-Wire object to override the config value for minimum amount of damage required to entangle PhysX vehicles.
VBS_TANGLED_OBJECTS	Array	List of tangled C-Wire objects reset on termination of the scripts.
VBS_TANGLED_FUEL	Scalar	Stores the amount of fuel removed for non-PhysX vehicles.
VBS_ENTANGLED_EVENTS	Scalar	Event handlers indexes for the collisions.
VBS_ENTANGLED_EVENT	Scalar	Event handlers index for repairing.

## 7.1.3 Repair

To remove the enforced speed restrictions, the vehicle must be fully repaired either by the editor (see [Vehicle Repair \(on page 652\)](#)) or by using:

```
_vehicle setDamage 0;
```

## 7.1.4 Motorcycles and Bicycles

Motorcycles and bicycles are treated differently. The limitations for motorcycles mean that on impact with concertina wire, their fuel is removed. Bicycles incur full damage on impact with concertina wire.

## 7.2 Destructible Trees

Trees in VBS4 fall if they are damaged. Additional destructible trees may be placed in a mission using the Editor.

### Follow these steps:

1. In the Editor Objects List, select **(F8) Objects**.
2. Right-click the location on the map, and select **New Object**.
3. Input *tree* in **Filters** to display the available tree objects.
4. Select a tree object, and click **OK**.

The Editor places the selected tree in the mission. When the tree receives sufficient damage, it falls over (determined by the `armor` parameter in `class HitPoints`).

#### NOTE

Fallen trees do not create an obstruction.

By default, Editor placed trees always fall north. To control the direction a tree falls, rotate the object in the Editor:

- In 2D View, hold **LShift + RMB**, and move the mouse left or right.
- In 3D View, hold **Space + LMB** or **LShift + RMB**, and move the mouse left or right.

The tree falls towards the top of the Editor Object icon in 2D mode.

## 7.3 Earthworks (Berms)

VBS4 provides special Editor Placed Interactive Berms that can be constructed or deconstructed by certain engineering vehicles.

### NOTE

Berms can only be placed by an Administrator or Instructor, not by Trainees.

Berms are found under **Objects > Interactive Engineering Obstacles**. Berms with the **reduced** suffix start out in a deconstructed (reduced) state, all the other types start out fully constructed.

All of the interactive berms can be constructed (made larger) or deconstructed (made smaller) by Trainees. For more information, see Earthworks (Berms) in the VBS4 Trainee Manual.

Vehicle Type	Location
D7 Bulldozer	<ul style="list-style-type: none"><li>• US Army Tracked - Woodland</li><li>• Generic Civilian Tracked</li></ul>
D9 Bulldozer	<ul style="list-style-type: none"><li>• US Army Tracked - Woodland</li></ul>
M9 ACE	<ul style="list-style-type: none"><li>• KR Army Tracked - Woodland</li><li>• US Army Tracked - Desert</li><li>• US Army Tracked - Woodland</li></ul>
850J Bulldozer	<ul style="list-style-type: none"><li>• Generic Civilian Tracked</li></ul>
ADF 850J Bulldozer	<ul style="list-style-type: none"><li>• AU Army Tracked - Woodland</li></ul>
Wheeled Frontloader	<ul style="list-style-type: none"><li>• Generic Civilian Wheeled</li></ul>
HMEC	<ul style="list-style-type: none"><li>• AU Army Wheeled - Desert</li><li>• GB Army Wheeled - Desert</li><li>• GB Army Wheeled - Woodland</li></ul>

### Scripting Functions

In addition, the following scripting functions are available:

Function	Description
<a href="https://sqf.bisimulations.com/display/SQF/fn_vbs_engineering_getBuildState"><u>fn_vbs_engineering_getBuildState</u> (https://sqf.bisimulations.com/display/SQF/fn_vbs_engineering_getBuildState)</a>	Returns the build status of a Berms construction object.

**Function**[fn\\_vbs\\_engineering\\_logWork](#)

(https://sqf.bisimulations.com/display/SQF/fn\_vbs\_engineering\_logWork)

**Description**

Applies work time to a Berms construction object.

## 7.4 Glint Object

The Glint Object provides Mission Designers with the ability to simulate light reflecting off polished surfaces, such as the lenses used in optics. Glints can either be displayed or hidden according to a variety of methods, ranging from line-of-sight, scripted conditions, to the Field of View for both the observer and the reflective object in question. Unless set to **Always On**, Glint visibility is subject to daylight hours between 0600 hours to 1800 hours.

### NOTE

Glints are not visible to observers unless they are at least 25m away from the object.

From the observer point-of-view, Glints are represented as small star shaped objects visible across the terrain.

Select **Glint Object** in the Editor Objects list in the **Tools** panel.

**Image-26: Glints**



From the Mission Designer / Administrator perspective, Glints are also represented in the offline and real-time Editor Map views. Along with the usual icon to represent the location of the Glint Object on the map, some additional properties can also be adjusted, along with the current status of the Glint.

**Image-27: Glint Objects in VBS Editor**

Name	<input type="text"/>
Always On	false ▾
Condition	true
Direction (0 Deg)	◀ ↴ ▶
Field Of View (45 Deg)	◀ ↴ △ ▶
Draw FOV	true ▾

On placing a glint object in VBS Editor, you are presented with the following options:

- **Name** - Refers to the variable name you give to the object to reference using scripts.
- **Always On** - When set to true, the Glint is visible from any angle, regardless of the player position, as long as the player has a line of sight to the Glint location. This also includes the default daytime restrictions, which means the Glints are visible at night. Irrelevant controls are hidden from view along with the visual indicators in the map view.

**NOTE**

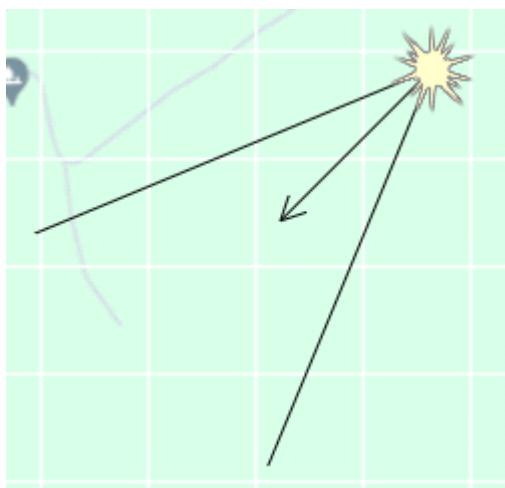
The **Condition** option overrides the **Always On** option.

- **Condition** - A scripted condition that can be used to during a mission, to determine when the Glint Object is displayed. This condition is applied after all the other conditions are met, such as Line-of-Sight. From within the condition, you can reference the Glint Object using **This**.
- **Direction** - The direction in degrees, of the reflective surface of the Glint used to calculate the center of the Glint Field Of View.
- **Field Of View** - The angle in degrees used to determine the potential area covered by the Glint Object. The default value of 45 degrees means the Glint is visible when the observer is within the 90 degree arc.
- **Draw FOV** - Can be used to toggle the visual representation of the glints FOV on and off, when viewed in the map.

**Image-28: Irrelevant controls are hidden**

Name	<input type="text"/>
Always On	<input checked="" type="checkbox"/> true
Condition	<input type="text"/> true

As mentioned previously, the Glint Object direction and FOV can be used to determine where and when the Glint is displayed. The direction and FOV of each Glint Object is compared to the Player direction and FOV. If both the Glint and players FOV encompass each other's positions, the Glint is considered to be visible. A visible Glint FOV, is drawn in red and is updated in real-time for both the Mission Designer in Prepare mode and all Administrators in the Multiplayer Execute mode. Glints that are not considered visible are drawn in black.

**Image-29: Glints that are not visible are shown in black**

Along with the ability to edit each Glint objects settings via the object properties dialog shown earlier, you can also adjust the orientation, FOV, of a specific glint object show or hide the visible indicators. From the Editor Map view, right-click a Glint Object to bring up the Editor Menu options. Right-click the Glint Object to bring up the Editor Menu options.



- **Set Glint FOV** - This works in exactly the same way as turret fire arcs. After selecting from the menu, you can move the mouse around the map to adjust orientation and FOV. Click the **LMB** to confirm the change.
- **Hide / Show Glint** - Toggles the visual representation of the direction of the Glint and the FoV on and off.

## 7.5 Hazardous Area

VBS4 includes the **Hazardous Area** Editor Object (EO), which enables Mission Designers to quickly create an area on the terrain which is contaminated by a CBRN (Chemical, Biological, Radioactive, Nuclear) substance. This topic discusses the following:

- [Creating a Hazardous Area \(below\)](#)
- [Hazardous Area Effects \(on page 247\)](#)
- [Hazardous Area Symbology \(on page 248\)](#)
- [Administrator Decontamination \(on page 248\)](#)

The following Hazardous Area substances are available to place in a scenario:

- **Mustard Gas**
- **Chlorine Gas**
- **Sarin Gas**
- **Liquid Nerve Agent (LNA)**
- **Radioactive**

### 7.5.1 Creating a Hazardous Area

Use the Hazardous Area EO to create and place a CBRN contaminated area in a scenario.

**NOTE**

The Hazardous Area EO can only be repositioned in Prepare Mode (OME).

**Image-30: Hazardous Area Object Properties dialog**



**Follow these steps:**

1. In the **Editor Objects List**, select **Hazardous Area**, and double-click the map where you want the epicenter of the Hazardous Area to be.

2. In the Hazardous Area Object Properties dialog (on the previous page), configure the following settings.

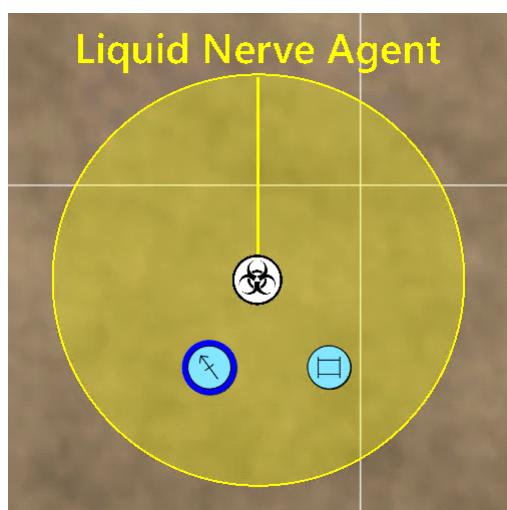
Setting	Description
<b>Description</b>	Optional. Enter a description for the Hazardous Area.
<b>Agents</b>	Use the drop-down to select the specific substance you want to use.
	<b>NOTE</b>
	This setting can only be modified in Prepare Mode (OME).
<b>Dispersion / Fallout (ft)</b>	Enter a dispersion / fallout area, in feet (ft).
	<b>WARNING</b>
	In VBS4, Liquid Nerve Agents (LNAs) and Radiation contaminants are confined to the area inside the Hazardous Area cylinder, unless a contaminated entity moves beyond its boundaries and contaminates other entities by touching / handling them, for example.
	While gases initially occupy the defined area, elements such as wind usually disperse them beyond the boundaries of the Hazardous Area. Therefore, entities that are outside the area defined by the Hazardous Area EO, may still come into contact with a gas cloud, and be affected / contaminated.
<b>Intensity</b>	Use the slider to set the intensity of the substance.
	<b>WARNING</b>
	For LNAs, there is a threshold level intensity of <b>0.15</b> . Below this level, LNAs cause detectable contamination but do not cause harmful effects to units. Above this level, LNAs cause harm to unprotected units.

Setting	Description
<b>Source Type</b>	<p>Use the drop-down to select from the following options:</p> <ul style="list-style-type: none"><li>• <b>Area</b></li><li>• <b>Point Source</b></li></ul> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"><p><b>EXAMPLE</b></p><p>Simulates the difference between a radioactive fallout area (radioactive particles in the air), and a radioactive point source (like a piece of uranium, for example), where players can detect the source of the Radiation the closer they get to it (see also AN / PDR-77 Probes in the VBS4 Trainee Manual).</p></div> <p>Both options are visualized in the same way in VBS.</p> <div style="border: 1px solid #0070C0; border-radius: 10px; padding: 5px; margin-top: 10px;"><p><b>NOTE</b></p><p>This setting can only be modified in Prepare Mode (OME).</p></div>

### 3. Click **OK**.

The Hazardous Area appears on the 2D Map as a **yellow** range visualization circle, with either of the following CBRN symbols at the center.

**Image-31: Gas / LNA and Radiation symbols**



In 3D Camera View, the Hazardous Area appears as a **yellow** range visualization cylinder, with CBRN symbology above it.

### Image-32: Hazardous Area cylinder in 3D



#### **i** NOTE

The following considerations apply:

- Some gases produce visible gas clouds for Trainees, but other gases and CBRN substances are invisible.
- Use the Range Visibility Settings in the VBS4 Administrator Manual to enable / disable the individual elements of the range visualizations.
- The height of the range visualization cylinder (2 meters by default) cannot be adjusted.
- Range visualizations can only be seen by scenario Administrators / Instructors, not Trainees.
- Hazardous Area range visualizations (cylinders) are also visible in AAR (see After Action Review (AAR)) in the VBS4 AAR Manual.



#### **WARNING**

Entities inside a defined Hazardous Area are contaminated. This includes buildings and, currently, all units in vehicles. However, vehicle occupants wearing MOPP suits receive similar levels of protection to those outside vehicles, see CBRN Suits and Gas Masks in the VBS4 Trainee Manual.

Trainees who suspect that they have entered a contaminated area are expected to establish what substance is present using the following equipment, described in the VBS4 Trainee Manual:

- CBRN Detection Devices
- M8 Chemical Detection Paper
- M9 Chemical Detection Paper

## 7.5.2 Hazardous Area Effects

Units who are wearing a MOPP Suit, gas mask, or SCBA mask may not be internally affected by a CBRN substance if they have adequate protection, but they may be outwardly contaminated (their clothing), and should use appropriate decontamination equipment once they have moved away from the Hazardous Area, see CBRN Decontamination in the VBS4 Trainee Manual.

For more information about MOPPS Suits, gas masks, SCBA masks, and other protective equipment, see CBRN Suits and Gas Masks in the VBS4 Trainee Manual.

The prognosis for unprotected units that move away from a Hazardous Area depends on the substance that they were exposed to.

Substance	Description
<b>Gases</b>	Recovery is possible with time. If units recover, the hazard symbology is removed from above their avatar, and from their entry in the Scenario Objects Panel.
<b>Liquid Nerve Agent</b>	Recovery is not possible unless treatment is given (see Antidotes in the VBS4 Trainee Manual), which only suppresses symptoms.
<b>Radiation</b>	Recovery is not possible and no treatment is available.

See also Chemical Effects and Symptoms in the VBS4 Trainee Manual for a list of health effects that units may experience.

Other entities, such as vehicles and objects are also contaminated when inside the area defined by the Hazardous Area EO, and remain contaminated even when they move away from the affected area. Trainees can use various equipment to decontaminate vehicles and objects, see Decontamination Equipment in the VBS4 Trainee Manual.

### NOTE

If necessary, Administrators / Instructors can instantly decontaminate entities in the VBS Editor in Execute Mode, providing that they move the entity outside of the Hazardous Area first, see [Administrator Decontamination \(on the next page\)](#).

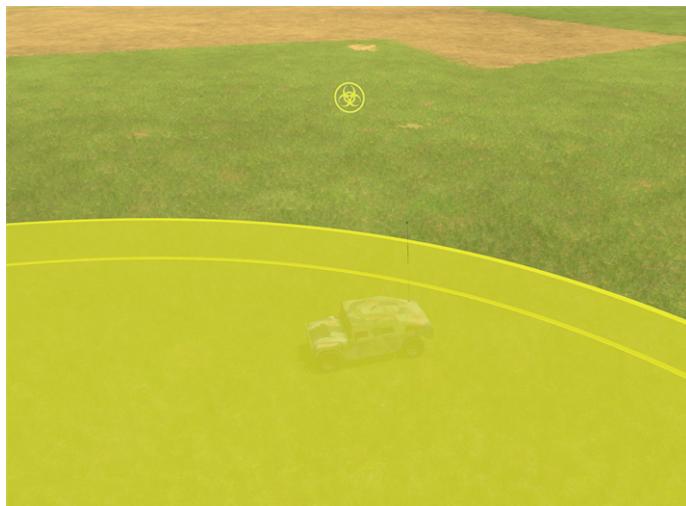
For a complete list of decontamination and other equipment that you can make available to Trainees in a scenario, see [CBRN Equipment \(on page 691\)](#).

### 7.5.3 Hazardous Area Symbology

All entities that are contaminated by a CBRN substance display CBRN symbology above their avatar in 3D Camera View. This includes units wearing MOPP suits as, while they may not have internal contamination and become ill, they may have outer contamination of their MOPP suit or other protective clothing.

In addition, similar symbology appears next to the entry of all contaminated entities in the Scenario Objects Panel. These symbols remain in place, even if the entity leaves the defined Hazardous Area, unless you perform [Administrator Decontamination \(below\)](#), or if players use appropriate decontamination equipment. For more information, see [Decontamination Equipment \(on page 693\)](#) and Portable Decontamination Equipment in the VBS4 Trainee Manual.

**Image-33: Contaminated vehicle with CBRN symbology**



### 7.5.4 Administrator Decontamination

Entities that are contaminated by a CBRN substance can be instantly decontaminated by Administrators / Instructors during a scenario.

#### Follow these steps:

1. Ensure that the entity is outside the Hazardous Area cylinder.
2. Do one of the following:
  - Right-click the **Entity** on the map.
  - Right click the **Entity** entry in the Scenario Objects Panel.
3. In the context menu, select **Clear CBRN Contamination**.

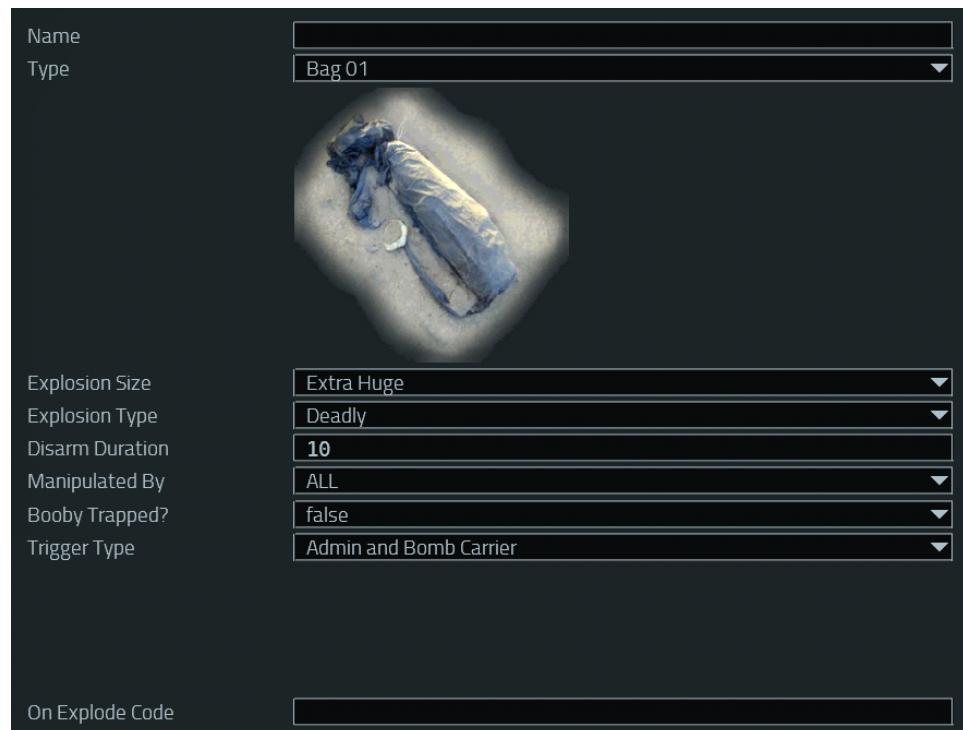
All contamination and related symbology is removed from the entity.

Usually, Trainees are expected to decontaminate themselves and other entities as part of a mission. For more information, see CBRN Decontamination in the VBS4 Trainee Manual

## 7.6 Placing Improvised Explosive Devices

VBS4 includes Improvised Explosive Devices (IEDs) to enable the simulation of explode-on-demand roadside bombs, suicide bombers, and vehicle-borne IEDs.

### Image-34: IED Object Properties



#### Follow these steps:

1. In the **Editor Objects List**, select **IED** and click the map, where you want to place the IED Editor Object.
2. Set the [IED Options \(on page 251\)](#).
3. Set the [IED Trigger Type \(on page 252\)](#).
4. Click **OK** to confirm.

The IED Editor Object is placed on the map.

5. **Optional:** To rotate the IED in the 2D or 3D View, hold **Shift + RMB** and release to confirm.

### Pressure Plate Rotation

If you are using an IED with a Pressure Plate (see [IED Trigger Type \(on page 252\)](#)), it is possible to rotate the Pressure Plate area separately from the IED itself:

- a. In the 2D or 3D View, click the **Pressure Plate** to select it.
- b. To rotate the Pressure Plate, hold **Shift + RMB** and release to confirm.

**Image-35: IED and Pressure Plate in the 2D and 3D Views (left to right)**



In addition, see the following IED-related functionality:

- [Equipment Inventory \(on page 256\)](#)
- [Attaching IEDs to Units and Vehicles \(on page 256\)](#)
- [Attaching IEDs to Triggers \(on page 257\)](#)
- [Detonating an IED \(on page 258\)](#)
- [Knock-Out Effect \(on page 259\)](#)
- [On Explode Code \(on page 260\)](#)

## 7.6.1 IED Options

The IED Editor Object has the following options that can be set:

### NOTE

To obtain the IED functionality as described in the following table, use the IED Editor Object. Placing individual IED objects in the mission using the Quick Menu (see Quick Menu Actions in the VBS4 Trainee Manual), for example, does not provide the same functionality.

IED Option	Description
<b>Name</b>	Variable name of the IED. Only relevant if you intend to reference the IED in script code.
<b>Type</b>	Defines the 3D model that is used to visualize the IED in VBS4.
<b>Explosion Size</b>	Size of the explosion that the IED generates.
<b>Explosion Type</b>	Sets the type of explosion. The options are: <ul style="list-style-type: none"><li>• <b>Deadly</b> - Kills units that are close to the explosion.</li><li>• <b>Wound Only</b> - Does not kill units. Useful for EVAC type missions.</li><li>• <b>Fake (No Damage)</b> - The IED does not do any damage.</li></ul> See <a href="#">Knock-Out Effect (on page 259)</a> for information on how different explosion types affect characters.
<b>Disarm Duration</b>	Time (in seconds) it takes to disarm an IED, using the <b>DISARM IED</b> option in the Quick Menu for vehicles, or the <b>Disarm Bomb</b> 3D World Action for units.   <b>NOTE</b> Can only be set in Prepare Mode.  For more information, see User Actions in the VBS4 Trainee Manual.
<b>Manipulated By</b>	Administrator can specify which side can pick up and plant the IED.   <b>NOTE</b> Can only be set in Prepare Mode.  All other sides only get the <b>DISARM IED / Disarm Bomb</b> option in the Quick Menu / 3D World Action.

IED Option	Description
<b>Booby Trapped?</b>	<p>IED explodes on pickup unless disarmed first. An unarmed IED placed in VBS Editor does not offer this option.</p> <p>Player placed IEDs can use user actions to add and remove a booby trap. Administrators can toggle a booby trap using the right-click context menu in Execute Mode.</p>
	<div style="border: 1px solid #0070C0; padding: 10px;"> <p><b>NOTE</b></p> <p>If an IED is attached to a unit with the <b>Booby Trapped?</b> setting set to true, then it explodes instantly if done so in the Execute Mode, and if done in the Prepare Mode, then it explodes instantly upon mission start. This happens with any IED Type (on the previous page) and any Trigger Type (below).</p> </div>
<b>Trigger Type</b>	<p>Enables you to set what triggers the IED, see <a href="#">IED Trigger Type (below)</a>.</p>
	<div style="border: 1px solid #0070C0; padding: 10px;"> <p><b>NOTE</b></p> <p>Can only be set in Prepare Mode.</p> </div>
<b>Radio Range</b>	<p>This field appears when <b>Radio</b> trigger types are selected, see <a href="#">IED Trigger Type (below)</a>.</p>
<b>Prox. Distance / Side</b>	<p>These fields appear when <b>Proximity</b> trigger types are selected, see <a href="#">IED Trigger Type (below)</a>.</p>
<b>Can Be Jammed?</b>	<p>This field appears when <b>Radio</b>, <b>Cell Phone</b>, and <b>Proximity</b> trigger types are selected, see <a href="#">IED Trigger Type (below)</a>.</p> <p>If set to <b>true</b>, these IED trigger types can be jammed by a CREW device (see <a href="#">Enabling CREW (on page 717)</a> to prevent detonation).</p> <div style="border: 1px solid #0070C0; padding: 10px;"> <p><b>NOTE</b></p> <p>If the IED is carried by a suicide bomber or is attached to a vehicle (VBIED), it cannot be jammed.</p> </div>
<b>On Explode Code</b>	<p>Script to run when the IED explodes (see <a href="#">On Explode Code (on page 260)</a> for further details).</p>

## 7.6.2 IED Trigger Type

Use the **Trigger Type** drop-down to select how to trigger the IED:

### Admin and Bomb Carrier

Only an administrator or the bomb carrier can set off the IED. Can be moved by players if the **Manipulated By** field allows the side of the player to do so. Players can also shoot the IED or disarm it.

## Admin Only

Only an administrator can detonate the IED. Can be moved by players if the **Manipulated By** field allows the side of the player to do so. Players can also shoot the IED or disarm it.

## Cell Phone

Similar to the Radio IED except that there is no range setting. The cell phone has an unlimited detonation range.

## Passive IR

Detonation of the IED using an infrared tripwire mechanism.

### NOTE

If an IED of this **Trigger Type** is attached to a unit (see [Attaching IEDs to Units and Vehicles \(on page 256\)](#)), the IED Editor Object disappears from the Editor Objects List and is instead placed in the unit Equipment Inventory.

### Follow these steps:

1. With the IED in your Inventory, select user action **Place Passive IR IED x** (x represents the number of the IED if there are multiple IEDs).  
You are now using a wire laying device similar to the Wire Controlled IED, which you can use to move to the placement area of the IR laser device.
2. When you are at your destination, select user action **Place IR Laser x** to place the device (it appears as a wire coil, similar to the Wire Controlled IED. This represents the beginning of the IR tripwire).
3. Move to the position where you want to place the other end of the IR tripwire.
4. Select user action **Place IR Reflector x**.  
The wire coil object disappears and no further objects are visible. The Passive IR is an invisible trigger object.
5. Select user action **Activate IR IED x** to activate the device.

## Pressure Plate

Setup a pressure plate to trigger the IED. You can change the size (**Plate Dimension L / W**) and relative position to the IED (**Plate Pos X / Y**). In addition, set the **Activation Weight**, the options are:

- **Every Weight (Even Humans)**
- **Light Vehicles**
- **Heavy Vehicles**

To rotate the Pressure Plate, see [Pressure Plate Rotation \(on page 250\)](#).

**NOTE**

If an IED of this **Trigger Type** is attached to a unit (see [Attaching IEDs to Units and Vehicles \(on page 256\)](#)), the IED Editor Object disappears from the Editor Objects List and is instead placed in the unit Equipment Inventory.

## Proximity

Enables you to define whether or not the IED explodes automatically when a unit of side **Proximity Side** approaches within **Proximity Distance** meters of the device. You can also select whether or not the IED can be jammed, see [Can Be Jammed? \(on page 252\)](#).

**NOTE**

If an IED of this **Trigger Type** is attached to a unit (see [Attaching IEDs to Units and Vehicles \(on page 256\)](#)), the IED Editor Object disappears from the Editor Objects List and is instead placed in the unit Equipment Inventory.

## Radio

Detonation of the IED by radio signal, up to the maximum distance set in the **Radio Range** box.

**NOTE**

If an IED of this **Trigger Type** is attached to a unit (see [Attaching IEDs to Units and Vehicles \(on page 256\)](#)), the IED Editor Object disappears from the Editor Objects List and is instead placed in the unit Equipment Inventory.

### Follow these steps:

1. With the IED in your Inventory, select user action **Place Radio IED x** (x represents the number of the IED if there are multiple IEDs).
2. Select user action **Detonate Radio IED x** to detonate the IED.

The IED detonates.

**NOTE**

You can only detonate IEDs you placed. This action works for vehicles also. If you are outside the range specified in **Radio Range** field, the IED does not detonate.

## Wire Controlled

Detonation of the IED using a wire connection.

**NOTE**

If an IED of this **Trigger Type** is attached to a unit (see [Attaching IEDs to Units and Vehicles \(on the next page\)](#)), the IED Editor Object disappears from the Editor Objects List and is instead placed in the unit Equipment Inventory.

**Follow these steps:**

1. With the IED in your Inventory, select user action **Place Wire Controlled IED x** ( $x$  represents the number of the IED if there are multiple IEDs).

The IED is placed on the ground and a wire coil object is floating in front of you.

2. Move to another position.

The wire spools off as you move and there is a HUD indication of how much wire you have spooled off, and how much of the 200 meter length is left.

3. When you have reached your destination you can do one of the following:

- Select user action **Detonate Wire Controlled IED x** to detonate while still holding the coil.
- Select **Drop Wire IED x** to drop the coil on the ground. This allows you to move about while the wire remains in place. If you remain within 5 meters of the coil, the **Detonate Wire Controlled IED x** is still available.

**Image-36: Wire Controlled detonation**

**Timer**

A type of fuse. When selected, the **Timer** field appears. The administrator can specify the time to detonation from scenario start.

**NOTE**

If an IED of this **Trigger Type** is attached to a unit (see [Attaching IEDs to Units and Vehicles \(below\)](#)), the IED Editor Object disappears from the Editor Objects List and is instead placed in the unit Equipment Inventory.

**NOTE**

The timer cannot be adjusted by players in the scenario.

### Timer Player Activated

A type of fuse. Allows the administrator to place an IED that can be picked up, replaced, and detonated by a player-specified timer. For more information on how the player can set the IED timer, see [Using Improvised Explosive Devices \(IEDs\)](#) in the VBS4 Trainee Manual.

**NOTE**

If an IED of this **Trigger Type** is attached to a unit (see [Attaching IEDs to Units and Vehicles \(below\)](#)), the IED Editor Object disappears from the Editor Objects List and is instead placed in the unit Equipment Inventory.

**NOTE**

For the **Radio**, **Cell Phone**, **Passive IR**, and **Wire Controlled** IED trigger types, some form of in-game action is required before they become active. Merely placing them using VBS Editor is not sufficient to activate them.

## 7.6.3 Equipment Inventory

Picking up the IED using the Equipment Inventory (see [Equipment Inventory](#) in the VBS4 Trainee Manual) or the user action has exactly the same result.

However, the same does not apply to dropping the IED, because there is a difference between just dropping it on the ground and placing (arming) it. If you drop the IED using the Inventory, you are merely dropping it. The only way to set / arm an IED is to use the **Place IED** user action.

## 7.6.4 Attaching IEDs to Units and Vehicles

You can attach IEDs to units or vehicles using standard linking techniques (see [Linking Editor Objects](#) (on page 69)), bearing the following in mind:

- Position the IED at a suitable location near the vehicle or unit.
- Remember that the IED object is attached to the other entity – so when the unit or vehicle moves, the IED does too.

- You can hide or unhide the IED by right-clicking it and selecting **Hide / Unhide IED** from the context menu.
- IEDs can be linked to other IEDs to form a daisy-chain using the **LShift + Drag** shortcut. Double-headed arrows on the connecting lines indicate that IEDs affect each other.

## 7.6.5 Attaching IEDs to Triggers

IEDs can be attached to triggers, so that they explode when the trigger condition becomes "true".

### Follow these steps:

1. Create a trigger with the desired condition (for example, a radio call).
2. Right-click the **IED** and select **Attach to Trigger** from the context menu.
3. Drag the linking line to the respective trigger.

The IED is attached to the trigger.

#### NOTE

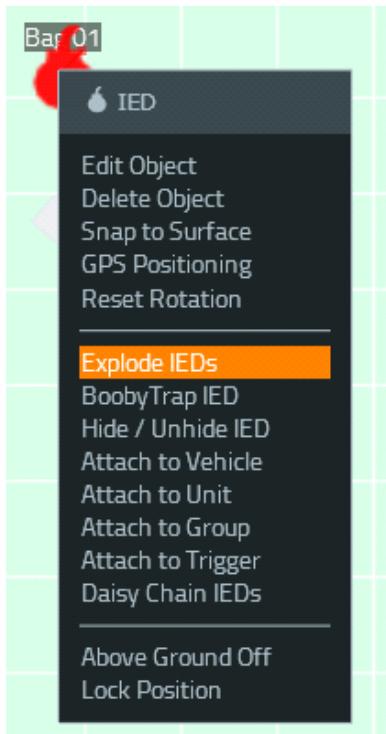
A linked IED can still be detonated manually (using the VBS Editor context menu) or, if set to **Proximity**, by an approaching unit or vehicle.

## 7.6.6 Detonating an IED

In Execute Mode administrators can detonate an IED at any time using the **Explode IED** context menu option.

Also, a player driving a vehicle with an attached IED or acting as a suicide bomber has the **DETONATE IEDS** option in their Quick Menu (see Quick Menu Actions in the VBS4 Trainee Manual), meaning they can blow themselves up at any time.

**Image-37: Detonating an IED**



You can activate multiple triggers / detonate IEDs, using the Script Editor Object.

**Follow these steps:**

1. In the Editor Objects List, select **Script** and place the Script Editor Object on the map.
2. In the **Filter** drop-down, select **Special Scripts**.
3. In the **Script File** drop-down, select **Activate Trigger(s)** or **Explode Linked IED**.
4. In the **Execute Globally?** drop-down, select whether the script should run locally or globally in a multiplayer scenario:
  - **Execute Only on Client Where Condition is True** - Runs the script only on clients, where the **Condition** setting (see step 5) is true.
  - **Execute on Every Client, Even if Condition is False on Some** - Runs the script on all the clients.

5. In **Condition**, specify the Boolean condition for the linked triggers / IEDs (see step 8) to be executed.
6. In the **Repeatedly** drop-down, set whether the condition should be evaluated repeatedly or not:
  - **Do Not Repeat** - Evaluate the condition only once.
  - **Repeat When Condition is True Again** - Evaluate the condition every time it returns true.
7. Click **OK**.
8. Right-click the Script Editor Object, select **Link to Condition Trigger / Link IED**, drag the arrow and click the trigger / IED you want to link.  
Repeat this step for as many triggers / IEDs as you need.

When the scenario runs, the Script Editor Object activates / detonates the linked triggers / IEDs, according to the set condition.

For more information, see the [Script Editor Object \(on page 78\)](#).

### 7.6.7 Knock-Out Effect

Blast wave effects from IEDs and other explosions can knock out a unit, causing the screen to black out for a period of time. This effect is based on explosion size and proximity to the blast. Units can also experience dizziness (screen movement) for a period of time after they regain consciousness. Even if a unit is not knocked out they may still experience dizziness.

The listed IED settings produce the following effects in VBS4:

IED Setting	Description
<b>Deadly</b>	Causes severe damage and knockout at farther ranges.
<b>Wound Only</b>	Causes damage and knockout for units close to the explosion.
<b>Fake (No Damage)</b>	Causes no damage but causes a knockout.

#### NOTE

When units are in a vehicle they do not experience knockout.

Vehicles with larger caliber weapons can cause knockout when a person stands close enough to the weapon barrel. Explosions from weapons can cause knockout at close range.

## 7.6.8 On Explode Code

It is possible to run a script when the IED explodes. This script can access several parameters passed in through `this`:

```
[  
- THE IED OBJECT  
- ASSIGNED VEHICLE VARIABLE NAME IF ANY - STRING  
- TYPE OF IED CHARGE - STRING (class name)  
- TYPE OF EXPLOSION - STRING "normal"/"wounding"/"fake"  
- WAS IED BOOBYTRAPED? - BOOLEAN  
- DISARM DURATION - SECONDS  
- CAN THE IED BE JAMMED BY CREW? - BOOLEAN  
- DETONATION TYPE - STRING "proximity"/"PressurePlate"/"Admin"  
- PROXIMITY DETONATION RADIUS - SCALAR (IF "proximity")  
- PROXIMITY DETONATION SIDE - STRING "West"/"East"/"All"..."  
- PRESSURE PLATE SIZE A - SCALAR  
- PRESSURE PLATE SIZE B - SCALAR  
- PRESSURE PLATE SIZE X - SCALAR  
- PRESSURE PLATE SIZE Y - SCALAR  
- WEIGHT OF PRESSURE PLATE - SCALAR  
- PROXIMITY TRIGGER - IF EXISTS LOCALLY, ELSE NULL  
]
```

## 7.7 Light Source

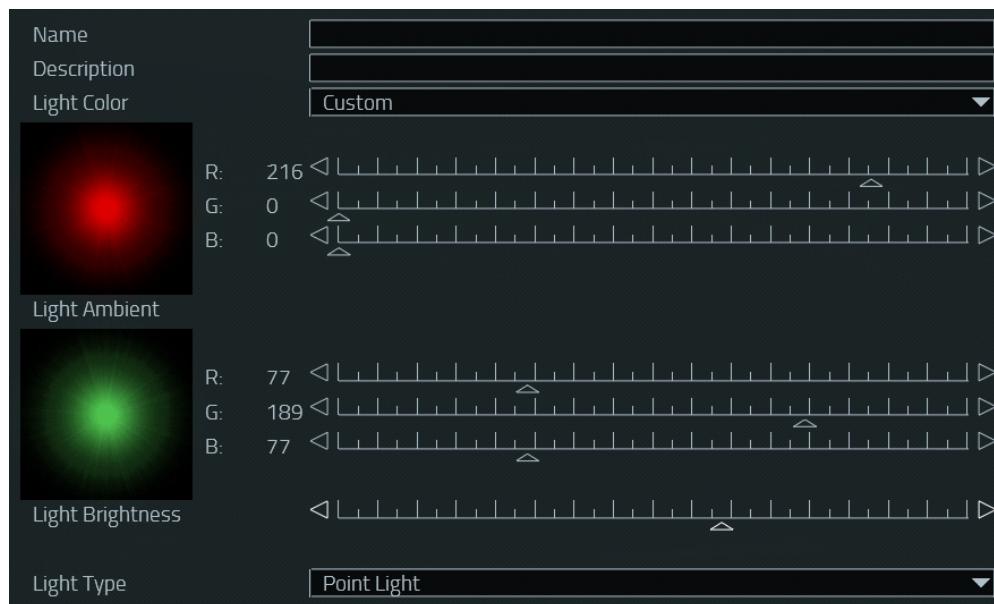
A Light Source Editor Object is available to provide custom lighting options for mission designers. This object allows you to create a light source, and place it in different locations, with the option to attach to vehicles and objects as required.

**Image-38: Light source with red light settings**



When the light source is placed in the Editor, the Object Properties dialog opens. This allows the light source to be configured.

**Image-39: Light Source Object Properties dialog**



- **Name** - Name of the light source, can be accessed using a script.
- **Description** - User provided description.

- **Light Color** - The color of the light source. Preset colors can be selected using the drop-down, and custom colors generated using the RGB sliders.
- **Light Ambient** - Sets the color of the ambient light using the RGB sliders.
- **Light Brightness** - Sets the brightness of the light source (moving the slider to the right increases brightness).
- **Light Type** - Choose between a spot light or a point light.
  - **Point Lights** - Emit light in all directions. The radius is displayed in 2D view, showing the color and approximate range of the light.
  - **Spot Lights** - Directional cone of light with the following extra inputs:
    - **Light Cone Angle** - Adjusts the cone frustum. The slider goes from 0 to 180 degrees.
    - **Light Cone Falloff** - Adjusts the light falloff on the cone (inner frustum). In 2D view, the light direction and cone angle are shown, as well as the color.

## 7.7.1 Light Source Attachment

When the light is attached to a vehicle / object, the light source is then attached to the linked vehicle / object. The offset of the vehicle / object in the Mission Editor remains as set as the vehicle moves around. The Light Source Editor Object can be dragged to a different location to change the offset.

Multiple light sources can be linked to the same vehicle.

## 7.7.2 Light Source Rotation

Both type of lights (spot and point) can be rotated, although point lights do not have direction so the light looks the same. Rotation is disabled while attached to objects, but the light source keeps its relative orientation upon attachment, so it is possible to control the orientation when attaching to objects.

## 7.8 Placing Mines

VBS4 includes a variety of land and sea mines for use in missions.

### **WARNING**

Adding / deleting this Editor Object in the VBS Editor during a multiplayer scenario may not be reflected on other clients.

You can do the following with mines:

- [Create a Mine \(below\)](#)
- [Create a Minefield \(on page 265\)](#)

### **NOTE**

Mines that you want Trainees to place themselves during a scenario should be added to the Equipment Inventory (see Equipment Inventory in the VBS4 Trainee Manual) of units, see [Edit Equipment Loadout \(on page 662\)](#). How Trainees then place them is discussed in Placing Mines Simulation in the VBS4 Trainee Manual.

### 7.8.1 Create a Mine

In the **Editor Objects List**, select **Mine** and click the map, where you want to place the Mine Editor Object.

**Image-40: Mine Editor Object Properties**

Presence Condition	true
Type	AT2 Anti-Tank Mine
Placement Radius	0

In the Object Properties dialog, set the following options:

**For land mines:**

Option	Description
<b>Presence Condition</b>	The condition for the mine to be present.   <b>NOTE</b> Only available in Prepare mode.
<b>Type</b>	Drop-down list of possible mines to place. Land mines (anti-tank or anti-personnel) can be hidden or observable.

Option	Description
<b>Placement Radius</b>	The distance from the placement point of this Editor Object that the mine could randomly spawn within.
<b>For sea mines:</b>	
Option	Description
<b>Presence Condition</b>	<p>The condition for the mine to be present.</p> <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"> <p><b>NOTE</b></p> <p>Only available in Prepare mode.</p> </div>
<b>Type</b>	<p>Sea mines have the following types:</p> <ul style="list-style-type: none"> <li>• <b>Sea Mine Bottom</b> - Snaps to the seabed.</li> <li>• <b>Sea Mine Floating</b> - Floats on the surface of the sea.</li> <li>• <b>Sea Mine Tethered</b> - Held in place by a tether stretching down to the sea-bed. Once the height in the water is set by the user (with the transform tool) the mine remains in this position until it is deleted or triggered.</li> </ul> <p>Each sea-mine type has the following fuse types:</p> <ul style="list-style-type: none"> <li>• <b>Contact</b> - Contact fuses work when a collision occurs between an object and the mine. The object must meet the trigger mass of the mine, which is set in the model configuration of the mine (see the Configuration Manual in the VBS Developer Reference). Currently all supported large vessels (Ferry+) trigger the mine.</li> </ul> <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"> <p><b>NOTE</b></p> <p>The Developer Reference is in the <code>\docs\</code> folder of the VBS Developer Suite installation.</p> </div> <ul style="list-style-type: none"> <li>• <b>Magnetic</b> - When a vessel of the specified mass (see <b>Contact</b>), and with magnetic mine detonation enabled, enters the model-configuration assigned trigger radius of this mine, the mine detonates.</li> <li>• <b>Seismic</b> - The seismic mine is triggered much in the same way as the magnetic mine above. However, this mine does NOT check for magnetism, and detonates purely on vessel mass and proximity.</li> </ul>
<b>Placement Radius</b>	<p>Sea-mine types have the following placement considerations:</p> <ul style="list-style-type: none"> <li>• <b>Sea Mine Bottom</b> - Cannot be raised above sea-bed.</li> <li>• <b>Sea Mine Floating</b> - Can be raised above sea-level but falls back down. Can be placed below sea-level but floats up.</li> <li>• <b>Sea Mine Tethered</b> - Cannot be placed above sea-level. If placed below the surface, it remains in position (does not float to surface).</li> </ul>

Click **OK** to confirm.

The Mine Editor Object is placed on the map.

#### Image-41: A visible M15 Anti-Tank mine and a floating sea mine



### 7.8.2 Create a Minefield

You can create a minefield, using the Script Editor Object.

#### Follow these steps:

1. Add a trigger (see [Triggers \(on page 810\)](#)) to the map.

 **WARNING**

The trigger must be of a certain size to define the minefield area. Also, the trigger area can only be rectangular. Circular areas are converted to rectangular ones.

2. In the Editor Objects List, select **Script** and place the Script Editor Object on the map.
3. In the **Filter** drop-down, select **Special Scripts**.
4. In the **Script File** drop-down, select **Minefield**.
5. In the **Type** drop-down, select the type of mine to use.
6. In the **Warning Signs** drop-down, select one of the following:
  - **Don't Show Signs** - Does not show any warning signs about the minefield, to indicate it.
  - **Show Signs** - Shows warning signs about the minefield, to indicate it.
7. In the **Density** drop-down, select the mine density of: **Normal**, **Low**, or **Very Low**.
8. In **Grid Spacing**, specify the spacing (in meters) between the mines, as they are arranged into a grid.

9. In the **Execute Globally?** drop-down, select whether the script should run locally or globally in a multiplayer scenario:
  - **Execute Only on Client Where Condition is True** - Runs the script only on clients, where the **Condition** setting (see step 9) is true.
  - **Execute on Every Client, Even if Condition is False on Some** - Runs the script on all the clients.
10. In **Condition**, specify the Boolean condition for the minefield to be created.
11. In the **Repeatedly** drop-down, set whether the condition should be evaluated repeatedly or not:
  - **Do Not Repeat** - Evaluate the condition only once.
  - **Repeat When Condition is True Again** - Evaluate the condition every time it returns true.
12. Right-click the Script Editor Object, select **Link to Trigger (Creates Minefield)**, drag the arrow and click the trigger you created in step 1, to link.

When the scenario runs, the Script Editor Object creates a minefield, according to the set condition.

For more information, see the [Script Editor Object \(on page 78\)](#).

For a demonstration of some Mine Clearance functionality in action, see the VBS4 Instructor Series - Mine Clearance Demonstration video at <https://youtu.be/f2bXHSdA2cE>.

 **NOTE**

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

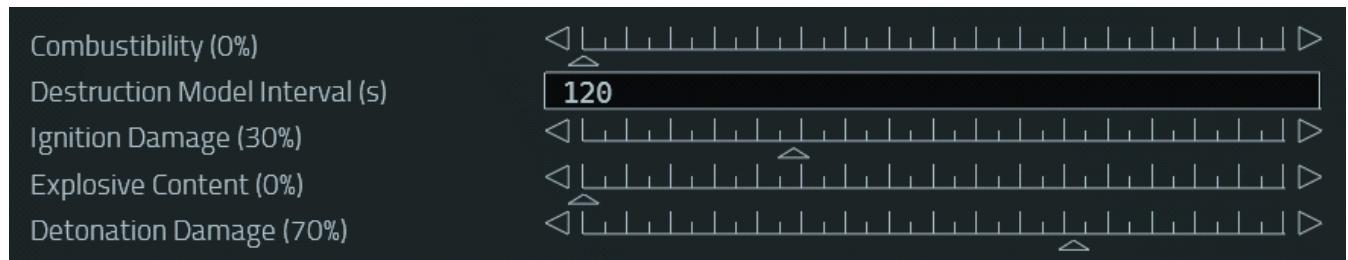
## 7.9 Secondary Damage

The Secondary Damage module is used to produce secondary effects to buildings damaged by an explosion. You can adjust the intensity of fire over time, create secondary explosions, and adjust the amount of (cumulative) detonation damage.

### Follow these steps:

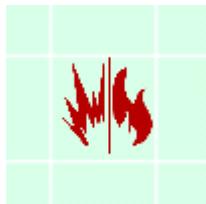
1. In VBS Editor, place a destructible building on the map.
2. Select **Module** from the Editor Objects List.
3. Expand the **Module** drop-down, select **Secondary Damage**, and click **OK**.

The Secondary Damage Object Properties dialog opens:



4. Using the slider bars adjust the following:
  - **Combustibility** - Ignition probability, when the building is struck, and the damage threshold is exceeded.
  - **Destruction Model Interval (s)** - Delay (in seconds) until the building advances to the next damage state (the states may vary, depending on the building model).
  - **Ignition Damage** - Ignition damage threshold.
  - **Explosive Content** - Detonation probability, when the building is struck, and the damage threshold is exceeded.
  - **Detonation Damage** - Detonation damage threshold.
5. Click **OK** to save your settings.

The Secondary Damage icon appears on the map:

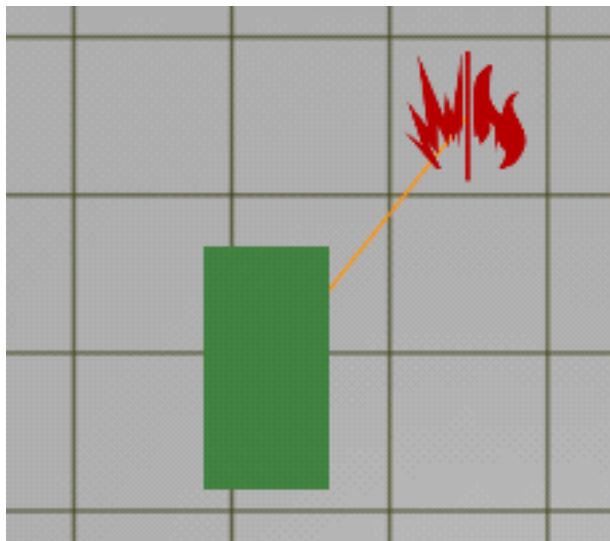


### Linking

To apply Secondary Damage, you must link the Secondary Damage Editor Object to the building you want to apply the effects to.

**Follow these steps:**

1. Right-click on the **Secondary Damage** icon and select **Link to Structure**.  
The list closes and a black arrow is attached to your cursor.
2. Drag the cursor and click on a **building**. The arrow changes color to **orange** which means that the building is linked to the Secondary Damage Editor Object.



3. Repeat steps 1 and 2 to link additional buildings to the same Secondary Damage Editor Object icon.

Preview the mission and damage the building (for example, using an anti-tank weapon).

When the building is sufficiently damaged, the Secondary Damage effects begin.

**⚠️ WARNING**

Multiple Secondary Damage Editor Objects can be used in the mission, but they should not be linked to the same buildings.

## 7.10 Shopping Center

This Editor Object enables you to place a large shopping center (400m x 250m) in a scenario. The shopping center offers an environment highly suited to counter-terrorism training as it has a complex layout, with numerous hiding places, and can be populated with large numbers of civilians.

In addition, related objects such as kiosks, benches, bins, furniture, plants, photo booths, and vending machines can be placed inside the shopping center, enabling you to customize the layout. There are also various counter-terrorism units, specific to the kind of scenarios the shopping center is used for.

### NOTE

The shopping center is a closed object. Units are unable to access the building using the external doors, so must be placed inside by the administrator.

### Follow these steps:

1. Place a unit on the map.

Counter-terrorism specific units are found at: **(F1) Unit > GB Civilians > AFO - G36C / CTSO - HK416 / Fireman**

### NOTE

Any unit type can be used, the shopping centre model is not exclusively for the use of counter-terrorism type units.

2. Place the shopping centre object on the map.

Go to: **(F8) Objects > Demo Shopping Centre - Buildings > Demo Shopping Centre**

3. Press **Map (M)** to switch to 3D Camera View (this makes placing units and objects in the shopping center easier).
4. Click the unit, and drag it into the building to place it in position.
5. Place objects in the shopping center, go to: **(F8) Objects > Demo Shopping Centre - Objects > Object**

The shopping center is set up for scenario start.

**Image-42: Shopping center with counter-terrorism personnel****Image-43: Objects placed in a scenario by the Administrator**

## 7.10.1 Monitoring Features

The shopping center incorporates monitoring features that enable administrators to conduct real-time tracking of events, for example:

- **2D Plan View**

Shows an accurate layout of the shopping center structure, and all units moving inside it. It enables administrators to track trainees during a scenario:

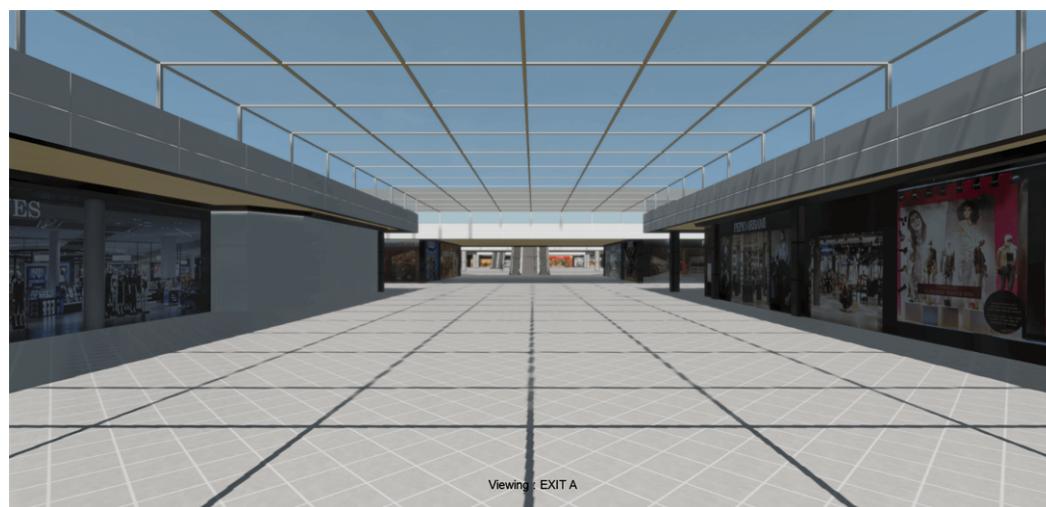
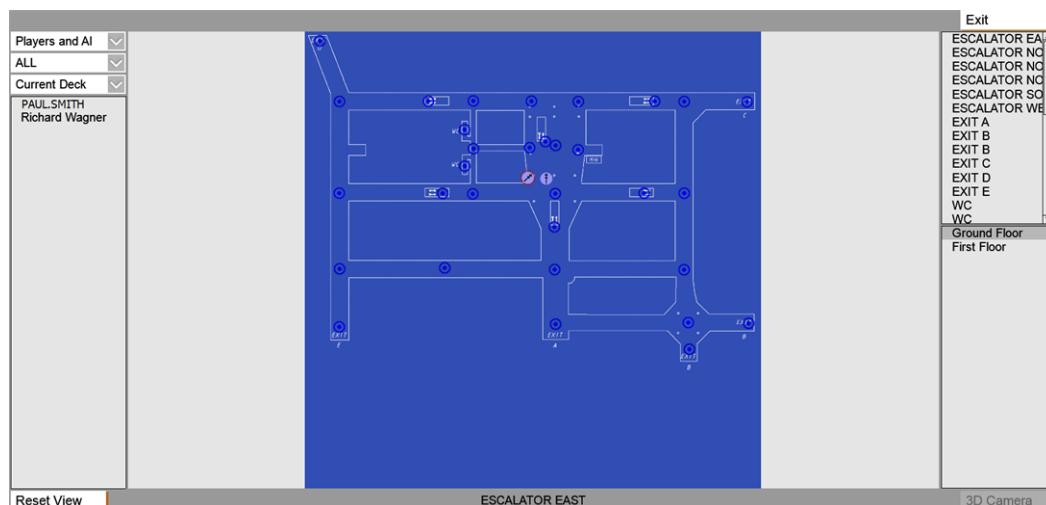
In Execute mode, go to the **Scenario Objects** panel, right-click **Demo Shopping Centre** in the list, and select **Show Plan View** from the context menu.

- **CCTV Camera View**

Cameras are positioned throughout the building that behave like a CCTV system. They enable administrators to quickly access a specific camera view during a scenario, using the 2D Plan View UI:

Select a location in the top-right panel, and click **3D Camera** at the bottom-right of the UI.

**Image-44: 2D plan and CCTV view**



## 7.11 Sound Source

The Sound Source Editor Object can be placed in missions to play sounds.

**Image-45:** Sound Source dialog

Name	<input type="text"/>
Presence Condition	<input type="text" value="true"/>
Type	<input type="text" value="AK47 Ambient"/> ▼
Condition	<input type="text" value="true"/>
Volume (9dB)	<input type="range"/>
Origin	<input type="text" value="Localized"/> ▼
Audible Distance	<input type="text" value="750"/>

### Follow these steps:

1. In the Editor Objects List, select **Sound Source**, and place the Editor Object on the map.
2. Set the following settings:

Setting	Description
<b>Name</b>	Name of the Sound Source Editor Object.
<b>Presence Condition</b>	Condition for the Sound Source Editor Object to be present. <div style="border: 1px solid #0070C0; padding: 5px; margin-top: 10px;"><span style="color: #0070C0;">i</span> <b>NOTE</b> Only available in Prepare mode.</div>
<b>Type</b>	Sound to play.
<b>Condition</b>	Condition for the Sound Source to play the sound. If false, the sound is not played.
<b>Volume</b>	Volume of the sound, when played.
<b>Origin</b>	Origin of the sound. If set to Localized, the sound comes from a 3D position.
<b>Audible Distance</b>	Distance (in meters) from the center, where the sound can be heard.

3. Click **OK**.

The Sound Source Editor Object is placed on the map.

## 7.12 Training Targets

VBS4 includes a range of Training Targets, in the form of dummy units, vehicles, and other objects. When a Trainee fires at a Training Target, it falls over.

### Image-46: Soldier Training Target



#### Follow these steps:

1. In the Editor Objects List, select (**F8**) **Objects** and double-click anywhere on the map.
2. In the **Type** list of the Object Properties dialog, go to **GB Range Targets - Falling / Popup**, and select a **Target Object** in the list, so that it is highlighted.

#### **i** NOTE

Normally, once hit by gunfire, Training Targets behave as follows:

- **Falling Target** - Remains in the lowered position.
- **Popup Target** - Automatically returns to the upright position after a few seconds.

3. Click **OK**.

The Training Target is placed on the map.

### 7.12.1 Lower Target at Mission Start

To set the Training Target as lowered at mission start, do one of the following in the VBS Editor (Prepare Mode):

- Right-click the **Target Object** on the map, and select **Lower Target at Mission Start** in the context menu.

- Go to the [Scenario Objects Panel \(on page 39\)](#), right-click the **Target Object** in the Objects list, and select **Lower Target at Mission Start** in the context menu.

The Training Target is in the lowered position when the mission starts.

For more information, see Lower Target at Mission Start in the VBS4 Instructor Manual.

## 7.12.2 Lower / Raise Target

To lower / raise the Training Target at any time during the mission, do one of the following in the VBS Editor (Preview / Execute Mode):

- Right-click the **Target Object** on the map, and select **Lower Target / Raise Target** in the context menu.
- Go to the [Scenario Objects Panel \(on page 39\)](#), right-click the **Target Object** in the Objects list, and select **Lower Target / Raise Target** in the context menu.

### TIP

These actions can also be performed using script command [fn\\_vbs\\_setPopupTargetsState](https://sqf.bisimulations.com/display/SQF/fn_vbs_setPopupTargetsState) ([https://sqf.bisimulations.com/display/SQF/fn\\_vbs\\_setPopupTargetsState](https://sqf.bisimulations.com/display/SQF/fn_vbs_setPopupTargetsState)).

The Training Target lowers / raises.

For more information, see Lower / Raise Target in the VBS4 Instructor Manual.

## 7.13 Water Current

The Water Current Editor Object enables the creation and control of water currents in VBS4.

### **NOTE**

The Water Current Editor Object only affects units in the water, but not watercraft.

### Follow these steps:

1. In the Editor, select **Water Current** from the Editor Objects List.
2. Right-click the placement position on the map, and select **New Object**.

The Water Current Object Properties dialog opens.

**Image-47: Water Current Editor Object properties**

Name	<input type="text"/>
Rectangular	<input checked="" type="checkbox"/> false
Size (Left-Right)	<input type="text"/> 250
Size (Up-Down)	<input type="text"/> 250
Current Speed (m/s)	<input type="text"/> 10
Direction (0 Deg)	<input type="range"/>

3. **Optional:** Input a name for the Editor Object.
4. Specify whether the area is **Rectangular** (true), or elliptical (false).
5. Specify the area **Size**, **Current Strength**, and current **Direction**.
6. Click **OK**.

The Editor places the water current area with an arrow indicating the current direction. Any unit that enters the area moves in the current direction at the specified speed.



## 7.14 Customizable Signs

You can place customizable signs in your scenario, and display text on them.

The customizable-sign Editor Objects can be found in VBS Editor in **(F8) Objects > VBS Objects > Customizable Sign Type**.

**Image-48: Customizable sign with an inscription**



**Follow these steps:**

1. In VBS Editor, select any of the available customizable signs from **(F8) Objects > VBS Objects > Customizable Sign Type**.
2. Click the location on the map, where you want to place the sign.
3. Update the **URN Marking** with the text to display on the sign.

The URN Marking is visible in the Editor Objects List and is transmitted to all applications connected to VBS4 through VBS Gateway.

**⚠️ WARNING**

Verify that `drawURNMarkings` is enabled in the `VBS4.xml` file, and restart VBS4 if you update `drawURNMarkings`.

For more information, see VBS4.xml Options in the VBS4 Administrator Manual.

4. Click **OK**.

The customizable sign is placed on the map, displaying the specified text.

## 8. Environment Tools and Objects

VBS4 supports a wide variety of environmental settings that include specific weather conditions and health simulation effects.

Use the appropriate Editor Objects and Tools to change the scenario environment:

- [Define Scenario Settings \(on the next page\)](#)
- [Weather Settings \(on page 285\)](#)
- [Map Settings \(on page 296\)](#)
- [Amputations \(on page 324\)](#)
- [Advanced Wounding \(on page 327\)](#)
- [Concussion Effects \(on page 337\)](#)
- [Sandstorm \(on page 340\)](#)
- [Radio Jamming Device \(on page 758\)](#)

## 8.1 Define Scenario Settings

You can define a large range of scenario specific settings in VBS Editor:

- Initialization Script
- Scenario Auto-Save
- Date and Time of Day
- Map Coordinates and Grid System
- Wildlife
- General AI Behavior
- Map Behavior
- Engagement Limits
- Fatigue Settings
- Unlimited Ammunition / Fuel / Invincibility

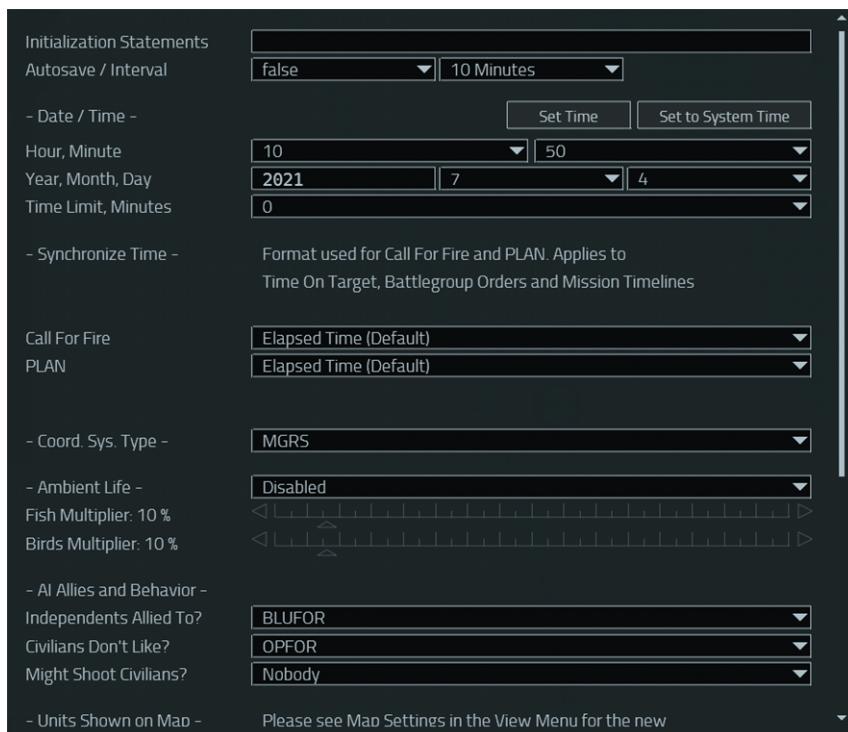


### TIP

For weather conditions, snow coverage, puddles (moisture), and sea conditions, see [Weather Settings \(on page 285\)](#).

#### Follow these steps:

1. Open the Tools menu, and select **Scenario Settings** to open the Object Properties dialog for the scenario.



2. Specify **Initialization Statements** to execute a script command or script when the scenario starts.

For more information, see [Scripting Introduction and Overview](#) in the VBS4 Scripting Manual.

3. Specify whether to **Autosave** the mission state during run-time and set a save **Interval**.

#### 4. Use the - **Date / Time** - settings to specify the start time for the scenario:

##### NOTE

If the date and time settings are not explicitly set, the system date and 12 noon are used.

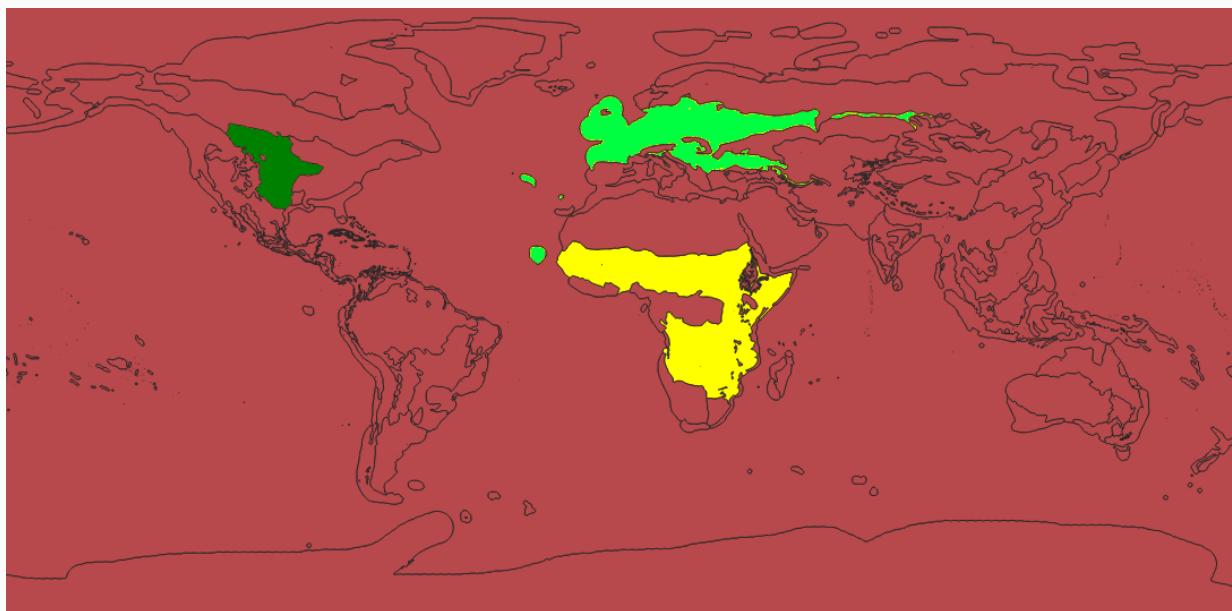
Date / Time Setting	Description
- <b>Date / Time</b>	Select one of the following settings: <ul style="list-style-type: none"><li>• <b>Use Scenario Settings</b> Use the time settings set in the dialog.</li><li>• <b>No Change / Scripted</b> (Default) Disable the time settings set in the dialog. This setting enables the use of scripted time settings.</li></ul>
<b>Set Time</b>	Click <b>Set Time</b> to open a scenario preview. Use the Set Time slider and click <b>OK</b> .
<b>System Time</b>	Click <b>Set to System Time</b> to set the time to the time on your client.
<b>Hour, Minute</b>	Set the time of day for the start of the scenario.
<b>Year, Month, Day</b>	Set the date for the scenario.
<b>Time Limit, Minutes</b>	Set a Time Limit for the scenario, with 0 as no time limit. The scenario automatically ends when the limit is reached.
<b>Synchronize Time</b>	Set the time format (hh:mm:ss) for VBS Call for Fire (CFF) or VBS Plan CAS to synchronize with either the Elapsed Time or the Mission Time. Applies to Time On Target, Battle-group Orders, and Timelines. Use the drop-downs to select from the following options: <ul style="list-style-type: none"><li>• <b>Call For Fire / Plan</b><ul style="list-style-type: none"><li>◦ <b>Elapsed Time (Default)</b> - Time from the start of the scenario.</li><li>◦ <b>Mission Time</b> - Time shown on the Watch.</li></ul></li></ul>

VBS4 automatically adjusts the terrain for specific biomes to display seasonally appropriate vegetation and surfaces based on the date selected.

**NOTE**

Seasonal effects only apply to the following biomes:

- Temperate broadleaf - Europe (including the Bystrzyca Kłodzka and Hohenfels insets).
- Temperate grasslands - North America.
- Tropical grasslands - Africa.

**5. Set a map grid system and base coordinates:**

Map Setting	Description
<b>- Coord. Sys. Type -</b>	Select the grid system to use on 2D maps: <ul style="list-style-type: none"><li>• <b>No Change / System Default</b> - Uses the coordinate system specified in the terrain configuration or defaults to MGRS if it is not specified.</li><li>• <b>MGRS (Default)</b> - Military Grid Reference System.</li><li>• <b>Lat / Long (dd.ddddd°)</b> - Decimal degrees.</li><li>• <b>Lat / Long (dd°mm'ss")</b> - Degrees, minutes, seconds.</li><li>• <b>UTM</b> - Universal Transverse Mercator.</li></ul>

**6. Enable - Ambient Life** - to include wildlife such as insects, birds, and fish.

Move the **Fish** and **Bird Multiplier** sliders to the right to increase the occurrence of these wildlife types in appropriate areas.

## 7. Set - AI Allies and Behavior - to control the general behavior of AI units:

AI Behavior Setting	Description
<b>Independents Allied To?</b>	<p>Set the side that Independent units ally with.</p> <ul style="list-style-type: none"><li>• <b>Nobody</b> - Independents attack both BLUFOR and OPFOR.</li><li>• <b>All Sides</b> - Independents do not attack BLUFOR or OPFOR.</li><li>• <b>BLUFOR</b> - Independents attack OPFOR.</li><li>• <b>OPFOR</b> - Independents attack BLUFOR.</li></ul>
<b>Civilians Don't Like?</b>	<p>Set a side that specific civilian units attack.</p> <p>Angry civilians are available under the <b>(F1) Unit</b> Editor Object category:</p> <ul style="list-style-type: none"><li>• <b>AF Civilians (Angry)</b></li><li>• <b>IQ Civilians (Angry)</b></li><li>• <b>SB Civilians (Angry)</b></li></ul> <p>Angry civilians automatically start throwing stones at the specified side. Stones are thrown in a similar manner to grenades.</p>
<b>Might Shoot Civilians?</b>	Specify sides that may engage civilian units.

## 8. Specify - Units Shown on Map - settings to determine the visibility of units and vehicles on the map for BLUFOR and OPFOR.

- a. In the Editor Menu, open **View > Map Settings**.
- b. Select **Icons**.
- c. Set the following **Units Shown on Map** settings, as described in **Map Settings (on page 296)**.

## 9. Specify - **Engagements** - settings to determine engagement time limits:

Engagement Setting	Description
<b>Interaction Timeout</b>	<p>Specifies an engagement time limit from the most recent instance of an event that would start an engagement.</p> <p>This counter measures the time since the last occurrence of a situation that would lead to the creation of a new engagement (if the unit was not already involved in an engagement). This means that each unit that is involved in an engagement resets the counter each time a situation that can create an engagement happens.</p> <p>Default value: <code>interactionTimeout = 15 minutes</code> (shown as <code>900</code> seconds).</p>
<b>Defeat Timeout</b>	<p>Specifies an engagement time limit based on the most recent instance of a defeat condition.</p> <p>This counter measures the time since one of the following happened:</p> <ul style="list-style-type: none"> <li>• All OPFOR are dead (there are no more OPFOR units, because dead units are changed to civilians).</li> <li>• All OPFOR are unable to fire, because they are injured or out of action.</li> <li>• All BLUFOR are dead.</li> <li>• All BLUFOR are unable to fire, because they are injured or out of action.</li> </ul> <p>Default value: <code>defeatTimeout = 5 minutes</code> (shown as <code>300</code> seconds).</p>

Engagements end when one of the timeouts (Interaction or Defeat) reaches its limit.

Engagement events are recorded in the AAR Statistics dialog, see Engagements in the VBS4 AAR Manual for more information.

## 10. Use - **Physiological** - settings to control the rate of fatigue for characters.

### NOTE

Fatigue is disabled by default in VBS4. To re-enable fatigue, turn on **Realistic Fatigue**. For more information, see Simulation Settings in the VBS4 Administrator Manual.

If enabled, the indicator bar only shows if unit fatigue is bigger than 0.

To override the default or scripted setting, set - **Physiological** - to **Use Scenario Settings**, and move the **Fatigue Scaling (%)** slider to the left to reduce the rate at which fatigue affects characters.

11. Use the - **Global Overrides** - drop-downs to apply the following global effects for each of the respective unit / vehicle categories (All, Players, BLUFOR, OPFOR, Civilian, Independent).

Setting	Description
<b>Unlimited Ammo</b>	All selected unit categories have unlimited ammunition for their personal weapons. Magazines are automatically replaced when they become exhausted. In addition, when set to <b>Players</b> , works for whatever vehicle weapon / turret Players are using.
	<p> <b>WARNING</b></p> <p>Units / vehicles must have at least one magazine at the start of the scenario. If they have no ammunition at all, this setting does not work.</p>
<b>Unlimited Fuel</b>	All selected vehicle categories have unlimited fuel.
<b>Take No damage</b>	All selected unit categories are invincible and cannot be killed or injured, and all selected vehicle categories do not receive damage.

### NOTE

These settings have the following characteristics:

- They work for all units / vehicles placed in Single Player and Multiplayer scenarios.
- They work for all units / vehicles created in-game in **Execute Mode** (in Single Player and Multiplayer scenarios).
- The settings can be saved / loaded to and from Battlespaces.
- If set to **None**, standard VBS behavior applies.
- Global Overrides supersede entity override settings while active.
- Empty vehicles are classed as **Civilian** when applying global settings.
- For related Global Override SQF commands, see [setGlobalOverride](https://sqf.bisimulations.com/display/SQF/setGlobalOverride) (<https://sqf.bisimulations.com/display/SQF/setGlobalOverride>) and [getGlobalOverride](https://sqf.bisimulations.com/display/SQF/getGlobalOverride) (<https://sqf.bisimulations.com/display/SQF/getGlobalOverride>).
- For related Entity Override SQF commands, see [setEntityOverride](https://sqf.bisimulations.com/display/SQF/setEntityOverride) (<https://sqf.bisimulations.com/display/SQF/setEntityOverride>) and [getEntityOverride](https://sqf.bisimulations.com/display/SQF/getEntityOverride) (<https://sqf.bisimulations.com/display/SQF/getEntityOverride>).

To apply entity overrides to individual units and vehicles, see [Adding Units \(on page 344\)](#) and [Adding Vehicles \(on page 599\)](#).

## 12. Click **OK**.

VBS Editor adds an Intel Editor Object to the map to indicate that the scenario is using custom settings.



Only one Intel Editor Object can exist, and if the object is deleted, settings reset to their default values.

## 8.2 Weather Settings

Weather settings in VBS4 are adjusted using the Weather Settings dialog. To access the dialog, go to **Tools > Weather Settings** in the VBS Editor.



### TIP

For other scenario settings, see [Define Scenario Settings \(on page 278\)](#).

**Image-49: Weather Settings dialog**



The Weather Settings dialog has the following features:

- |   |                                  |
|---|----------------------------------|
| 1 | Weather Tab                      |
| 2 | Expand / Collapse All Categories |
| 3 | Category Heading                 |
| 4 | Presets Drop-down                |
| 5 | Settings Panel                   |

The category headings include the following categories, which enable you to access specific settings to create customized weather, or select from a range of preset weather conditions:

- [Overcast \(on page 289\)](#)
- [Precipitation \(on page 289\)](#)
- [Wind \(on page 290\)](#)
- [Fog \(on page 290\)](#)

- [Water \(on page 291\)](#)
- [Surface \(on page 292\)](#)
- [Atmosphere \(on page 295\)](#)

On the **Category Heading** of the category you want to adjust, expand the **Presets** drop-down, and do one of the following:

Select **Custom** to create a customized Category, and go to step 1.

Select a **Preset** from the list, and go to step 3.

Category	Presets
<b>Overcast</b>	Clear Sky, Dense Overcast, Light Overcast, Scattered Clouds
<b>Precipitation</b>	Hail, No Precipitation, Rain, Sleet, Snow
<b>Wind</b>	Light Wind, No Wind, Strong Wind
<b>Fog</b>	Dense Fog, Light Fog, No Fog
<b>Water</b>	Calm Sea, Frozen Water, Large Waves
<div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><p><b>NOTE</b> Frozen Water is available only in Prepare Mode.</p></div>	
<b>Surface</b>	Dry Surface, Puddles, Snow, Snow (Plowed Roads), Snow (Vegetation and Buildings).
<div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><p><b>NOTE</b> Snow and Snow (Plowed Roads) are available only in Prepare Mode. Snow (Vegetation and Buildings) is available only in Execute Mode.</p></div>	
<b>Atmosphere</b>	Currently, no presets are available.

### Follow these steps:

1. Click the **down arrow** on the **Category Heading** that you want to customize.



The corresponding **Settings Panel** opens.

2. Adjust the settings.

3. Click **Apply** to see how your adjustments look.



**TIP**

It is best to make adjustments in 3D View so that you can see the results (press **Map (M)** to enter 3D View, then open the **Weather Settings** dialog and make adjustments). However, be aware that moving weather conditions, such as precipitation, wind, and sea waves are not visible in **Prepare Mode**, so you should check them in **Preview Mode**.

In addition, you can move the camera around with the Weather Settings dialog open, which enables you to see different areas of the scenario.

4. Do one of the following:

- Click **Reset** to revert to the last applied adjustments.
- Click **Cancel** to revert to the last applied adjustments and close the dialog.
- Click **OK** to apply the adjustments you have made and close the dialog.

5. To save the adjusted settings, save the Battlespace.



**NOTE**

Weather settings are saved in the **Battlespaces.xml** file, which is found at the following location on your computer:

***\Documents\VBS4\Battlespaces\Battlespace\_Name\Missions\BattLespace\_Name\BattLespaceSettings.xml***



**NOTE**

Some settings may take a while to take effect (for example, rain, snow) and may cause performance issues (observed when changing snow coverage, for example) if done during scenario execution.

 **TIP**

Alternatively, to quickly find a specific setting without opening categories, do the following:

1. Click in the **Search** field.

A full list of all of the available settings opens, regardless of category.

2. Scroll down to the setting you want, and click it.

You are immediately taken to the selected setting in the relevant Settings Panel.

Search	
Weather Overcast / Layer 0	Coverage
Weather Overcast / Layer 0	Density
Weather Overcast / Layer 0	Type
Weather Overcast / Layer 0	Altitude
Weather Overcast / Layer 1	Coverage
Weather Overcast / Layer 1	Density

## 8.2.1 Overcast

This category enables you to create customized overcast behavior, using the settings listed in the following table.

Setting	Description
<b>Layer 0 / 1</b>	Click the down arrow to open the overcast (cloud) settings for Layer 0 / Layer 1. 
<b>Coverage</b>	Enter a value, use the arrows, or use the slider to set the cloud coverage, as a percentage (%).
<b>Density</b>	Enter a value, use the arrows, or use the slider to set the cloud density, as a percentage (%).
<b>Type</b>	Enter a value, use the arrows, or use the slider to set the rendered cloud type. 0 = Cumulus, 1 = Stratus.
<b>Altitude</b>	Enter a value, use the arrows, or use the slider to set the altitude at which clouds begin to form, and the altitude at which they end, in meters (m).

## 8.2.2 Precipitation

This category enables you to create customized precipitation behavior, using the settings listed in the following table.

Setting	Description
<b>Type</b>	Use the drop-down to select from the following options: <ul style="list-style-type: none"> <li>• Rain</li> <li>• Snow</li> <li>• Sleet</li> <li>• Hail</li> </ul>
<b>Altitude</b>	Enter a value, use the arrows, or use the slider to set the precipitation altitude, in meters (m).
<b>Density</b>	Enter a value, use the arrows, or use the slider to set the precipitation density, as a percentage (%).
<b>Severity</b>	Enter a value, use the arrows, or use the slider to set the precipitation severity (speed) at which the precipitation is falling (values are from 0 to 1).

## 8.2.3 Wind

This category enables you to create customized wind behavior, using the settings listed in the following table.

Setting	Description
<b>Wind Direction</b>	Use the drop-down to select from the following wind propagation directions: <ul style="list-style-type: none"> <li>• Propagate From North</li> <li>• Propagate From North East</li> <li>• Propagate From East</li> <li>• Propagate From South East</li> <li>• Propagate From South</li> <li>• Propagate From South West</li> <li>• Propagate From West</li> <li>• Propagate From North West</li> </ul>
<b>Wind Speed</b>	Enter a value, use the arrows, or use the slider to set the wind speed, in meters per second (m/s).
<b>Gust Speed</b>	Enter values, use the arrows, or use the slider to set the minimum and maximum gust speed, in meters per second (m/s).
<b>Gust Duration</b>	Enter values, use the arrows, or use the slider to set the minimum and maximum gust duration, in seconds (s).
<b>Gust Interval</b>	Enter a value, use the arrows, or use the slider to set the gust interval, in seconds (s).

## 8.2.4 Fog

This category enables you to create customized fog behavior, using the settings listed in the following table.

Setting	Description
<b>Base Altitude</b>	Enter a value, use the arrows, or use the slider to set the fog base altitude above sea level, in meters (m).
<b>Altitude Scale</b>	Enter a value, use the arrows, or use the slider to set how quickly fog density changes with altitude (value from -500 to 500, in meters).
<b>Density</b>	Enter a value, use the arrows, or use the slider to set the fog density, as a percentage (%).
<b>Color</b>	Click inside the <b>Color</b> field to open the Color Palette dialog. Select a color in the dialog, and click <b>OK</b> .

## 8.2.5 Water

This category enables you to create customized water behavior, using the settings listed in the following table.

 Water		Custom		
Setting	Description			
<b>Freeze Water</b>	<p>Click to freeze / unfreeze all water in the scenario, including seas, rivers, lakes, and streams. When enabled, units and vehicles can travel on frozen bodies of water in the scenario.</p> <div style="border: 1px solid #0070C0; padding: 5px; margin-top: 10px;"> <p> <b>NOTE</b></p> <p>The following considerations apply:</p> <ul style="list-style-type: none"> <li>• This setting can only be used in <b>Prepare Mode</b>, not Execute Mode.</li> <li>• If enabled, all other settings in the Water category are disabled.</li> </ul> </div>			
<b>Sea State Control</b>	<p>Use the drop-down to select from the following options:</p> <ul style="list-style-type: none"> <li>• Use Sea State Settings</li> <li>• Sea State is linked to Wind Settings (disables options in the Sea State settings)</li> </ul>			
<b>Wave Direction</b>	<p>Use the drop-down to select from the following wave propagation directions:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;"> <ul style="list-style-type: none"> <li>• Propagate From North</li> <li>• Propagate From North East</li> <li>• Propagate From East</li> <li>• Propagate From South East</li> </ul> </td><td style="width: 50%;"> <ul style="list-style-type: none"> <li>• Propagate From South</li> <li>• Propagate From South West</li> <li>• Propagate From West</li> <li>• Propagate From North West</li> </ul> </td></tr> </table>		<ul style="list-style-type: none"> <li>• Propagate From North</li> <li>• Propagate From North East</li> <li>• Propagate From East</li> <li>• Propagate From South East</li> </ul>	<ul style="list-style-type: none"> <li>• Propagate From South</li> <li>• Propagate From South West</li> <li>• Propagate From West</li> <li>• Propagate From North West</li> </ul>
<ul style="list-style-type: none"> <li>• Propagate From North</li> <li>• Propagate From North East</li> <li>• Propagate From East</li> <li>• Propagate From South East</li> </ul>	<ul style="list-style-type: none"> <li>• Propagate From South</li> <li>• Propagate From South West</li> <li>• Propagate From West</li> <li>• Propagate From North West</li> </ul>			
<b>Force</b>	<p>Enter a value, use the arrows, or use the slider to set the water force, which is the wave height / water roughness, according to the <a href="http://en.wikipedia.org/wiki/Beaufort_Scale">Beaufort Scale</a> (<a href="http://en.wikipedia.org/wiki/Beaufort_Scale">http://en.wikipedia.org/wiki/Beaufort_Scale</a>).</p>			
<b>Sea Color</b>	<p>Click inside the <b>Color</b> field to open the Color Palette dialog. Select a color in the dialog, and click <b>OK</b>.</p>			
<b>Water Temperature</b>	<p>Enter a value, use the arrows, or use the slider to set water temperature, in degrees Celsius (°C). The permitted range is 4 °C to 40 °C.</p>			

## 8.2.6 Surface

This category is divided into two sub-categories: Moisture and Snow. These sub-categories enable you to create customized surface behavior, such as the moisture content of soil and snow cover, using the settings listed in the following tables.



### Moisture

Setting	Description
<b>Surface Moisture</b>	Enter a value, use the arrows, or use the slider to set the surface moisture (amount of moisture in the soil), in millimeters (mm). Higher Surface Moisture settings cause puddles to form.
<b>Visualize Moisture</b>	Click the switch to turn VBS Blue IG visualizations on / off (such as puddles, mud).

### Snow

Setting	Description
<b>Snow Depth</b>	Enter a value, use the arrows, or use the slider to set the snow depth and uniformity of coverage on the ground, in meters (m). The lower the value, the less even the ground coverage.
<b>Snow Compactness</b>	<p><b>NOTE</b></p> <p>The following considerations apply:</p> <ul style="list-style-type: none"><li>• This setting can only be used in <b>Prepare Mode</b>, not Execute Mode.</li><li>• If set to 0, the <a href="#">Snow Compactness (below)</a> and <a href="#">Road Plowing (on the next page)</a> settings are disabled.</li><li>• For larger snow depth, any snow placed after any entities / objects are placed in the scenario may result in the entities / objects being submerged in snow. If you want the entities / objects to be placed on the snow, add the snow first and the entities / objects after. Alternatively, use the <b>Snap to Surface</b> context-menu option to snap the entities / objects onto the snow surface.</li></ul>

Setting	Description
<b>Snow on Vegetation</b>	Enter a value, use the arrows, or use the slider to set the snow depth and uniformity of coverage on vegetation, as a percentage (%). The lower the value, the less even the coverage on vegetation.
<b>Snow on Buildings</b>	Enter a value, use the arrows, or use the slider to set the snow depth and uniformity of coverage on buildings, as a percentage (%). The lower the value, the less even the coverage on buildings.
<b>Road Plowing</b>	Enter a value, use the arrows, or use the slider to set the snow coverage after plowing on roads, as a percentage (%).
<b>Ice Plowing</b>	Enter a value, use the arrows, or use the slider to set the snow coverage after plowing on frozen surfaces (such as frozen lakes), as a percentage (%).

**NOTE**

This setting can only be used in **Prepare Mode**, not Execute Mode.

**NOTE**

This setting can only be used in **Prepare Mode**, not Execute Mode.  
[Freeze Water \(on page 291\)](#) must be enabled to use this setting.

**NOTE**

**Low** and **Normal** Graphics Settings presets may produce visual defects on height changes in terrain deformation details, such as vehicle tracks in snow. Instead of using the **High** preset, you can increase the **Terrain Vertex Count** video setting to reduce these visual effects.

Using the [Moisture \(on the previous page\)](#) and [Snow \(on the previous page\)](#) settings, the following example results are possible.

## Fresh Snow

<b>Surface Moisture</b>	0	
<b>Snow Depth</b>	0.03	
<b>Snow Compactness</b>	0.8	
<b>Snow on Vegetation</b>	25	
<b>Snow on Buildings</b>	30	
<b>Road Plowing</b>	50	
<b>Ice Plowing</b> (if frozen water)	30	

## Deep Snow

<b>Surface Moisture</b>	0	
<b>Snow Depth</b>	0.5	
<b>Snow Compactness</b>	0.175	
<b>Snow on Vegetation</b>	60	
<b>Snow on Buildings</b>	65	
<b>Road Plowing</b>	40	
<b>Ice Plowing</b> (if frozen water)	5	

## Melting Last Snow

<b>Surface Moisture</b>	65	
<b>Snow Depth</b>	0.03	
<b>Snow Compactness</b>	0.2	
<b>Snow on Vegetation</b>	30	
<b>Snow on Buildings</b>	40	
<b>Road Plowing</b>	50	
<b>Ice Plowing</b> (if frozen water)	30	

## 8.2.7 Atmosphere

Enables you to create customized atmospheric behavior, using the following setting:



### Setting

#### Air Temperature

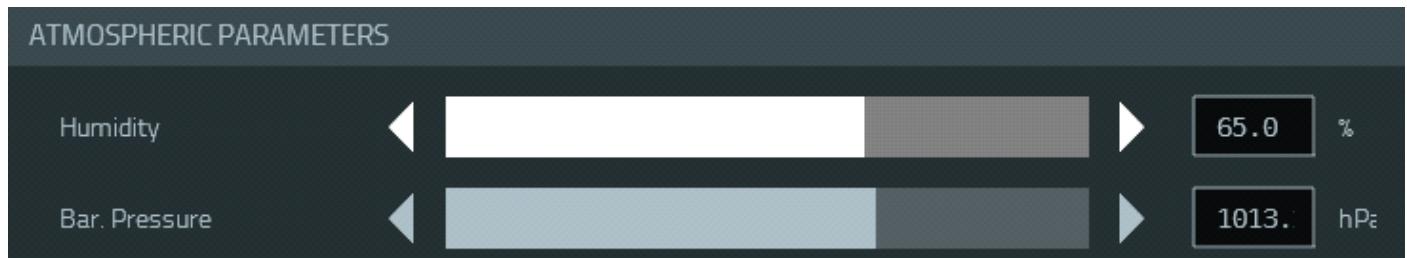
### Description

Enter a value, use the arrows, or use the slider to set the air temperature, in degrees Celsius (°C).  
The permitted range is -40 °C to 40 °C.

## 8.2.8 Atmospheric Parameters

You can also set atmospheric parameters in **Tools > Atmospheric Parameters**.

**Image-50: Atmospheric Parameters dialog**



### Follow these steps:

1. Use the sliders or enter values to adjust the following parameters:

- Humidity (as a percentage (%)).

**NOTE**

Humidity is used as a display value only and has no impact on ballistics in VBS4.

- Barometric Pressure (in hectoPascals (hPa)).

2. Click **OK** to save your adjustments.

If the **Advanced Ballistics** setting is enabled, ballistics are affected by wind speed and direction, temperature, and barometric pressure. For more information, see Simulation Settings in the VBS4 Administrator Manual.

**TIP**

If necessary, Trainees can display atmospheric parameters for themselves during a scenario, as a HUD. For more information, see Atmospheric Parameters in the VBS4 Trainee Manual.

## 8.3 Map Settings

The Map Settings dialog is used to adjust map and Fog of War (FoW) settings for Trainees in Command and Control (C2) mode. The settings in the dialog can be applied to both units and vehicles, which are often collectively referred to as **entities**.

FoW refers to the situational awareness of players, and what they are aware of in a scenario. Using the Map Settings dialog, you can configure maximum FoW, which means that when you open the 2D map, only entities in your direct line-of-sight are visible. Entities over hills or behind buildings are not displayed. Alternatively, you can configure minimum FoW, which means that you can see all entities in the scenario on the 2D map at all times, no matter where they are. In addition, you can adjust the settings so that players have all knowledge of their own side, but no knowledge of an enemy.

The Map Settings dialog also allows you to add / edit / remove layers of offline and / or online map data, from VBS4 and third parties.

For more information about C2 mode, see Command and Control (C2) Screen in the VBS4 Trainee Manual.

### Follow these steps:

1. Open the Map Settings dialog in the VBS Editor menu (**View > Map Settings**).

The Map Settings dialog opens.

2. Use the settings in the following dialog tabs:

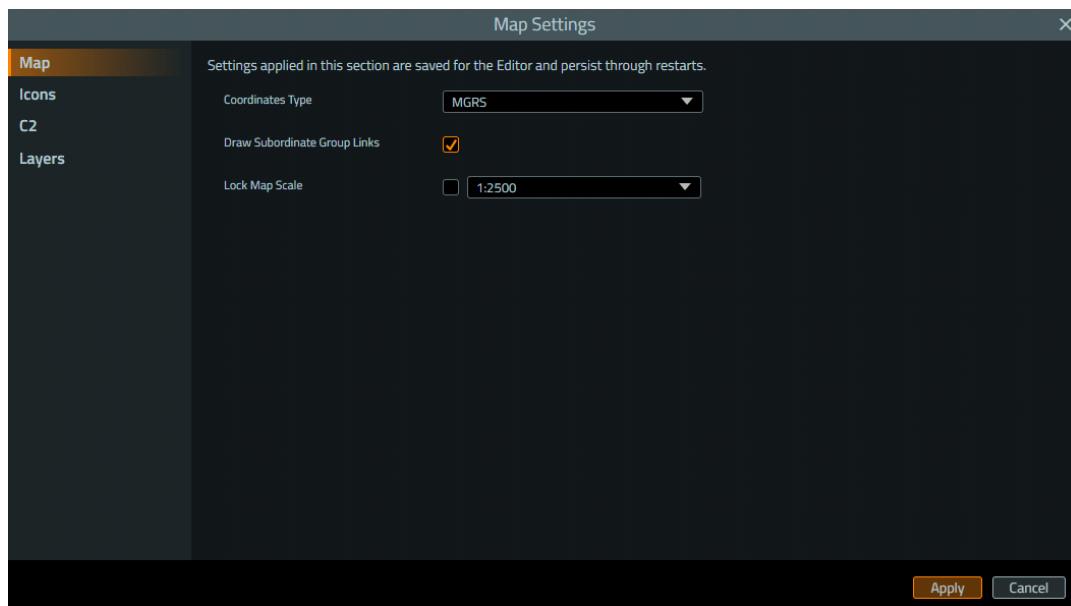
- [Map Tab \(on the next page\)](#)
- [Icons Tab \(on page 298\)](#)
- [C2 Tab \(on page 300\)](#)
- [Layers Tab \(on page 301\)](#)

3. Click **Apply** to save the settings.

The settings are saved in either your user Profile or the exported mission, meaning that next time you open VBS4 or an exported mission, the settings are as you left them.

## 8.3.1 Map Tab

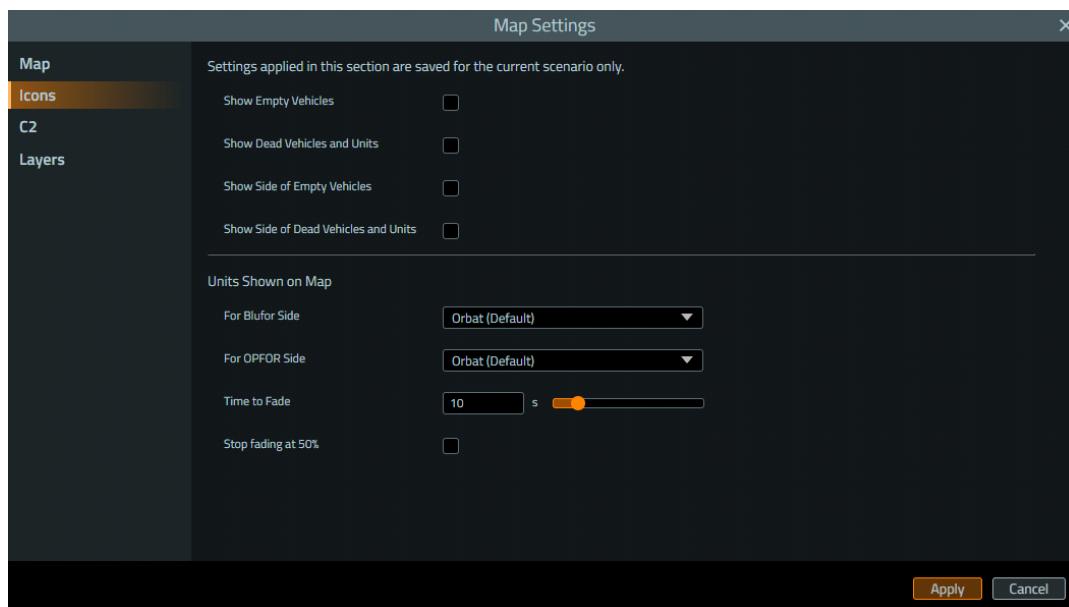
The settings on this tab are used to adjust map coordinates / scale.



Setting	Description
<b>Coordinates Type</b>	<p>Sets the coordinates type for the 2D map. Use the drop-down to select from the following options:</p> <ul style="list-style-type: none"> <li>• MGRS</li> <li>• Lat / Long</li> <li>• BNG</li> <li>• LLMS</li> <li>• UTM</li> </ul> <div style="border: 1px solid #8B8B00; padding: 10px; margin-top: 10px;"> <span style="color: #8B8B00; font-size: 2em; margin-right: 10px;">★</span> <b>FEATURE NOTICE</b> <p>This coordinates type is UK-specific, and cannot be used in other regions of the Whole-Earth Terrain.</p> </div>
<b>Draw Subordinate Group Links</b>	Check to show links between a group and its subordinate(s) group on the 2D map.
<b>Lock Map Scale</b>	<p>Locks the map scale to one of the following, and prevents scrolling in / out when the 2D map is opened in C2 mode:</p> <ul style="list-style-type: none"> <li>• 1:2500</li> <li>• 1:5000</li> <li>• 1:10000</li> <li>• 1: 25000</li> </ul> <p>Default setting is unchecked (disabled). Active only at run-time. Works for single or multiplayer scenarios.</p>

## 8.3.2 Icons Tab

The settings on this tab are used by the Administrator / Instructor to control the entity icons that users see on the 2D map in C2 mode. The tab is divided into two sections. Settings in the upper section are used to show / hide icons for various types of entities, settings in the lower section ([Units Shown on the 2D Map \(below\)](#)) are used to control icons to simulate FoW.



The upper section of the Icons tab has the following settings (the boxes are usually unchecked (settings disabled) by default).

Setting	Description
<b>Show Empty Vehicles</b>	Select to show C2 mode users all empty vehicles on the map.
<b>Show Dead Vehicles and Units</b>	Select to show C2 mode users all dead vehicles and units on the map.
<b>Show Side of Empty Vehicles</b>	Select to show C2 mode users which side empty vehicles are on. Their icons appear on the 2D map as semi-opaque.
<b>Show Side of Dead Vehicles and Units</b>	Select to show C2 mode users which side dead units / vehicles are on. Their icons appear on the 2D maps as semi-opaque.

### Units Shown on the 2D Map

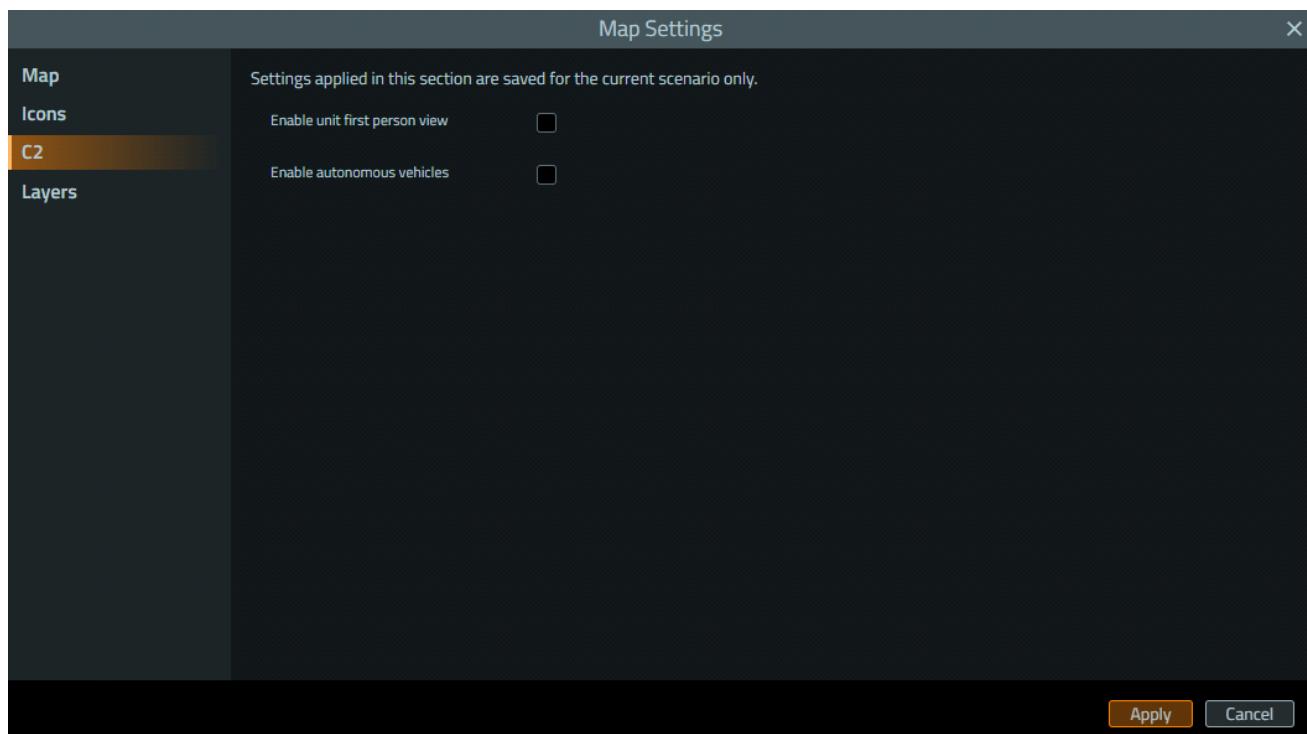
The lower section of the Icons tab has the following FoW settings, which determine what players see on the 2D map in C2 mode.

Setting	Description
<b>For BLUFOR Side</b>	<p>Sets what BLUFOR players see on the 2D map in a scenario.</p> <ul style="list-style-type: none"> <li><b>No Entities</b> - No entities are shown on the map.</li> <li><b>All</b> - All entities on the map are visible, regardless if they are in the line-of-sight of the player or not.</li> <li><b>Only Those on Player's Side</b> - Only entities on the same side are visible.</li> <li><b>Only Those on Player's Side, or in his line of sight</b> - Only entities in the line-of-sight of the player, or on the same side, are visible.</li> <li><b>Visible to Player's Side</b> - All entities on the same side as the player, units of other sides (providing that they are in the line-of-sight of the player), or anyone else on their side are visible.</li> <li><b>Units in Line of Sight</b> - All entities in the line-of-sight of the player (regardless of side) are visible.</li> <li><b>Player Only</b> - The player only sees themselves.</li> <li><b>Orbat (Default)</b> - All entities in the line-of-sight of the player (regardless of side), and all entities within the player Higher Echelon are visible.</li> </ul> <p>In addition, all entities on the same side as the player are listed in the ORBAT List, regardless if they are in the line-of-sight of the player or not).</p>
<b>For OPFOR Side</b>	<p>Sets what OPFOR players see on the 2D map in a scenario.</p> <ul style="list-style-type: none"> <li><b>No Entities</b> - No entities are shown on the map.</li> <li><b>All</b> - All entities on the map are visible, regardless if they are in the line-of-sight of the player or not.</li> <li><b>Only Those on Player's side</b> - Only entities on the same side are visible.</li> <li><b>Only Those on Player's Side, or in His Line of Sight</b> - Only entities in the line-of-sight of the player, or on the same side, are visible.</li> <li><b>Visible to Player's Side</b> - All entities on the same side as the player, units of other sides (providing that they are in the line-of-sight of the player), or anyone else on their side are visible.</li> <li><b>Units in Line of Sight</b> - All entities in the line-of-sight of the player (regardless of side) are visible.</li> <li><b>Player Only</b> - The player only sees themselves.</li> <li><b>Orbat (Default)</b> - All entities in the line-of-sight of the player (regardless of side), and all entities within the player Higher Echelon are visible.</li> </ul> <p>In addition, all entities on the same side as the player are listed in the ORBAT List, regardless if they are in the line-of-sight of the player or not).</p>
<b>Time to Fade</b>	<p>When a unit moves away from another entity, this is the time before the icon of the entity fades away and, possibly, disappears altogether.</p> <p>Enter a number (in seconds) in the box, or use the slider to adjust.</p>
<b>Stop Fading At 50%</b>	<p>Related to the <b>Time to Fade</b> setting.</p> <p>Check to stop icon fading at 50%.</p>

### 8.3.3 C2 Tab

The settings on this tab allow Administrators / Instructor to enable / disable specific behavior for users in the 3D View in C2 mode.

**Image-51: C2 Tab**



Setting	Description
<b>Enable Unit First Person View</b>	Select to enable access to the Player Camera view of any BLUFOR unit in the scenario.
<b>Enable Autonomous Vehicles</b>	Select to enable anyone to access Assign To in the context menu, and link AVs to units.

## 8.3.4 Layers Tab

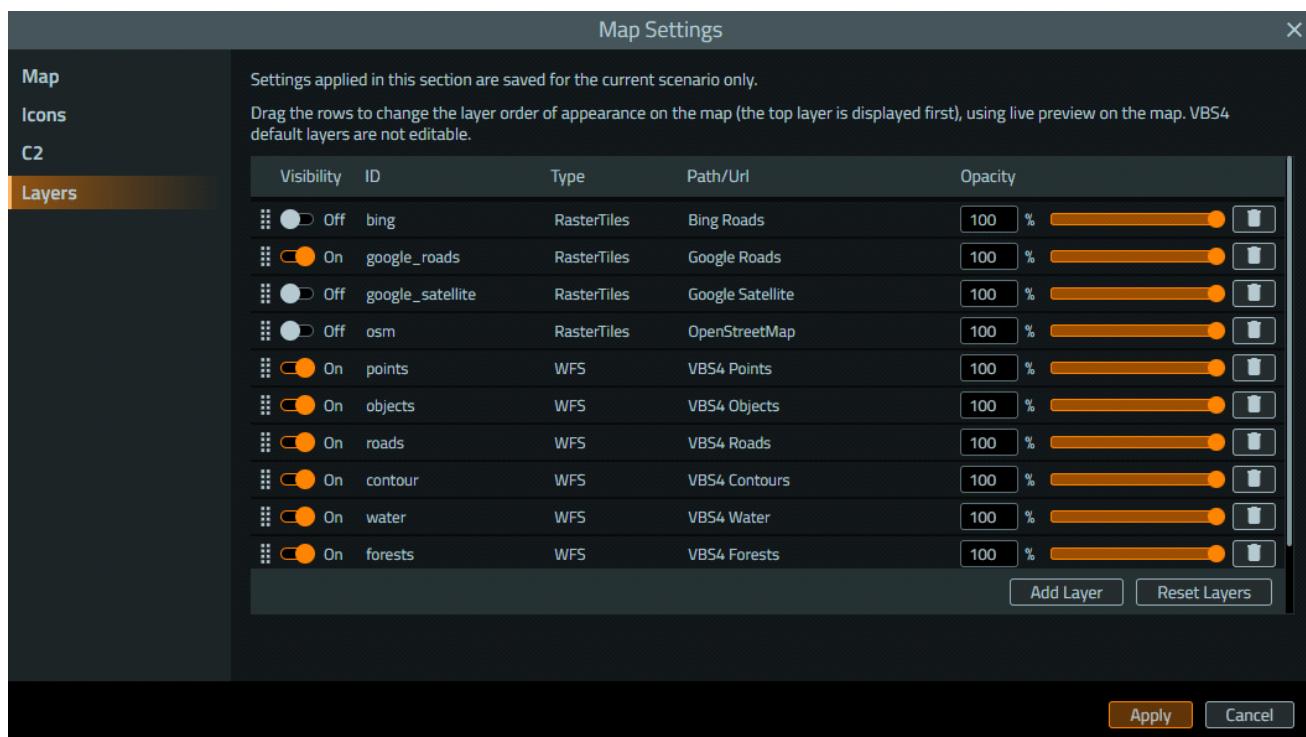
The settings on this tab allow Administrators / Instructors to add map layers.

### **i** NOTE

The following considerations apply:

- While map layers are normally set up by Administrators / Instructions, Trainees can override the setup by accessing the Map Settings in the C2 (see Command and Control (C2) Screen in the VBS4 Trainee Manual).
- Certain map layers, such as Microsoft Bing Maps, Google Maps, or OpenStreetMap (OSM), require an unrestricted internet connection, with access to the applicable third-party servers, to be displayed. Some layers may require additional access permission from the relevant vendors.

### Image-52: Layers Tab



For more information, see Custom Map Layers.

To export the currently visible region of the map as a [.pdf](#) file or QGIS project ([.qgs](#) file), see [Export Map \(on page 315\)](#).

To convert raster map files using QGIS, see [Converting Raster Map Files \(on page 318\)](#).

## 8.3.5 Custom Map Layers

You can import and apply custom layers to VBS4 maps. The layers can be, for example, raster images or vector data, which contain mapping data (such as, buildings, landmark, and vegetation symbols). They can be switched on and off as required (in Prepare and Execute Modes), and their opacity adjusted.

This topic discusses the following:

- [Formats \(below\)](#)
- [Import and Apply Map Layers \(on page 304\)](#)

### NOTE

Certain map layers, such as Microsoft Bing Maps, Google Maps, or OpenStreetMap (OSM), require an unrestricted internet connection, with access to the applicable third-party servers, to be displayed. Some layers may require additional access permission from the relevant vendors.

Map layers added in Execute Mode are not synchronized with other clients.

You can also apply custom map styles to your map. For information, see [Custom Map Styles](#) in the VBS4 Administrator Manual.

### WARNING

In a multiplayer scenario, each participant inherits custom map layers configured during Battlespace creation. However, any additional changes done to custom map layers during scenario runtime are only applied locally.

### 8.3.5.1 Formats

The following map-layer formats are supported:

- GeoJSON
- MBTiles ([.png](#) only, not [.Vector](#))
- RasterTiles
- KML
- KMZ
- WFS
- WMTS
- GeoTIFF

The following formats require Projections to be defined (see [Custom Map Projections](#) in the VBS4 Administrator Manual):

- WMTS

 **NOTE**

WMTS custom layers with [Tile Matrix Set](https://www.ogc.org/standards/tms) (<https://www.ogc.org/standards/tms>) Projections other than the UTM or EPSG:4326 Projections.

- GeoJSON

 **NOTE**

GeoJSON custom layers that are exported with any Projection other than the UTM or EPSG:4326 Projections.

The following vector-data formats require map styling (see Custom Map Styles and Custom Map Style Elements in the VBS4 Administrator Manual):

- GeoJSON
- KML
- KMZ
- WFS

The following formats require cloud optimization:

- GeoTIFF

Bohemia Interactive Simulations recommends using [GDAL](https://gdal.org/index.html) (<https://gdal.org/index.html>) to convert GeoTIFF images to a cloud optimized format. If you do not already have GDAL on your system, it can be installed using third-party software, such as [OSGeo4W Network Installer](https://qgis.org/en/site/forusers/download.html) (<https://qgis.org/en/site/forusers/download.html>).

To convert `no-overviews.tif (tq.tif)` files into `no-overviews-cog.tif (tq-cog.tif)` Cloud Optimized GeoTIFF (COG) files, use the [gdal\\_translate](https://gdal.org/programs/gdal_translate.html) ([https://gdal.org/programs/gdal\\_translate.html](https://gdal.org/programs/gdal_translate.html)) command in the command-line interface. This should be followed by the default parameters shown in the following example.

 **EXAMPLE**

```
gdal_translate tq.tif tq-cog.tif -of COG -co TILING_
SCHEME=GoogleMapsCompatible -co
COMPRESS=DEFLATE -co PREDICTOR=2 -co NUM_THREADS=ALL_CPUS -ot byte
```

 **NOTE**

If you have issues with colorization after converting to COG, you can use the `-expand rgb` parameter at the end of the command. However, the majority of GeoTIFFs do not require this parameter.

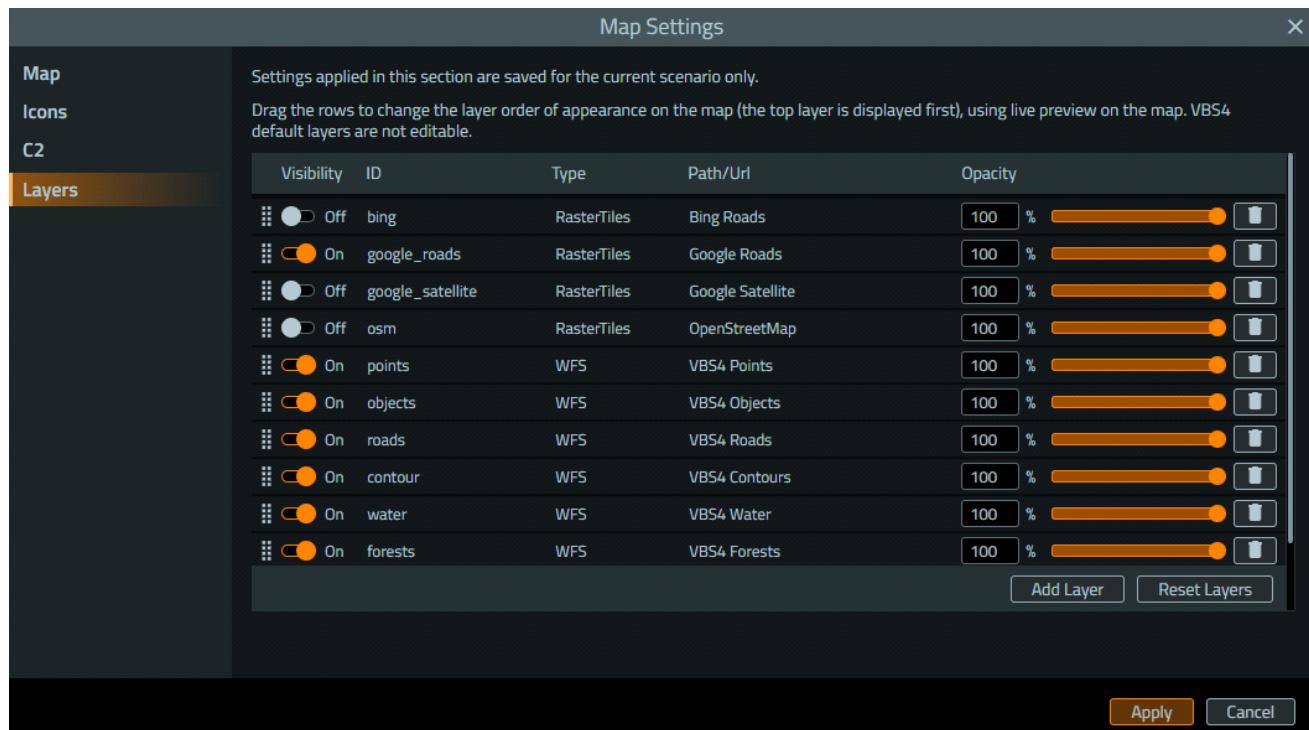
### 8.3.5.2 Import and Apply Map Layers

The following procedure describes how to import and apply custom map layers in VBS4.

**Follow these steps:**

1. In the Editor Menu, open **View > Map Settings**.
2. Open the **Layers** tab, so that the layers are displayed.

**Image-53: Layers tab**



3. Click **Add Layer** to add a new map layer.
4. In **ID**, enter the map-layer ID.

**⚠️ WARNING**

While the ID can be arbitrary, it has to be unique and, if you want to define your own map style, has to match a map Source defined in your map-styles **.json** file. For more information, see Custom Map Style Elements in the VBS4 Administrator Manual.

5. In the **Type** drop-down, select the map-layer format.

## 6. Specify the map-layer path in one of the following ways:

If the map-format is WFS / WMTS / RasterTiles:

- In the **Path / URL** column, enter the map-layer URL of the WFS / WMTS / RasterTiles server, or the local path to the RasterTiles map-layer folder.

### **WARNING**

The following considerations apply:

- The folder path must be absolute. For local map-layer data, Bohemia Interactive Simulations recommends using MBTiles instead of RasterTiles.
- If WMTS is used, the URL must contain the **LAYER** parameter, set to a value which uses specific data, valid for the particular vendor and server.

For other map formats:

- In the **Path / URL** column, enter the path to the map-layer file you want to use.

### **WARNING**

The file path must be absolute.

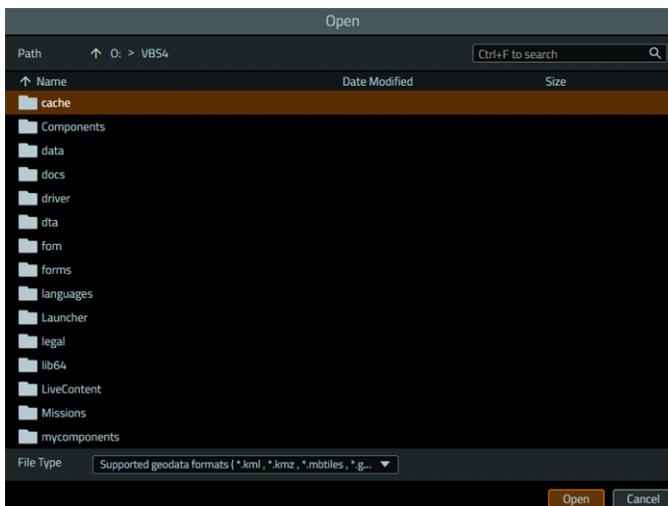
- Click the **Browse** button to navigate to a map-layer file.



The browser opens. Use the **Search** bar to search for a specific file in the specified folder.

**TIP**

The browser supports the following file wildcards: `*.kml`, `*.kmz`, `*.mbtiles`, `*.geojson`, `*.tif`, `*.tiff`.



Select the map-layer file you want, and click **Open**.

- Click the **Visibility** toggle to switch the map layer on / off at any time.

**TIP**

Bohemia Interactive Simulations recommends to switch off the visibility of lower-order layers (see [Layer Order \(on the next page\)](#)) to increase performance (for example, if the visibility of Microsoft Bing Maps, Google Maps, or OpenStreetMap is switched on, the visibility of the lower-order layers can be switched off).

- Use the **Opacity** slider, or enter a percentage in the box next to it, to adjust the transparency of the map layer.
- Click **Cancel** or **X** to cancel the changes and close the dialog.
- Click the **Trash** icon to delete the map layer.



11. To add more map layers, repeat steps 3 - 6.

**NOTE**

**Layer Order**

Multiple map layers are stacked on top of each other. The first layer row in the list matches the top map layer.

To change the layer order:

- a. Place your mouse cursor over the **Drag Handle** of the affected layer row.



- b. Click and hold the **LMB** to drag the layer row to the wanted position, then release the **LMB**.

12. Click **Apply** to apply the map layers.

13. To reset to the VBS4 default map layers, click **Reset Layers**.

**NOTE**

In Prepare Mode, the layers are reset to the default VBS4 layers, while in Preview / Execute Mode, they are reset to the layers saved with the Battlespace.

The OS data from the map layers shows on the map.

For information on how the map layers are stored and the format they are stored in, see [Map Layer Elements \(on the next page\)](#).

## 8.3.6 Map Layer Elements

The map layers are stored in a JSON file called `mapLayers.json`.

For more information on where the default version of that file and its modifications (patches) are located, see [Layers Patching \(on page 311\)](#).

### NOTE

For information on how to customize the map layers using the VBS4 UI, see [Custom Map Layers \(on page 302\)](#).

The layers are defined in the `layers` JSON object.

### EXAMPLE

An example of WFS and WMTS layers:

```
{  
    "layers": {  
        "objects": {  
            "alias" : "$STR_OBJECTS_LAYER",  
            "category" : "other",  
            "opacity" : 1.0,  
            "presence" : true,  
            "type" : "wfs",  
            "url" : "{vws_ows_url}SERVICE=WFS&REQUEST=GetFeature&typeNames=  
                    bisim:PolygonsBuildings&OUTPUTFORMAT=application/geo-  
                    json&MAXQUALITY=15&MINZOOM=15&TILESIZE=256&QUALITYBIAS=-2",  
            "zIndex" : 6.0  
        },  
        },  
        "shadedRelief": {  
            "alias" : "$STR_SHADED_RELIEF",  
            "category" : "shadedrelief",  
            "opacity" : 1.0,  
            "presence" : true,  
            "type" : "wmts",  
            "url" : "{vws_ows_url}layer=Blue_shaded_relief",  
            "zIndex" : 0.0  
        },  
    }  
}
```

The layer properties are:

**NOTE**

Some of the layer properties have counterpart elements in the [Layers tab \(on page 304\)](#) (see [Custom Map Layers \(on page 302\)](#)).

Layer Property	Description
<code>id</code>	<p>ID name for the map-layer data ("<code>objects</code>" and "<code>shadedRelief</code>" in the preceding example), which matches the <b>ID</b> column in the <a href="#">Layers tab (on page 304)</a>. VBS4 uses the following default IDs:</p> <div style="border: 2px solid red; padding: 10px;"><p><b>⚠️ WARNING</b></p><p>While the ID can be arbitrary, it has to be unique and, if you want to define your own map style, has to match a map Source defined in your map-styles <code>.json</code> file. For more information, see <a href="#">Custom Map Style Elements</a> in the VBS4 Administrator Manual.</p><ul style="list-style-type: none"><li>• <code>bing</code> - Microsoft Bing road data.</li><li>• <code>google_roads</code> - Google road data.</li><li>• <code>google_satellite</code> - Google satellite data.</li><li>• <code>osm</code> - OpenStreetMap (OSM) data.</li><li>• <code>points</code> - VBS4 point data.</li><li>• <code>objects</code> - VBS4 object data (such as buildings, bridges, rocks, walls, and so on).</li><li>• <code>roads</code> - VBS4 road data.</li><li>• <code>contour</code> - VBS4 contour data.</li><li>• <code>water</code> - VBS4 water data.</li><li>• <code>forests</code> - VBS4 forest data.</li><li>• <code>satelliteTexture</code> - VBS4 satellite data.</li></ul></div>

**NOTE**

Related to the **Show / Hide Texture** options (see [Mission Designer Interface \(on page 28\)](#)).

- `shadedRelief` - VBS4 elevation data.

**NOTE**

Related to the **Enable / Disable Shaded Relief** options (see [Mission Designer Interface \(on page 28\)](#)).

Layer Property	Description
<code>alias</code>	<p>Any string, used as an alias of the layer, which is displayed instead of the <code>url</code> element. The string appears in the <b>Path / URL</b> column in the <a href="#">Layers tab (on page 304)</a>. If it is undefined / empty, the value of the <code>url</code> element is used instead.</p> <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><p><b>NOTE</b> If <code>alias</code> is used, then <b>ID</b>, <b>Type</b>, and <b>Path / URL</b> are not editable in the <a href="#">Layers tab (on page 304)</a>.</p></div>
<code>category</code>	<p>Category name for the map-layer data. The possible categories are:</p> <ul style="list-style-type: none"><li>• <code>satelliteTexture</code> - VBS4 satellite data.</li></ul> <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><p><b>NOTE</b> Related to the <b>Show / Hide Texture</b> options (see <a href="#">Mission Designer Interface (on page 28)</a>).</p></div> <ul style="list-style-type: none"><li>• <code>shadedRelief</code> - VBS4 elevation data.</li></ul> <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><p><b>NOTE</b> Related to the <b>Enable / Disable Shaded Relief</b> options (see <a href="#">Mission Designer Interface (on page 28)</a>).</p></div> <ul style="list-style-type: none"><li>• <code>other</code> - Other data.</li></ul>
<code>opacity</code>	<p>Layer opacity, from 0 - 1, where 1 is 100% opaque. Matches the <b>Opacity</b> column in the <a href="#">Layers tab (on page 304)</a>.</p>
<code>presence</code>	<p>Layer visibility. Can be:</p> <ul style="list-style-type: none"><li>• <code>true</code> - Layer is visible.</li><li>• <code>false</code> - Layer is hidden.</li></ul> <p>Matches the <b>Visibility</b> column in the <a href="#">Layers tab (on page 304)</a>.</p>

Layer Property	Description
<code>type</code>	<p>Map-data format.</p> <p>Can be:</p> <ul style="list-style-type: none"> <li>• <code>geojson</code> - GeoJSON</li> <li>• <code>mbtiles</code> - MBTiles (<code>.png</code> only, not <code>.Vector</code>)</li> <li>• <code>rastertiles</code> - Local path or URL.</li> <li>• <code>kml</code> - KML</li> <li>• <code>kmz</code> - KMZ</li> <li>• <code>wfs</code> - WFS</li> <li>• <code>wmts</code> - WMTS</li> <li>• <code>geotiff</code> - GeoTIFF</li> </ul> <p>Matches the <b>Type</b> column in the <a href="#">Layers tab (on page 304)</a>.</p>
<code>url</code>	<p>Map-data absolute path or URL, which matches the <b>Path / URL</b> column in the <a href="#">Layers tab (on page 304)</a>.</p> <p>The URL format depends on the map-data format used (defined by <code>type</code>).</p> <div style="border: 2px solid red; padding: 10px;"> <p> <b>WARNING</b></p> <p>If WMTS is used, the URL must contain the <code>LAYER</code> parameter, set to a value which uses specific data, valid for the particular vendor and server.</p> </div>
<code>zIndex</code>	<p>Z-index number, which defines the layer order (if multiple layers are used).</p> <p>The highest number matches the topmost layer row in the <a href="#">Layers tab (on page 304)</a>.</p>

### 8.3.6.1 Layers Patching

Map layers are stored in a JSON file, which has a default version and patch (modification) versions:

- **Default Map Layers** - The default map layers are stored at:

`\VBS_Installation\Components\WebMapController\mapLayers.json`



**WARNING**  
The **Default Map Layers** file should not be modified directly, as any changes are lost when installing / updating VBS4.

- **Custom Map Layers** - Any changes to the default map layers, or additional custom layers that are added, are stored as patches (differences in content from the **Default Map Layers** `mapLayers.json`) in the following default folders:

- Documents folder:

`\Documents\VBS4\Map\`

- Battlespace folder:

`\Documents\VBS4\Battlespaces\BattleSpace_Name\Missions\Scenario_Name\`.

**NOTE**

The Battlespace folder takes precedence over the Documents folder.

The map-layers patching follows the [RFC 7386: JSON Merge Patch](https://www.rfc-editor.org/rfc/rfc7386) (<https://www.rfc-editor.org/rfc/rfc7386>) standard.

Map-layers patches from the Documents and Battlespace folders.

Documents folder patch:

- Updates the shaded-relief layer opacity.
- Deletes the satellite-texture layer.
- Adds a new Admin layer.

Battlespace folder patch:

- Updates the shaded-relief layer opacity.

**NOTE**

Overwrites the opacity from the Documents folder patch.

- Updates the shaded-relief layer URL.

Before patching:

```
{  
  "layers": {  
    "shadedRelief": {  
      "url": "{vws_ows_url}layer=Blue_shaded_relief",  
      "type": "wmts",  
      "category": "shadedrelief",  
      "zIndex": 0,  
      "opacity": 1.0  
    },  
    "satelliteTexture": {  
      "url": "{vws_ows_url}layer=Blue_alb",  
      "type": "wmts",  
      "category": "satellite",  
      "zIndex": 1  
    }  
  }  
}
```

```
        "type": "wmts",
        "category": "satellite",
        "zIndex": 1,
        "opacity": 1.0
    },
    ...
}
}
```

Documents folder patch:

```
{
  "layers": {
    "shadedRelief": {
      "opacity": 0.5
    },
    "satelliteTexture": {
      "deleted": true
    },
    "adminLayer": {
      "url": "{vws_ows_url}layer=Blue_alb",
      "type": "wmts",
      "category": "satellite",
      "zIndex": 2,
      "opacity": 1.0
    }
  }
}
```

Battlespace folder patch:

```
{
  "layers": {
    "shadedRelief": {
      "url": "https://localhost:26555",
      "opacity": 0.8
    }
  }
}
```

After patching:

```
{
  "layers": {
    "shadedRelief": {
      "url": "https://localhost:26555",
    }
  }
}
```

```
"type": "wmts",
"category": "shadedrelief",
"zIndex": 0,
"opacity": 0.8
},
"satelliteTexture": {
    "deleted": true
},
"adminLayer": {
    "url": "{vws_ows_url}layer=Blue_alb",
    "type": "wmts",
    "category": "satellite",
    "zIndex": 2,
    "opacity": 1.0
},
...
}
```

## 8.3.7 Export Map

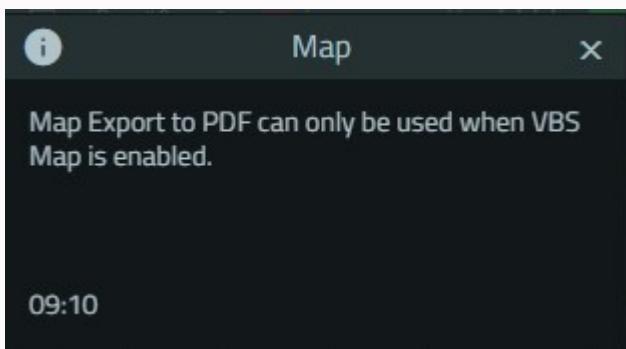
You can export the currently visible region of the map, using the default map layers, as a **.pdf** file or QGIS project (**.qgs** file).

### NOTE

For more information about QGIS software, see: <https://qgis.org/en/site/>

### WARNING

Export to **.pdf** does not work if the **-disableVBSMap** parameter is used locally on the VBS instance doing the export. You see the following error popup, if **-disableVBSMap** is enabled. For more information, see Deploying VBS Map in the VBS Map Manual.



### NOTE

The following considerations apply:

- Any VBS Plan drawings, APP6D symbology, or NATO tactical markers / orders on the map are also present on the resultant map images of maps exported as **.pdf** files.
- Currently, maps exported as **.pdf** files are based on projections similar in appearance to those displayed by VBS Map (see VBS Map Overview in the VBS Map Manual).
- Map layers added in Execute Mode are not synchronized with other clients.

### Follow these steps:

1. Ensure that VBS4 displays the map region you want to export. Adjust the map as needed by moving up / down / left / right, and zooming in / out.

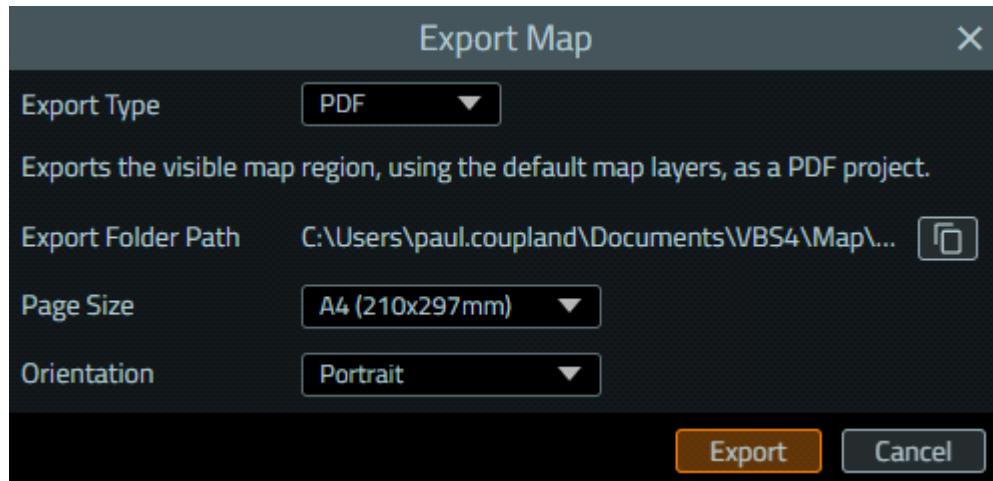
For more information about the VBS Editor camera and map controls, see [3D Camera and 2D Map Views \(on page 43\)](#).

2. In the VBS Editor menu, open **Tools > Export Map**.

**NOTE**

The **Export Map** option is available in the Prepare / Preview / Execute Mode.

The Export Map dialog opens.



3. In the **Export Type** drop-down, select from the following options:

Option	Description
PDF	Select to export the map as a <b>.pdf</b> file.
QGIS	Select to export the map as a <b>.qgs</b> file.

4. (Optional) In **Export Folder Path**, use the **Copy Path to Clipboard** icon to copy the export path, if you want to paste it elsewhere (for example, in Microsoft Windows File Explorer).



**NOTE**

All the **.pdf** / **.qgs** map export files are stored at either of the following locations:

- **\Documents\VBS4\Map\Exports\** (default).
- **\Path\User\Map\Exports\** if the **-profiles=Path** command-line option is used.

## 5. Do one of the following:

- **PDF:** Use the **Page Size** drop-down to select the page size you want to use:

- A2 (420x594mm)
- A3 (297x420mm)
- A4 (210x297mm)
- A5 (148.5x210mm)

Use the **Orientation** drop-down to select from the following:

- Portrait
- Landscape

- **QGIS:** Use the **Detail Level** drop-down to select the detail level you want:

- Low** - No buildings, fewer roads (no dirt paths or residential roads).
- Medium** - No buildings, most roads present.
- High** - Everything present.



### WARNING

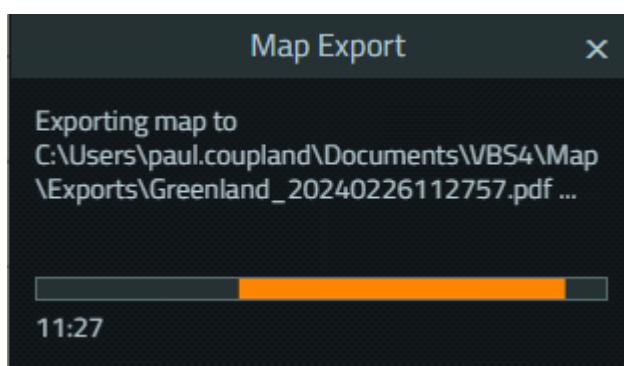
**Detail Level** set to **High** can cause QGIS to become unresponsive when loading the project. This applies to large regions with many objects.

## 6. Click **Export** to start the map export.

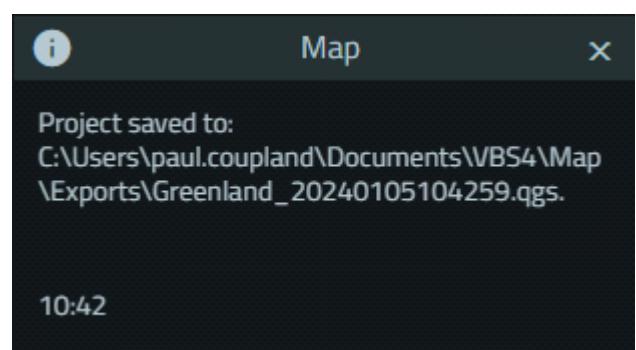
The currently visible map region is exported as a **.pdf** / **.qgs** file.

The export of map files is confirmed by the following popups:

- **PDF**



- **QGIS**



### WARNING

To load the project in QGIS, ensure VBS4 is running, as it streams the map data to QGIS.



### NOTE

While the QGIS communicates with VBS4, the latter can be used as usual.

### 8.3.8 Converting Raster Map Files

Raster map images can be converted to the XYZ (Directory or MBTiles) file format using free QGIS software.

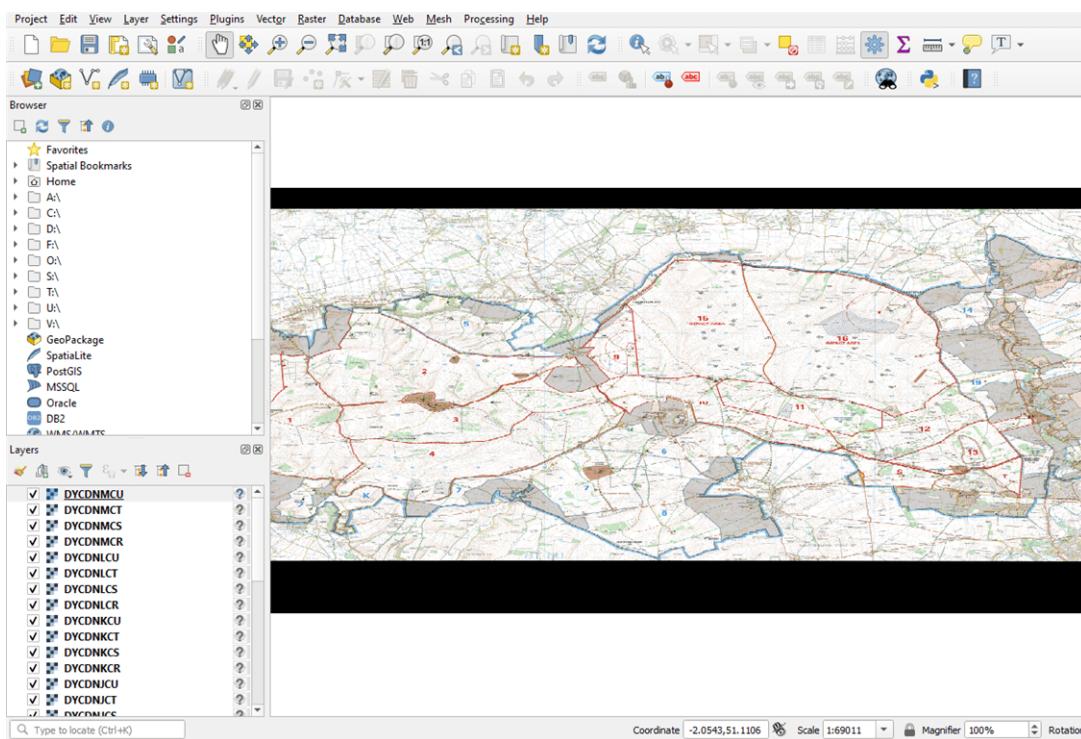
#### NOTE

As QGIS is third-party software, some functions in the following procedures may differ slightly from time to time, due to QGIS updates.

**Follow these steps:**

1. Download [QGIS](https://qgis.org/en/site/) (<https://qgis.org/en/site/>).
2. Run QGIS, and create an empty project (**Project > New**).
3. Add layers using the raster files you want to convert:
  - a. Do one of the following:
    - Go to **Layer > Add Layer > Add Raster Layer**
    - Press **Ctrl + Shift + R**
  - b. In Source, click the **browse** button next to the Raster Dataset(s) field, and navigate to the raster data files you want to convert.
- c. Select the raster files you want to import, and click **Open**.
4. In the Data Source Manager dialog, click **Add**.
5. When the files are loaded into the Layers window, click **Close**.

The map is correctly visible in the main QGIS window.



You have multiple layers listed in the Layers window, which must be merged into one **Float32** file.

### Follow these steps:

1. Go to **Raster > Miscellaneous > Merge** to open the Merge dialog.
2. Click the **Browse** button next to the **Input Layers** field, to open the Multiple Selection dialog.



3. Click **Select All**.

4. Click **OK**.

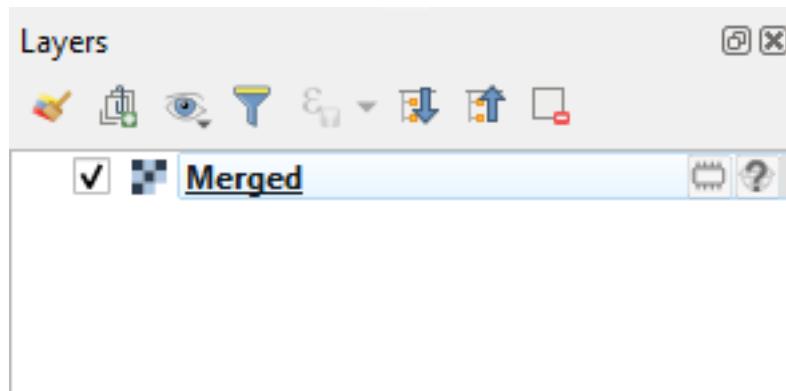
The Multiple Selection dialog closes.

5. In the Merge dialog, go to the **Output Data Type** field, and use the drop-down to select a target file type in **Float32** format.
6. Click **Run**.
7. When the process has finished, click **Close**.

The layers are merged into one **Float32** file (**Merged** in the Layers window).

8. In the Layers window, delete all of the previously imported source layers, as they are now redundant:
  - a. Press and hold **Ctrl**.
  - b. Click all the layers, except for the **Merged** layer, so that they are highlighted.
  - c. Right-click any layer, and in the context menu, click **Remove Layer...**
  - d. In the Remove Layers and Groups dialog, click **OK**.

The redundant layers are removed, and only the Merged layer is left.



The Merged layer must be reprojected into **EPSG: 3857**, if not already done. However, it is likely that **EPSG: 4326** is displayed at the bottom-right of the application.



To fix this, follow these steps:

1. Go to **Raster > Projections > Warp (Reproject)** to open the Warp (Reproject) dialog.
2. The Input Layer field should contain **Merged**.
3. In Source CRS [optional], click the **drop-down**, and select **Project CRS: EPSG:4326 - WGS 84**.

- In Target CRS [optional], click the **drop-down**, and select **Project CRS: EPSG:3857 - WGS 84**.

**NOTE**

If **Project CRS: EPSG:3857** is not there, follow these steps:

- Click the **Select CRS** button to open the Coordinate Reference System Selector dialog.



- Uncheck the **No Projection** (or unknown / non-Earth projection) box.
- In the **Filter** field, type EPSG:3857 (with no spaces).

**WGS 84 / Pseudo-Mercator EPSG:3857** appears in the Predefined Coordinate Reference Systems window.

- Click it, so that it is highlighted, and click **OK**.

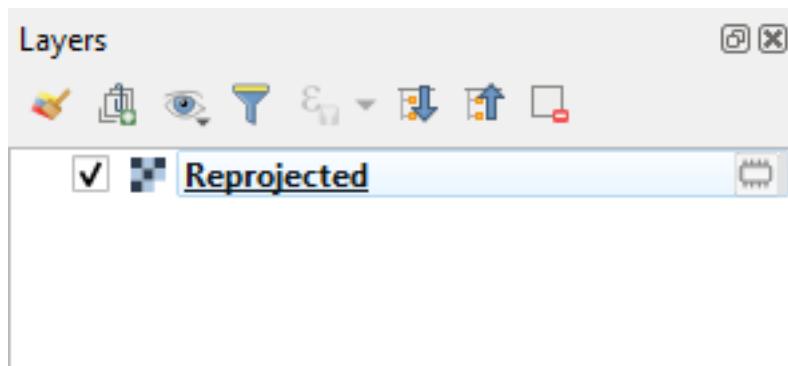
- In the Warp (Reproject) dialog, click the **arrow** next to Advanced Parameters to expand the options.



- Go to the Output Data Type field, and use the drop-down to select the **Float32** file type again.
- In the CRS of the Target Raster Extent [optional] field, click the **drop-down**, and select **EPSG:3857 - WGS 84 / Pseudo-Mercator**.
- Click **Run**.
- When processing has finished, click **Close**.

The Reprojected layer is present in the Layers window.

Remove the Merged layer, as it has the incorrect projection, and is not needed.



Update the EPSG number displayed at the bottom-right of the application.

## Follow these steps:

1. At the bottom-right of the application, click **EPSG: 4326** to open the Project Properties dialog.
2. In the Recently Used Coordinate Reference Systems window, click **EPSG: 3857**, so that it is highlighted.
3. Click **Apply**.
4. Click **OK**.

**EPSG: 3857** is correctly displayed at the bottom-right of the application.

Export the processed map layer to the required format (XYZ / MBTiles).

## Follow these steps:

1. Go to **Processing > Toolbox**.
  2. In the Processing Toolbox window, click the **arrow** next to Raster Tools.
  3. Double-click one of the following:
    - Generate XYZ files (Directory)
    - Generate XYZ files (MBTiles)
- The Generate XYZ Tiles dialog opens.
4. Do one of the following:
    - Click the **Set to current map canvas extent** button next to the Extent field.  

    - Click the **down arrow** button next to the Extent field, and select **Calculate from Layer > Merged** from the context menu.  


The coordinates are automatically entered into the Extent field.

5. In the Minimum / Maximum Zoom fields, use the arrows to adjust zoom levels.

### NOTE

Numbers between 11 and 16 produce good results. More detailed layers can be set up to 19.

6. Do one of the following:

- For **Directory** files, go to the Output Directory field, and enter the file path to the directory where you want to store the output (or click the **browse** button to navigate to it).
- For **MBTiles** files, go to the Output File field, and enter the file path to the folder where you want to store the output (or click the **browse** button to navigate to it).

7. Click **Run**.

8. When processing has finished, click **Close**.

Your newly created map file is at the location you specified.

## 8.4 Amputations

For amputations to occur, **Advanced Wounding and Amputations** must be enabled in the simulation options (see Simulation Settings in the VBS4 Administrator Manual). Amputations are caused by high caliber rounds (.50BMG, 25mm, and so on) and by explosives (40mm grenades, hand grenades, tank fire, rockets). The number of severed body parts in a scene is limited.

If a unit is affected by amputation and remains alive, it drops its weapon, which creates a [Weapon / Ammo Editor Object \(on page 673\)](#) on the ground.

**i** **NOTE**

By default, advanced wounding and amputation only applies to military units. These units use the `hasAmputation` and `amputationDamage` parameters in their configuration.

For more information, see Person Parameters in the VBS Developer Reference and the `\docs\` folder of your VBS Developer Suite installation.

**Image-54: Amputation simulation**



## 8.4.1 Retrieve and Carry Amputated Limbs

Amputated limbs can be retrieved and carried by units other than the injured unit and, for example, placed in vehicles. Limbs are handled similarly to other objects, using the Equipment Inventory (see Equipment Inventory in the VBS4 Trainee Manual).

### NOTE

By default, amputated limbs are automatically deleted from a scenario after 30 minutes.

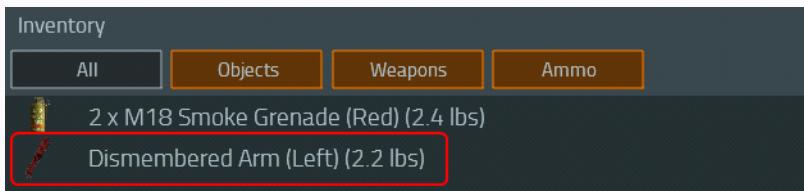
To override this behavior, use SQF function [fn\\_wounding\\_setAmputatedLimbTimeToLive](#).

Do one of the following:

- Approach the amputated limb, press **I** to open your Equipment Inventory, and move it from the **Available** window to the **Inventory** window.
- Approach the amputated limb and select **Pick Up** in the 3D World Action menu (see 3D World Actions in the VBS4 Trainee Manual). The limb is placed in your Equipment Inventory.

### EXAMPLE

Amputated limb in the Equipment Inventory.



## 8.4.2 Amputation Script Command Examples

Amputations can also be implemented using the **setAmputation** script command.

### NOTE

The following script snippets only have a visual effect, apart from head amputation, which results in the death of the unit.

Physical aspects of amputation are processed by event handlers. For example, an event of a high-caliber projectile hitting a leg executes the **setDamage** and **setAmputation** commands, but also makes the character fall on the ground.

### Amputate Half

```
unitname setAmputation "Arm_Left_Half";
unitname setAmputation "Arm_Right_Half";
```

```
unitname setAmputation "Leg_Left_Half";
unitname setAmputation "Leg_Right_Half";
```

### Amputate Full

```
unitname setAmputation "Head";
unitname setAmputation "Arm_Left_Full";
unitname setAmputation "Arm_Right_Full";
unitname setAmputation "Leg_Left_Full";
unitname setAmputation "Leg_Right_Full";
```

### Amputate Reset

```
unitname setAmputation "Head_Reset";
unitname setAmputation "Arm_Left_Reset";
unitname setAmputation "Arm_Right_Reset";
unitname setAmputation "Leg_Left_Reset";
unitname setAmputation "Leg_Right_Reset";
```

## 8.4.3 Wounding

Wounding occurs only if **Advanced Wounding and Amputations** is enabled in simulation options (see Simulation Settings in the VBS4 Administrator Manual).

Seriously wounded players lose blood over time (their health constantly decreases), pant in pain, and die without medical attention. To enable blood loss, see the **Bleeding** setting in [Advanced Wounding \(on the next page\)](#).

## 8.5 Advanced Wounding

VBS4 has the capability to provide advanced wounding and treatment simulation, as well as advanced and realistic bleeding simulation.

### 8.5.1 Related Simulation Settings

Advanced wounding has the following simulation settings (see [Simulation Settings](#) in the VBS4 Administrator Manual):

- **Advanced Wounding and Amputations** - Simulates injuries to specific limbs, including amputations, and bleeding out.

#### NOTE

By default, advanced wounding and amputation only applies to military units. These units use the `hasAmputation` and `amputationDamage` parameters in their configuration.

For more information, see [Person Parameters](#) in the VBS Developer Reference and the `\docs\` folder of your VBS Developer Suite installation.

- **Bleeding** - If enabled, units can die from bleeding out from wounds.
- **Health Degradation** - This option allows the player to enable / disable the health degradation (bleeding out) simulation. If enabled, health degrades when less than 75%, and stops at 10%.
- **One Incapacitated Screen** - Presents the text "You are Incapacitated" on screen for death and unconsciousness. Enable this to prevent the death message from giving hints for medical examination.

#### Damage Effects

VBS4 soldiers have a penalty to accuracy when they suffer a head / torso/ arm injury. The penalty is largest from an arm injury, and grows proportionally with the amount of damage suffered. This effect requires the **Injured Hands Trembling** simulation option to be enabled. VBS4 soldiers also have temporary blurry vision, when a head injury is present, and when legs are damaged, VBS4 soldiers limp when walking and are unable to run.

### 8.5.2 Advanced Wounds

Apart from the generic wounding model, it is possible to:

1. Specify which units have advanced wounding using the [Advanced Wounding Editor Object \(on the next page\)](#).

2. Specify which wounds the unit has in the [Add / Remove Wounds... Dialog \(on page 330\)](#). This dialog is capable of adding gunshot wounds, bleeding, internal wounds, limb amputations, chemical or fire burns, and several additional symptoms as well. It can be accessed using:

- The **Units with Advanced Wounding** dialog.
- Right-clicking the unit and selecting **Interventions > Add / Remove Wounds....**

Each of these wounds / symptoms has an accompanying proper treatment in VBS4, which can be administered using the [Advanced First Aid \(on page 334\)](#) interface. If an improper (or no) treatment is administered, the unit state gets worse to the point when the unit dies from its injuries.

### 8.5.3 Advanced Wounding Editor Object

Upon placement, the Advanced Wounding Editor Object can be linked to units or can be set to apply for units of a specific side or for all units. These units can be configured with different wound types.

#### NOTE

If you link the Advanced Wounding Editor Object to a Group, Advanced Wounding is applied to the Group leader only.

All units not affected by the Advanced Wounding Editor Object use the old lower-fidelity wounding system.

#### WARNING

Adding / deleting this Editor Object in the VBS Editor during a multiplayer scenario may not be reflected on other clients.

### Allowing In-Mission Wounds

The **Allow mission wounds** simulation option controls whether wounds obtained during a mission (for example, from gunshots, backblast, or shrapnel) are tracked and editable in the Editor Object:

- Seeing these wounds in the **Units with Advanced Wounding** interface.
- Being able to treat wounds received during the mission using the advanced treatment interface.
- Seeing the **Unit wounded** icons in the AAR timeline.

If set to `false`, the advanced treatment interface only deals with wounds configured directly by the Advanced Wounding Editor Object, not wounds received during the mission.

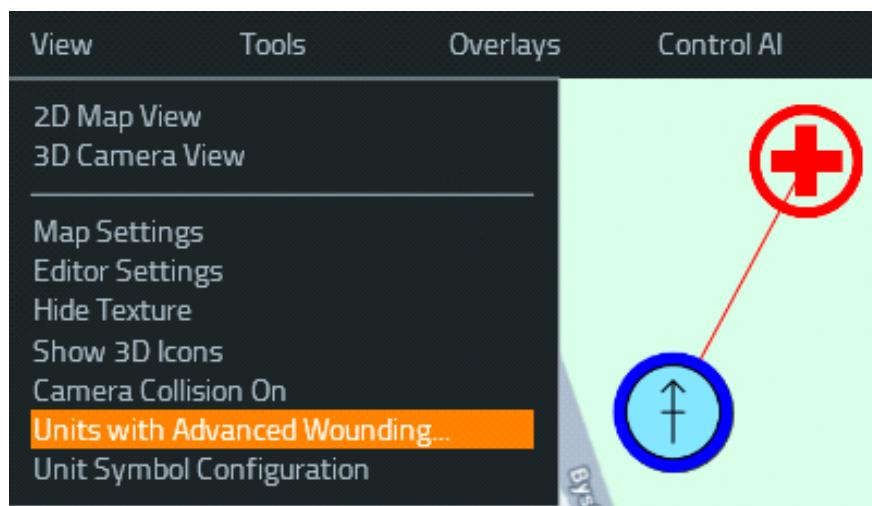
## Incapacitated Message

If you have the **One Incapacitated Screen** simulation setting set to enabled, the units affected by the Advanced Wounding Editor Object display the "**You are incapacitated**" message, instead of "**You are dead**" or "**You are unconscious**", to the player. This only applies to non-administrator users (for example, in a multiplayer scenario).

## 8.5.4 Units with Advanced Wounding

The mission designer (or administrator) can select units to apply symptoms to form a list visible in the Units with Advance Wounding dialog. Go to **View > Units with Advance Wounding...** to access the dialog.

**Image-55: Units with Advance Wounding... menu selection**



This opens up the Units with Advance Wounding list.

**Image-56: Units with Advanced Wounding list**

UNITS WITH ADVANCED WOUNDING				
Filter Side	Show All			
Filter Wounded	Show All			
UNITS WITH ADVANCED WOUNDING ENABLED				
Wounded	Unit Type	Group	Name	Variable Name
No	SF Soldier - M4A1	B 1-1-A-1	Carlos Thompson	

At the bottom of the dialog are two buttons: "Add/Remove Wounds..." and "Close".

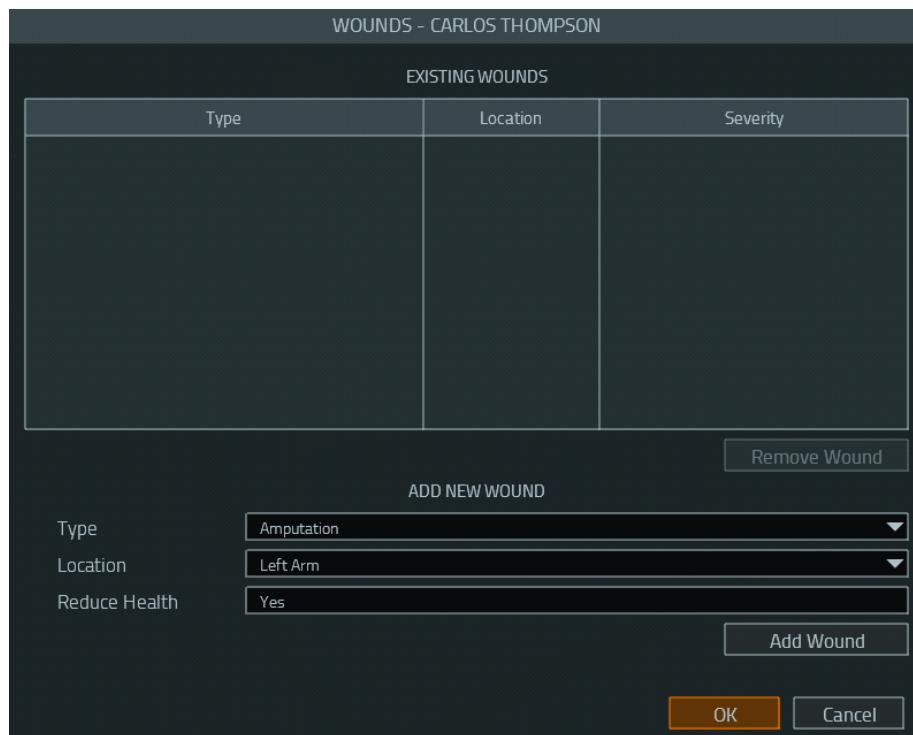
You can filter the list by side and by wounded / healthy units.

### 8.5.4.1 Add / Remove Wounds... Dialog

There are multiple methods to open this dialog in the Editor (Prepare / Execute Mode):

- From the Units with Advance Wounding list.
  - Select a unit in the list and click the **Add / Remove Wounds...** button.
  - Double-click a unit in the list and the **Add / Remove Wounds** dialog opens.
- Right-click the unit icon on the terrain map and select **Interventions > Add / Remove Wounds....**
- Right-click the unit name in the Scenario Objects Panel and select **Interventions > Add / Remove Wounds....**

**Image-57: Add / Remove Wounds dialog**



The dialog always displays the unit being edited in a label at the top. You can add new wounds / symptoms by specifying a wound type, severity, and the affected body part. For some wounds, you can select whether the wound reduces health over time. You can click **Add Wound** to add that wound to the specified units. It is also possible to remove individual wounds by selecting them in the wound list and pressing **Remove Wound**. The applied wounds can be either confirmed by clicking **OK** or canceled by clicking **Cancel**, in which case, no actual changes are done to the unit.

Possible wound options are:

Wound	Severity options	Selectable body part	Reduce Health	Note
Amputation	-	Yes	Yes / No	Does not imply bleeding. Has to be added by bleeding - generic.
Bleeding - Generic	Yes	Yes	-	For applying a bleeding effect with other wounds.
Bleeding - Projectile	Yes	Yes	Yes / No	Severity based on shot type.
Bleeding - Cut	Yes	Yes	Yes / No	Same as generic bleeding, but the examination says "cut".
Bleeding - Knife	Yes	Yes	Yes / No	There is severe bleeding (see Knife Attacks and Gestures in the VBS4 Trainee Manual).
Bleeding - Internal	Yes	-	-	Bleeding without visible trauma - detectable only by pulse change.
Blood Loss	Yes	-	-	The total blood loss of the unit at the beginning of the mission.
Cut - Knife	Yes	Yes	-	There is moderate bleeding (see Knife Attacks and Gestures in the VBS4 Trainee Manual).
				 <b>WARNING</b> This wound type is not treatable.
Sucking Chest Wound	-	-	Yes / No	
Burns	Yes	Yes	Yes / No	
Chemical Burns	Yes	Yes	Yes / No	
Backblast Wounds	Yes	-	Yes / No	
Abnormal Pulse	Yes	-	-	
No Pulse	-	-	-	
Respiration Stopped	-	-	-	Implies unconsciousness.
Airways Blocked	-	-	-	
Unconscious	-	-	-	

## 8.5.5 Bleeding Model

This advanced bleeding model requires the **Bleeding** simulation option to be enabled.

Adding bleeding to a unit using the Advanced Would Editor Object causes the unit to start losing blood:

- When the unit blood level is less than 60%, the unit becomes unconscious.
- When the unit blood level is less than 50%, the unit dies.

The amount of blood lost over time is tied to the current blood level (as the blood pressure decreases, less blood is lost). The following tables illustrate the times required for a unit to bleed to death from injuries shown in the previous table:

### Head / Chest Injuries

Damage type	Unconscious after	Dead after
0-9 mm projectile	5 min	10 min
12.7 & above projectile	2 min	2 min
Shrapnel	10 min	30 min

### Limb Injuries

Damage type	Unconscious after	Dead after
0-9 mm projectile	10 min	30 min
12.7 & above projectile	3 min	10 min
Shrapnel	20 min	60 min

## 8.5.6 Controlling Treatment Duration

Control how quick treatment is by modifying the **VBS\_TREATMENT\_WAIT\_COEF** variable (includes examination and treatment time). The variable is a coefficient, by which the default time is multiplied.

You can modify the variable using scripting. In a multiplayer environment, run:

```
publicExec ["true","VBS_TREATMENT_WAIT_COEF = X;,[],true];
```

Replace **X** with a numerical value.

```
// All examinations / treatments take half the original time
VBS_TREATMENT_WAIT_COEF = 0.5;
// All examinations / treatments take double the original time.
VBS_TREATMENT_WAIT_COEF = 2;
```

Treatment times use the following default values set in `advWoundingTimes.hpp`, in the VBS Developer Suite installation, found at:

`P:\vbs2\plugins\advanced_wounding\advWoundingTimes.hpp`

Treatment	Default Duration (seconds)
Basic examination	5
Chemical first-aid	10
Clearing the airway	10
CPR Right (when CPR is necessary)	20
CPR Wrong (when CPR is unnecessary)	10
Elevating a limb	5
Examination for bleeding	10
Examining a body part	5
Checking for consciousness	5
Asking a unit about pain	5
Checking for a pulse	5
Checking for breathing	5
Applying first-aid to a body part	10
Pouring water over burns	10
Extinguishing fire	20
Placing a unit in the recovery position	10
Applying a tourniquet	10
Applying a Bandage / Field Dressing	10
Applying a Field Dressing with Trauma Pad	10

These values can be adjusted, if necessary, using the `CfgAdvancedWoundingTimes` class. For more information, see Class `CfgAdvancedWoundingTimes` in the VBS Developer Reference.

 **NOTE**

The Developer Reference is in the `\docs\` folder of the VBS Developer Suite installation.

## 8.5.7 Advanced First Aid

A medic unit can heal an injured unit.

### TIP

VBS4 has medic unit models. However, any unit type can provide medical assistance.

**Follow these steps:**

1. Get closer to the injured unit (stand or crouch next to them).
2. Look at the injured unit, until the **Advanced First Aid** 3D World Action appears (see 3D World Actions in the VBS4 Trainee Manual). Then, select it.

### NOTE

When using a medic unit, the legacy **Heal** action is also present in addition to the **Advanced First Aid** action. The **Heal** action heals the unit instantly, instead of performing the full medical procedure.

The Treatment Interface opens, where the player can investigate symptoms, perform examinations, and apply treatment. This interface acts as a simple action-response system. The player selects an action and the system provides an answer after the time required to perform such an action passes.

The following options are offered by the Treatment Interface:

Option	Description
Basic Examination	Perform a basic examination.
Advanced Examination	Select a specific examination to perform.
Perform Treatment	Select a treatment to perform.
Finish Medical	End the examination / treatment.

Select one of the options and click **OK** to see the result.

## Image-58: Treatment Interface



The following possible examinations and correct treatments for damage types are available:

Wound	Treatment Options	Body Part	Additional Notes
Bleeding	Elevate Limb	All	
	First Aid Kit	All	
	Bandage / Field Dressing	All	Stops Minor / Moderate bleeding. Slows Severe / Arterial / Extreme bleeding (see <a href="#">Body Armor (on the next page)</a> ).
	Field Dressing with Trauma Pad	All	Stops all bleeding (see <a href="#">Body Armor (on the next page)</a> ).
Blood loss	N/A		Allows the Administrator to specify the starting blood loss level.
Burn wound	First Aid Kit / Pour Water	All	
Chemical burns	Chemical First Aid Kit		
Respiration stopped	Clear Airway, CPR, Recovery Position		Implies unconsciousness.
Severed Limb	Tourniquet	Limbs	
Unconscious	N/A	Head	Unit wakes up from unconsciousness after all other damage symptoms are treated.

## Body Armor

**NOTE**

Body armor is automatically removed when applying the Bandage + Field Dressing / Trauma Pad + Field Dressing to the torso of Virtus units.

The result of a correct treatment is always to cure the wound and increase unit health. Incorrect treatment does not cure the wound and may increase damage.

Examination	Possible Result	Body Part Specific	Note
Examine	KIA / WIA	No	
Conscious	Yes / No	No	
Pulse	Yes / No	No	
Breathing	Yes / No	No	
Bleeding	Minor / Moderate / Severe / Arterial	Yes	
Pain level	Minor / Moderate / Severe / Extreme	Yes	Only if conscious.

When a unit is wounded but not incapacitated, they can treat themselves by pressing **Quick Menu (Left Windows)**, and selecting **ADVANCED FIRST AID** (see Quick Menu Actions in the VBS4 Trainee Manual).

The following options are offered by the Treatment Interface:

Option	Description
Basic Examination	Perform a basic examination.
Advanced Examination	Select a specific examination to perform.
Perform Treatment	Select a treatment to perform.
Finish Medical	End the examination / treatment.

Self treatment, like advanced treatment, can make the condition worse if performed incorrectly.

AI medic units can heal themselves or other units when wounded. They can only heal bleeding and gunshot wounds. Medic units can heal wounded units. They can only heal bleeding and gunshot wounds.

Both are configured with `attendant = true` parameter, for more information, see Person Parameters in the VBS Developer Reference.

**NOTE**

The Developer Reference is in the `\docs\` folder of the VBS Developer Suite installation.

## 8.6 Concussion Effects

The Concussion Effects module simulates the effect of concussion for single units and groups.

### ★ FEATURE NOTICE

It is not possible to use the Concussion Effects Editor Object with waypoints. For more information, see One AI in the VBS4 Release Notes.

#### Follow these steps:

1. In VBS Editor, select **Module** from the Editor Objects List.
2. Right-click a location on the map, and select **New Object**.
3. Expand the **Module** drop-down, select **Concussion Effects**, and click **OK**.

The Concussion Effects Object Properties dialog opens:



4. Use the slider bars to adjust the following effects:

- **KNOCKOUT - Effect Duration** - Specifies how many seconds the unit is knocked out for.
- **DIZZINESS** -
  - **Effect Duration** - Specifies how many seconds the unit are dizzy for. If **KNOCKOUT** is enabled, the countdown begins once the unit(s) has woken up.
  - **Effect Strength** - Specifies the initial strength of the dizziness effect. Over time, the effect gradually decreases to zero.
- **DEAFNESS** -
  - **Effect Duration** - Specifies how many seconds the unit is unable to hear for.
  - **Tinnitus?** - Drop-down used to specify whether or not the unit experiences tinnitus (ringing in the ears).
- **BLINDNESS - Effect Duration** - Specifies how many seconds the unit is blinded for.

5. Select one of the options from the **Repeatedly** drop-down:

- **Do Not Repeat** - The animation occurs only once.
- **Repeat When Condition is True Again** - The animation occurs repeatedly.

6. Expand the first **Activate when** drop-down and select one of the following options:

- **At least one trigger is activated** - At least one Trigger must be activated for the animation to occur.
- **All triggers are activated** - All Triggers on the map must be activated for the animation to occur.

7. 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.

8. Enter **true** or **false** in the condition code field. If you set this to **false**, the effects do not occur.

9. Click **Add Hotkey** next to **DEFINE HOTKEYS** if you want to add a hotkey. Clicking **Add Hotkey** opens the VBS4 Hotkey Editor dialog.

10. Once you have adjust all relevant parameters, click **OK** on the Concussion Effects Object Properties dialog.

The **KO** Concussion Effects icon appears on the map:



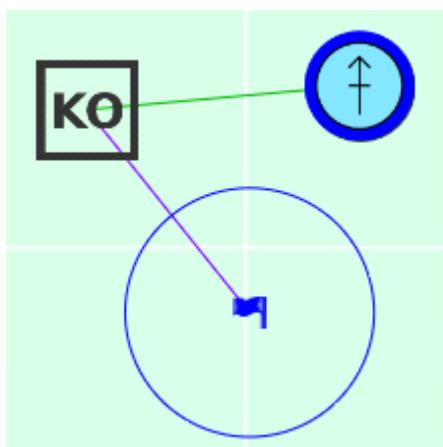
## 8.6.1 Linking and Triggers

To make the Concussion animation work, you need to link a single unit or a group to the Concussion Effects Editor Object (EO).

### NOTE

The module has no effect on the crew of a vehicle, if the Concussion Effects EO is linked to the vehicle.

**Image-59: Unit linked to Concussion Effects EO and Trigger**



### Follow these steps:

1. Place a unit or a group on the map.
2. Right-click the **Concussion** icon and select **Link to Unit** or **Link to Group** from the menu.  
The menu closes and a black arrow is attached to the cursor.
3. Drag the mouse and click a **unit or group**.  
The arrow turns green, meaning that the unit or group is linked to the Concussion Effects EO.
4. Repeat steps 2 and 3 to link other units or groups to the Concussion Effects EO.
5. Add a trigger (see [Triggers \(on page 810\)](#)).  
The menu closes and a black arrow is attached to the cursor.
6. Right-click the **Concussion Effects EO**, and select **Link to Condition Trigger** from the menu.  
The menu closes and a black arrow is attached to the cursor.
7. Click the **Trigger EO**.  
The arrow turns purple, indicating that the Trigger is linked to the Concussion Effects EO.
8. Preview the mission.  
When the unit or group reaches the Trigger, they are concussed.

## 8.7 Sandstorm

The Sandstorm Editor Object can be placed in missions to replicate sandstorms.

### ★ FEATURE NOTICE

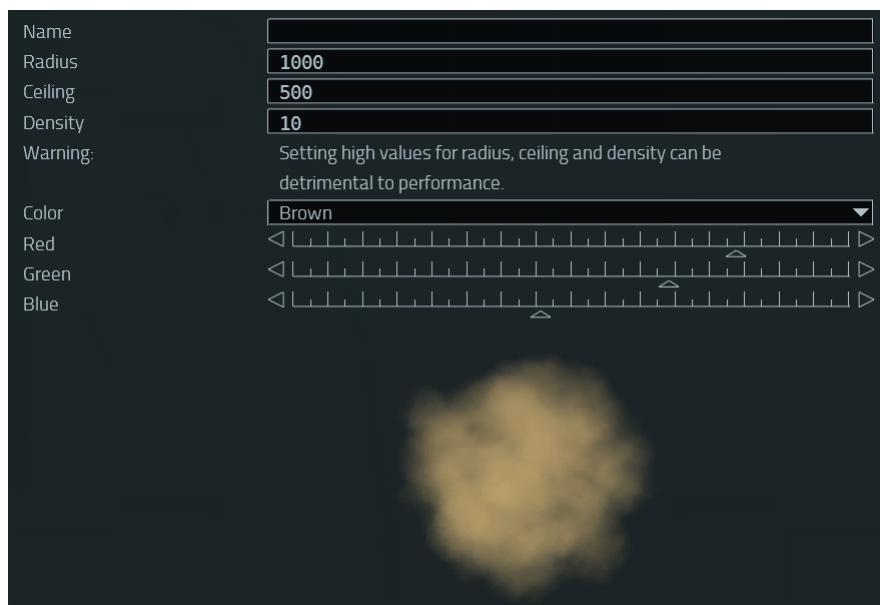
It is not possible to use the Sandstorm Editor Object with waypoints. For more information, see One AI in the VBS4 Release Notes.

- Players in buildings are protected from the effects of a sandstorm.

**Image-60: Sandstorm in VBS4**



**Image-61: Placing the Sandstorm object**



- **Name** - The name of the sandstorm; can be accessed using a script.
- **Radius** - The radius of the sandstorm in meters.

- **Ceiling** - The height of the sandstorm in meters.
- **Density** - The density of the sandstorm, default value is 10. Set to higher levels for a more dense storm.
- **Color** - There are a range of predefined sandstorm colors. It is possible to customize the color.

**NOTE**

The Sandstorm object is a graphically intensive object. The use of high values for the radius, ceiling, and density of a sandstorm can affect the performance of your computer.

## 8.7.1 Sandstorm Wind Sound Source

When a Sandstorm object is placed, the Wind - Sandstorm sound source Editor Object is also placed at the location to provide wind sounds for the sandstorm. As it is placed under the Sandstorm Editor Object, the best way to edit the sound source is from the Scenario Objects Tree.

**Follow these steps:**

1. Open the **Scenario Objects Tree**.
2. Right-click **Wind - Sandstorm**.
3. Select **Edit Object**.

The Object Properties dialog opens.

4. Use the drop-downs and slider to adjust the Sandstorm sound parameters.
5. Click **OK**.

The wind sound settings are saved.

**Image-62: Sandstorm Wind sound source in the Scenario Objects Panel**



**Image-63: Sandstorm sound source**

Name	<input type="text"/>
Presence Condition	<input type="text" value="true"/>
Type	Wind - Sandstorm ▾
Condition	<input type="text" value="true"/>
Volume (-1dB)	<input type="range"/>
Origin	Localized ▾
Audible Distance	<input type="text" value="2000"/>

**NOTE**

A set of script variables are available for mission designers to modify sandstorms. See [Sandstorms](#) (<https://sqf.bisimulations.com/display/SQF/VBS+Object+Variables#VBSObjectVariables-Sandstorms>).

## 9. Personnel and AI Tools and Objects

VBS4 includes a wide variety of military and civilian personnel for use in missions.

Add personnel to missions as individual units or groups, as playable or AI-controlled characters:

- [Adding Units \(on the next page\)](#)
- [Creating Unit Variants \(on page 357\)](#)
- [Adding Groups \(on page 359\)](#)
- [Creating Custom Groups \(on page 364\)](#)
- [ORBAT Editor \(on page 366\)](#)
- [Creating Command Structures \(on page 384\)](#)
- [Customizable Symbology \(on page 388\)](#)

 **NOTE**

Personnel may also be added to missions as vehicle crew. For more information, see [Vehicles Tools and Objects \(on page 598\)](#).

To support realistic training scenarios, VBS4 includes a wide variety of complex AI interactions and specific behaviors:

- [Look At Editor Object \(on page 395\)](#)
- [Select Animation Style \(on page 397\)](#)
- [AI Rules of Engagement \(on page 400\)](#)
- [Surrender \(on page 406\)](#)
- [Unit Path Recording \(UPR\) \(on page 408\)](#)
- [Verbal Command \(on page 414\)](#)

VBS Control AI provides a set of advanced AI behaviors available through the VBS4 Editor.

For more information, see VBS Control AI Overview in the VBS Control AI Manual.

## 9.1 Adding Units

VBS4 includes a wide range of personnel to support training scenarios:

- Friendly military units (BLUFOR).
- Enemy military units (OPFOR).
- Independent military units.
- Civilians (men, women, children) from various countries.
- Animals.
- Game Logic.

For information about controlling a character in a scenario, see [Character Control in the VBS4 Trainee Manual](#).

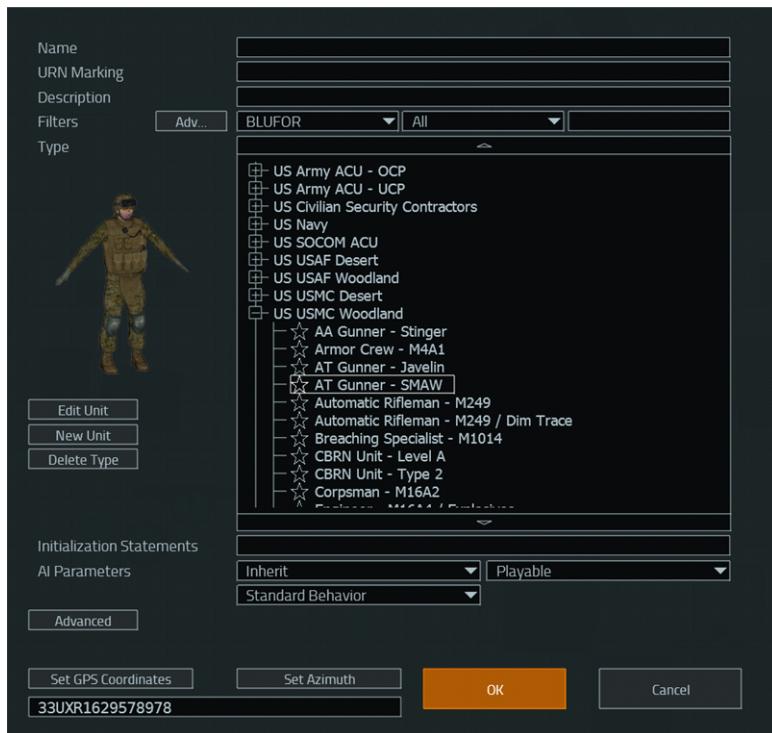
To add multiple personnel at once as a group or as a vehicle crew, see [Adding Groups \(on page 359\)](#) and [Adding Vehicles \(on page 599\)](#).

VBS Editor enables personnel to be added as playable or AI controlled:

### Follow these steps:

1. In the Editor, select **(F1) Unit** from the Editor Objects List.
2. Double-click a location on the map or right-click and select **New Object**.

The Unit Object Properties dialog opens:



### 3. Use the **Filters** and **Type** list to select the unit to add.

For more information on Object Property dialog filters, see [Unit and Vehicle Editor Object Filters \(on page 62\)](#).

### 4. Click **OK** to add the unit with its default options.

The Editor adds the unit to the selected location on the map.

To reopen the unit Object Properties, right-click the unit and select **Edit Object**.

- Continue to [Edit Unit Options \(below\)](#) step 2 to create a new variant of the unit.
- Continue to [Edit Unit Options \(below\)](#) step 3 to set specific settings for the unit in the Scenario.

#### **WARNING**

If you use VBS Radio, re-open Radio Admin Settings to update Side assignments and apply the Default Radio Profile to new units and groups, before saving the mission.

## 9.1.1 Edit Unit Options

After or during unit creation, use the Object Properties dialog to modify the unit.

1. In VBS Editor, double-click the unit or right-click and select **Edit Object**.
2. **Optional:** Click **New Unit** to create a new variant of the unit with a different inventory.

For more information see, [Creating Unit Variants \(on page 357\)](#).

#### **NOTE**

In Execute mode for units already placed on the map, this option is replaced by **Inventory**. Modifying the Inventory only persists for the duration of the mission runtime.

### 3. Add a **Name** to identify the unit for use in scripts and optionally add a **Description**.

For more information about using Names to identify objects, see [Using Basic Scripts in the VBS4 Scripting Manual](#).

### 4. To use **URN Markings**, type the marking in the **URN Marking** input.

- a. Verify that `drawURNMarkings` is enabled in the `VBS4.xml` file.

For more information, see [VBS4.xml Options in the VBS4 Administrator Manual](#).

- b. Type the marking to display in the **URN Marking** input

The URN marking is visible in the Editor Objects List and is transmitted to all applications connected to VBS4 through VBS Gateway.

5. **Optional:** In the **Type** list, click the **star** icon in front of the unit type, so that it is filled white, to add it to your Favorites list.



Click the **star** icon again, so that it is unfilled, to remove the unit from your Favorites list.

**i** **NOTE**

The Favorites list contains units, vehicles, and placeable objects that you use frequently, and enables you to quickly find and place them when creating new scenarios, see [Unit and Vehicle Editor Object Filters \(on page 62\)](#).

Your Favorites list is also saved locally in a **.cfg** file, which can then be ported to other computers. The corresponding **Favorites.cfg** file is found at the following location:

**C:\Users\username\Documents\VBS4\Config\**

Entity names are saved as classes, similar to those shown in the following example:

```
class cfgVehicles {  
    class bisim_ig_ir_army_soldier_des_m;  
    class vbs2_af_taliban_ak74;  
    class Land_Ind_Shed_01_EP1;  
    ...  
}
```

6. Use the **Initialization Statements** input to execute scripts for the unit when the mission starts.

For more information, see [Using Basic Scripts in the VBS4 Scripting Manual](#).

7. Use the playability drop-down to determine the unit playability and AI control.

For more information, see [AI / Player Unit Settings \(on the next page\)](#)

8. Click **Advanced** to view more settings for units including health and physiological settings.

For more information, see [Advanced Unit Settings \(on page 348\)](#).

9. Click **Set GPS Coordinates** to specify the exact position of the unit.

For more information, see [Set GPS Coordinates \(on page 65\)](#).

10. Click **Set Azimuth** to specify the unit orientation.

For more information, see [Set Azimuth \(on page 67\)](#).

11. Click **OK** to confirm the unit properties and close the dialog.

VBS Editor saves the settings for the unit as part of the mission.

To modify the equipment for the unit as part of the current mission, use the **Customize Starting Loadout** (Prepare) or **Edit Current Loadout** (Execute) option. For more information, see [Edit Equipment Loadout \(on page 662\)](#).

## 9.1.2 AI / Player Unit Settings

Use the **AI / Player** drop-downs to determine the unit AI type and playability:

Select the playability:

- **Player** - The unit is the default for single player missions.
- **Playable** - The unit is playable, which means that it can be operated by Control AI, but users can take control of the unit when required.
- **Non Playable** - The unit is non-playable, which means that it can only be operated by Control AI.

### NOTE

To enable the selection of units in the Network Lobby for multiplayer missions, select **Playable**.

Use the **AI Parameters** drop-down to control the AI Combat Mode of the unit in response to enemy contact:

Behavior	Description
<b>Weapons Free</b>	Fire at enemy forces, when they are encountered.
<b>Hold Fire</b>	Do not fire at enemy forces, when they are encountered.
<b>Inherit</b>	Inherit the combat mode from the group the entity is in (unless the entity is not part of a group).

The following additional Behavior options are available:

Behavior	Description
<b>No Behavior</b>	When selected, AI units do not react to enemy forces, until a behavior is assigned to them (for example, by linking a waypoint or setting the behavior by SQF).
<b>Standard Behavior</b>	When selected, AI units react to enemy forces, even if a behavior is not assigned to them (for example, by linking a waypoint or setting the behavior by SQF).

**NOTE**

The Combat Mode options of the **AI Parameters** setting do not apply in Prepare Mode - they can only be set in Preview / Execute Mode.

The Behavior options of the **AI Parameters** setting are hidden for already created Control AI units in Preview / Execute Mode. Therefore, they cannot be changed or viewed during scenario execution.

### 9.1.3 Advanced Unit Settings

The Unit Editor Object Properties dialog contains an additional set of Advanced parameters. Click the **Advanced** button to access them.

Advanced

Follow these steps:

1. Open the Unit Editor Object Properties dialog, and click **Advanced**.

The dialog expands to show additional unit properties.



2. Use the **Rank** drop-down to select a rank for military units.

 **NOTE**

VBS4 supports custom rank structures and uniform insignia based on custom configuration and unit models.

3. Use the **Special** drop-down to select additional conditions for units:

Setting	Description
<b>None</b>	Auto-places the object so that it is not in collision with other objects.
<b>In Cargo</b>	Places the unit in a cargo position of a linked (manned) vehicle, when the <b>Group With</b> option is selected in the context menu. For more information, see <a href="#">Linking Objects (on page 51)</a> .
<b>Flying</b>	This setting applies only to aircraft.
<b>In Formation</b>	Places the unit in formation based on its group setting. For more information, see <a href="#">Adding Groups (on page 359)</a> .
<b>Can Collide</b>	Enables exact unit placement.

 **NOTE**

This is the default value.

#### 4. Use the **Overrides** drop-downs to apply the following effects:

Damage effects:

Setting	Description
<b>Default Damage</b>	Standard VBS behavior applies, the unit can be killed or injured.
<b>Take No Damage</b>	The unit is invincible and cannot be killed or injured.

Ammunition effects:

Setting	Description
<b>Default Ammo</b>	The unit has access to the standard amount of ammunition they are carrying, or for the vehicle weapon / turret they are using.
<b>Unlimited Ammo</b>	The unit has unlimited ammunition available for their personal weapon, or the vehicle weapon / turret they are using. Magazines are automatically replaced when they become exhausted.



#### WARNING

The unit must have at least one magazine at the start of the scenario. If the unit has no ammunition at all, this setting does not work.

#### NOTE

These settings have the following characteristics:

- If the unit is in a vehicle, the vehicle is not affected by the **Damage** settings.
- They work for all units placed in Single Player and Multiplayer scenarios.
- They work for all units created in-game in **Execute Mode** (in Single Player and Multiplayer scenarios).
- The settings can be saved / loaded to and from Battlespaces.
- If set to **None**, standard VBS behavior applies.
- Global Overrides supersede entity override settings while active, see **Global Overrides** in [Define Scenario Settings \(on page 278\)](#).

To apply these settings globally to all units in a scenario, see **Global Overrides** in [Define Scenario Settings \(on page 278\)](#).

5. Use the **Health** slider controls the overall health level of the unit (right is full health).

 **NOTE**

In Execute mode, if a unit has 0 health it dies and cannot be healed using the slider. Right-click the unit on the map and select **Revive Unit**.

6. Use the **Blood Level** and **Bleeding** sliders to control blood levels for the unit:

- **Blood Level** is 50% on the left and 100% on the right.
- **Bleeding** controls the rate of blood loss from no bleeding on the left to arterial bleeding on the right.

A unit loses consciousness at 60% Blood Level and dies at 50%.

 **NOTE**

These options require the Bleeding setting to be enabled. See Simulation Settings in the VBS4 Administrator Manual.

7. Use the **Ammunition** slider to adjust the amount of available ammunition for the unit (right is maximum).

 **WARNING**

Do not use the Ammunition slider in Execute mode.

8. **Prepare Mode Only:** Use the **Presence Probability** slider to set a percentage probability that the unit is present when the mission starts (right is 100%).
9. **Prepare Mode Only:** Use **Placement Radius** to add variation to the position where the unit appears. When the mission starts the unit is placed in a random position within the specified radius (in meters).
10. **Prepare Mode Only:** Use **Presence Condition** to specify a script that determines whether the unit appears. The script is evaluated when the mission starts.

For more information, see the Using Basic Scripts in the VBS4 Scripting Manual.

## 11. Set the **Psychological / Physical Settings** settings:

- **Endurance**



### FEATURE NOTICE

Temporarily disabled for AI. See One AI in the VBS4 Release Notes.

Defines the physical stamina and hardness of a unit, as well as some measure of their ability to tolerate difficult conditions. Ranges from no endurance on the left of the slider, through to very fit on the right.

Endurance affects fatigue VO2max.

VO2max (ml / min / kg) is determined by the Endurance slider of the unit (or the [setEndurance](https://sqf.bisimulations.com/display/SQF/setEndurance) (<https://sqf.bisimulations.com/display/SQF/setEndurance>) command). The range is 25 ml / min / kg at no endurance, to 70 ml / min / kg at maximum endurance. The higher this setting, the further the unit can sprint, and the faster they can run. For information about how fatigue is actually calculated in VBS4, see [Calculation and Implementation of Fatigue \(on page 355\)](#).



### NOTE

You can reset the fatigue level of a unit to 0% at any time. Right-click the **unit** and select **Interventions > Clear Fatigue** in the context menu.



### NOTE

Fatigue is disabled by default in VBS4. To re-enable fatigue, turn on **Realistic Fatigue**. For more information, see Simulation Settings in the VBS4 Administrator Manual.

If enabled, the indicator bar only shows if unit fatigue is bigger than 0.

Fatigue from and end-user point-of-view is discussed in Character Fatigue in the VBS4 Trainee Manual.

- **Height**



### FEATURE NOTICE

Temporarily disabled for AI. See One AI in the VBS4 Release Notes.

Defines the height of the unit with a default of 1.82m. Moving the slider to the left makes the unit shorter, moving it to the right makes the unit taller.

- **BMI**

### ★ FEATURE NOTICE

Temporarily disabled for AI. See One AI in the VBS4 Release Notes.

Defines the Body Mass Index (BMI). This slider sets the BMI by which the unit model is scaled. Moving the slider to the left decreases the BMI and makes the unit appear slimmer, while moving the slider to the right increases the BMI and makes the unit appear wider.

The BMI range is [16, 34]. To set more exact BMI values, use the [setBMI](https://sqf.bisimulations.com/display/SQF/setBMI) (<https://sqf.bisimulations.com/display/SQF/setBMI>) command.

### NOTE

The following considerations apply:

- Currently, the new BMI system is only supported by GB Virtus models. New models will support the new BMI system in future releases of VBS4.
- The [setBMI](https://sqf.bisimulations.com/display/SQF/setBMI) (<https://sqf.bisimulations.com/display/SQF/setBMI>) command supports the legacy BMI range that accepts both negative and positive values, with 0 as the default. This legacy BMI range does not directly correspond to the actual BMI scale.

**Image-64: Model with BMI values between 16 - 34**



- **Weapon Inaccuracy**

Controls the weapon inaccuracy for the given unit. Moving the slider to the right increases the inaccuracy, while moving it to the left decreases it.

**i** **NOTE**

The following considerations apply:

- Applies to player and AI units.
- Only applies to firearms.
- The **Weapon Inaccuracy** option in [AI Rules of Engagement \(on page 400\)](#) overrides the weapon inaccuracy in the Unit Editor Object Properties.
  - If the AI Rules of Engagement Editor Object (EO) is placed in Prepare Mode, it overrides the weapon accuracy of all the units it applies to.
  - If the AI Rules of Engagement EO is placed in Preview / Execute Mode, it overrides all the units it applies to that are present in the scenario at that point. Therefore, the weapon inaccuracy of any units placed in the scenario after the AI Rules of Engagement EO placement is not overridden by the AI Rules of Engagement EO.

12. Click **OK** to save the settings for the unit and close the Object Properties dialog.

## 9.1.4 Calculation and Implementation of Fatigue

In VBS4, fatigue uses modified Pandolf equations to track total metabolic energy cost of movement, which is converted to bio-mechanical power in watts. This power is broken up into 2 aerobic pathways, 1 anaerobic pathway, an acidosis buffer, a respiratory rate buffer, and a muscle integrity / central nervous system power buffer. Each buffer or pathway has different characteristics of depletion and recovery and is utilized at varying levels of physical activity. As a result, fatigue onset and recovery is much more realistic and depends highly on the movement rate, loadout, and terrain gradient. Prolonged physical fatigue can be exhibited after longer periods of activity. Holding breath, diving, or low oxygen capacity for any reason eventually offloads work onto the anaerobic pathway.

### NOTE

Fatigue is disabled by default in VBS4. To re-enable fatigue, turn on **Realistic Fatigue**. For more information, see Simulation Settings in the VBS4 Administrator Manual.

If enabled, the indicator bar only shows if unit fatigue is bigger than 0.

### VO<sub>2</sub>max and AnT

Maximum volume of Oxygen uptake per kg (VO<sub>2</sub>max) and Anaerobic Threshold (AnT) percentage can be adjusted using the [Endurance \(on page 352\)](#) slider.

### Equations

#### Converting Endurance to VO<sub>2</sub>max

To convert endurance to VO<sub>2</sub>max is:  $V = 25 + 45e$   
To convert VO<sub>2</sub>max to endurance is:  $e = (V - 25) / 45$

- V represents VO<sub>2</sub>max
- e represents endurance level

### Default Settings

Soldier units are placed with [Endurance \(on page 352\)](#) values to match that of an average army soldier, which is VO<sub>2</sub>max of 48.3ml/kg/min.

### Effect

VO<sub>2</sub>max has a direct effect on maximal power. Matching VO<sub>2</sub>max levels to real-world values produces life like performances at 800m, 3218m, and 4800m runs and beyond, including total energy (kilojoules) consumed.

Maximal movement rate is dictated by fatigue and offers two power modes: sprinting and anaerobic threshold. Anaerobic threshold running monitors acidosis and fatigue levels to ensure movement at a maximal sustainable rate over very long periods as performed by endurance athletes. Muscle integrity deteriorates exponentially with very high exertion and takes 3 days to recover from a hypothetical 0%.

The following commands give developers the highest level of information on biological status as well as an ability to fully clear fatigue and control muscle integrity:

- [getBioParams](https://sqf.bisimulations.com/display/SQF/getBioParams) (<https://sqf.bisimulations.com/display/SQF/getBioParams>)
- [resetFatigue](https://sqf.bisimulations.com/display/SQF/resetFatigue) (<https://sqf.bisimulations.com/display/SQF/resetFatigue>)
- [addToMuscleIntegrity](https://sqf.bisimulations.com/display/SQF/addToMuscleIntegrity) (<https://sqf.bisimulations.com/display/SQF/addToMuscleIntegrity>)
- [getMuscleIntegrity](https://sqf.bisimulations.com/display/SQF/getMuscleIntegrity) (<https://sqf.bisimulations.com/display/SQF/getMuscleIntegrity>)

## 9.2 Creating Unit Variants

The Editor enables the creation of custom unit variants with alternate equipment loadouts.

### NOTE

This process adds a new unit type to the Editor Objects List. To modify the unit only as part of the saved mission or for the current runtime with creating a new Editor Object, see [Edit Equipment Loadout \(on page 662\)](#).

### TIP

For a more advanced tool to create unit variants, see [ORBAT Editor \(on page 366\)](#).

### Follow these steps:

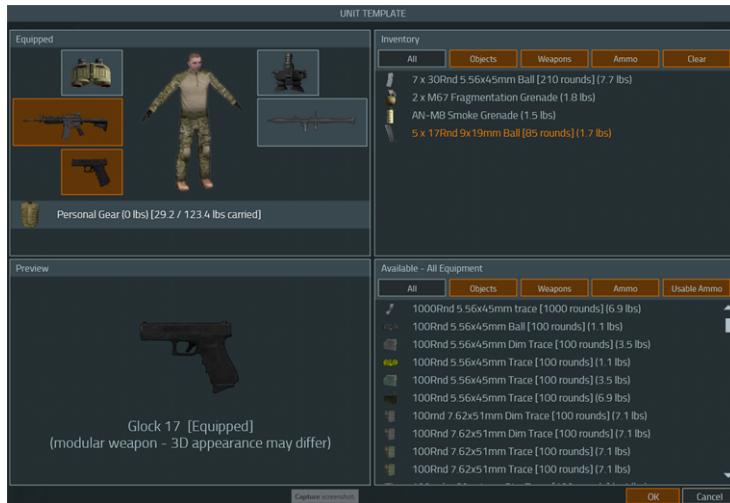
1. In the Editor Objects List, select **(F1) Unit**.
2. Double-click a position on the map, or right-click, and select **New Object**.  
The Unit Object Properties dialog opens.
3. In the Object Properties dialog, select the unit to copy, and click **New Unit**.

If the unit is already a custom variant, use **Edit Unit** to modify it, or **New Unit** to create another variant.

### NOTE

In the Editor (Execute Mode), this option is only available when adding a new unit to the map. For existing units, the **Inventory** option enables the unit loadout to be modified, but only for the duration of the current mission runtime.

The Unit Template panel opens.



4. Use the force categories in the bottom-left panel and the equipment filters in the bottom-right panel to filter the list of equipment displayed.
5. Drag equipment from the bottom-right to the top-right or top-left to add the equipment to the unit loadout. If prompted, select an amount in the pop-up, and click **OK**.

The Editor adds the equipment to the unit loadout and adds its weight to the Personal Gear.

**NOTE**

If a UCS weapon (name prefixed by **modular weapon**) is added, the Create Custom Weapon dialog opens. For more information, see [Edit Weapon Components \(on page 665\)](#).

6. Click **OK** to confirm the loadout change.

The Save Unit dialog opens.

7. Input a **Name** for the Unit, and click **OK**.

The Editor returns to the Object Properties dialog with the new unit added to the Type list, marked with an asterisk, \*, to indicate that it is a custom variant.

**NOTE**

When exchanging missions between computers, ensure that you save any modified Units with a different name. This avoids the possibility of duplicate display names showing in the VBS Editor on the machine of the mission recipient.

8. Edit the other unit settings as required and click **OK**.

For more information about Unit Properties, see [Adding Units \(on page 344\)](#).

The Editor adds the custom unit variant to the scenario.

Custom unit variants are saved locally to:

`\Documents\VBS4\Config\editorVehicles.cfg`.

These variants are then available for all other missions created on the same computer.

To transfer the custom object to another computer, see [Export Custom Object Variants \(on page 98\)](#).

## 9.3 Adding Groups

VBS4 includes many personnel groups to support a wide range of training scenarios:

- Military fire teams and platoon level groups.
- Civilian groups.
- Vehicle groups.

Groups provide the following functionality:

- Player command of AI units.
- Create and extend groups by linking units.
- Group response to triggers and waypoints.
- Formations.
- Form larger organizational structures.

 **NOTE**

Vehicle crew also behave as groups. For information about adding vehicles, see [Adding Vehicles \(on page 599\)](#).

For information about commanding groups in a scenario, see Commanding Subordinates in the VBS4 Trainee Manual.

 **NOTE**

You can only set the group to playable, player led, or fully AI controlled in Prepare mode, not in Execute mode.

## To Add a Group:

1. In the Editor, select **(F2) Group** from the Editor Objects List.
2. Double-click a location on the map or right-click and select **New Object**.

The Group Object Properties dialog opens:



3. **Optional:** Click **Group Editor** to create a new group with different personnel.

For more information, see [Creating Custom Groups \(on page 364\)](#).

**NOTE**

This option is not available in Execute mode.

4. Use the **Side**, **Filter**, **Category**, and **Type** lists to select the group to add.
5. In the **Weapon Control Status** drop-down, select the AI group Combat Mode in response to enemy contact:

Behavior	Description
<b>Weapons Free</b>	Fire at enemy forces, when they are encountered.
<b>Hold Fire</b>	Do not fire at enemy forces, when they are encountered.
<b>Inherit</b>	Inherit the combat mode from the group the entity is in (unless the entity is not part of a group).

6. Use the **Playable** drop-down to select the player or AI control of the group:

- **Non Playable** - All units in the group are AI controlled.
- **Playable** - All units are available for selection in the network lobby.
- **Player as Commander** - The group leader is player controlled with AI subordinates.
- **Playable, Player as Commander** - The group leader is player controlled and other units are available for selection in the network lobby.

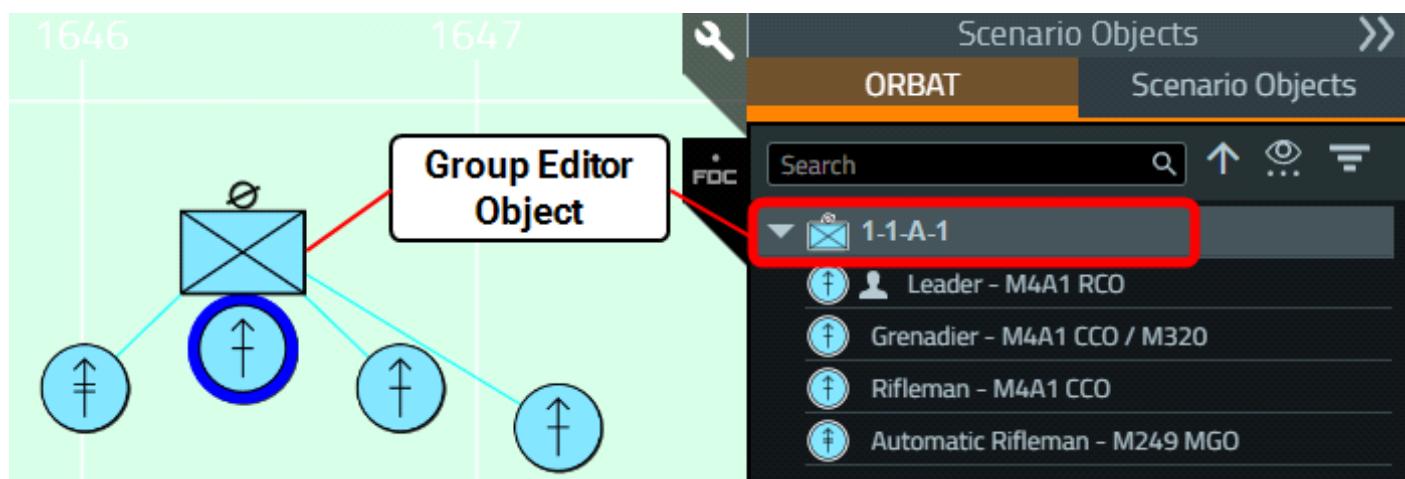
7. Use the **Formation** drop-down to set the default group formation.

8. Click **Set GPS Coordinates** to specify the exact position of the group.

For more information, see [Set GPS Coordinates \(on page 65\)](#).

9. Click **OK** to add the group with its default personnel and equipment.

The Editor adds the units in the selected group formation to the map and the Scenario Objects Tree. The units are linked to the group with lines.



- Edit the group by right-clicking the group object in the Scenario Objects Tree and selecting **Edit Object**.

- Edit individual units by right-clicking them in the map or the Scenario Objects Tree and selecting **Edit Object**.

For more information, see [Adding Units \(on page 344\)](#).

- Form larger organizational structures by right-clicking the group leader and selecting **Orders > Attach to Higher Echelon**.

For more information, see [Creating Command Structures \(on page 384\)](#).

- Create vehicle groups or create and add to groups using links.

For more information, see [Creating and Adding to Groups with Links \(on the next page\)](#).

- Create unit / vehicle groups from a single entity using copy and paste.

For more information, see [Copy and Paste from a Single Entity \(on page 363\)](#).

## **WARNING**

If you use VBS Radio, re-open Radio Admin Settings to update Side assignments and apply the Default Radio Profile to new units and groups, before saving the mission.

### 9.3.1 Creating and Adding to Groups with Links

Create new groups, create vehicle groups, and add to groups using **Group With** links.

#### Follow these steps:

1. In the Editor, right-click the unit or vehicle to add to a group, and select **Orders > Group With**.
2. Click the unit or vehicle to lead the group.

#### **NOTE**

The units and vehicles must belong to the same side.

The Editor links the unit or vehicle to the group leader with the following results:

- If the lead unit or vehicle did not previously lead a group, the Editor creates a new group.
- If the linked unit or vehicle was in another group, it leaves that group.
- If the linked unit or vehicle was the leader of another group, the rest of the group join that other group.

#### **NOTE**

Groups that combine vehicles with units on foot may cause group leadership issues and unexpected waypoint behavior.

You can also group individual units.

#### Follow these steps:

1. In the Editor, select the individual units you want to group, right-click and select **Orders > Group Selected**.
2. Click the unit to lead the group.

#### **NOTE**

Units must belong to the same side. **Group Selected** only works for individual units, not groups (including vehicles with more than 1 crew member). For these, use **Group With**.

To remove units or vehicles from a group, right-click them and select **Orders > Ungroup Selected**.

## 9.3.2 Copy and Paste from a Single Entity

You can quickly create groups of units or vehicles from a single entity on the fly.

**Follow these steps:**

1. Select a single entity.
2. Press **LCtrl + C**.
3. Move your cursor to where you want to paste the next entity in the group.
4. Press **LCtrl + V**.

The entities are linked as a group.

5. Repeat steps 3 and 4 repeatedly to add more entities to the group.

 **NOTE**

The original entity becomes the group leader.

## 9.4 Creating Custom Groups

The Group Editor in Prepare mode enables the creation of new groups, saved for use in future missions.

### NOTE

This option is not available in Execute mode.

### TIP

For a more advanced tool to create custom groups, see [ORBAT Editor \(on page 366\)](#).

### Follow these steps:

1. In the Editor, select **(F2) Group** from the Editor Objects List.
2. Double-click a location on the map or right-click and select **New Object**.  
The Group Object Properties dialog opens.
3. Click **Group Editor** to open the custom group dialog:



4. **Optional:** In the **Description** field, add a name / description for the group.

5. Do any of the following:

- Use the **Side**, **Category**, and **Type** inputs to select an existing group to copy.

**NOTE**

Previously created custom groups (marked \*) may be modified. Existing default groups may only be copied and added as new custom groups with a New Type Name.

- Select the **<Add New> Type** and input a **New Type Name** to create a new group type within an existing category.
- Select the **<Add New> Category** and **Type** and input **New Category Name** and **New Type Name** to create a new group type in a new category.

6. Do any of the following:

- Use the **Filter** and Unit Selection tree to select a unit or vehicle, and click **Add** to add a unit to the group.  
A group must contain at least one unit or vehicle.
- Select a unit or vehicle in the group and click **Up** or **Down** to change the group order.
- Select a unit or vehicle in the group and click **Copy** to add a duplicate to the group.
- Select a unit or vehicle in the group and click **Remove** to remove it from the group.

7. **Optional:** Click **New Unit** to create a custom unit or vehicle variant to add to the group.

For more information, see [Creating Unit Variants \(on page 357\)](#) and [Creating Vehicle Variants \(on page 609\)](#).

8. **Optional:** Click **Set GPS Coordinates** to specify the exact position of the group in the mission.

For more information, see [Set GPS Coordinates \(on page 65\)](#).

9. Click **OK**.

**NOTE**

If you copy a default group, the Editor prompts you to provide a **New Type Name**.

The Editor adds the custom group to the mission, and also adds the Group to the **Type** selection in the Object Properties for adding a new group to future missions.

VBS4 saves custom groups in the configuration in:

`\Documents\VBS4\Config\editorGroups.cfg`.

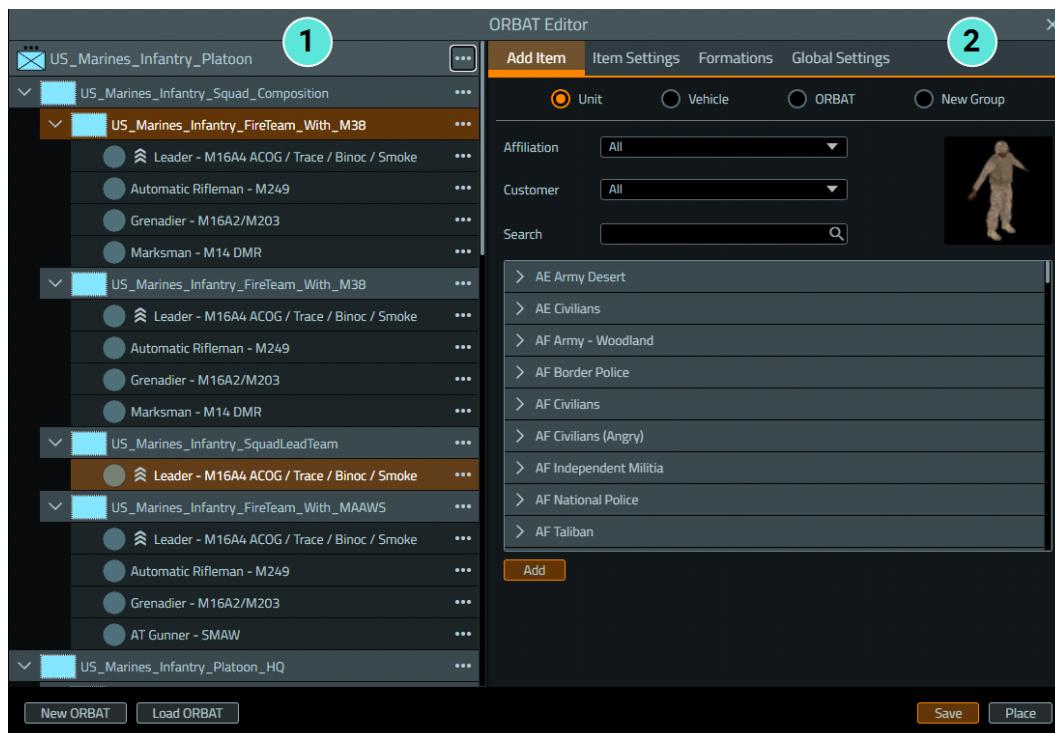
To transfer the custom object to another computer, see [Export Custom Object Variants \(on page 98\)](#).

## 9.5 ORBAT Editor

The ORBAT Editor allows you to customize existing Orders of Battle (ORBATs) and create new ones in VBS4.

ORBATs comprise group-based command hierarchies that can contain personnel, vehicles, and higher echelons.

The ORBAT Editor is available in Prepare / Preview / Execute Modes in either the VBS Editor or VBS Plan.



<b>1</b>	<b>ORBAT Tree</b>	Contains the ORBAT units, vehicles, and groups command hierarchy.
<b>2</b>	<b>ORBAT Settings</b>	Contains the various definitions of the ORBAT units, vehicles, and groups, and their formations.

### TIP

For a how-to example of using the ORBAT Editor, see Create Custom ORBATS in the VBS Plan Manual.

The following aspects of the ORBAT Editor are discussed:

- [ORBAT Editor Controls \(on the next page\)](#)
- [Creating New ORBATS \(on page 368\)](#)
- [Modifying Existing ORBATS \(on page 379\)](#)

## 9.5.1 ORBAT Editor Controls

The ORBAT Editor has the following high-level UI controls:

Control	Description
<b>Access</b>	<p>To access the ORBAT Editor, do one of the following:</p> <ul style="list-style-type: none"><li>• Select <b>(F9) ORBAT</b> in the Editor Objects List.</li></ul> <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><p><b>NOTE</b> Opens the ORBAT Editor in the Place ORBAT mode - see <a href="#">Placing Entities (on page 376)</a>.</p></div> <ul style="list-style-type: none"><li>• Select <b>Tools &gt; ORBAT Editor</b> in VBS Editor / VBS Plan.</li><li>• Use the <b>Units Tool</b> or the <b>CAS Units Tool</b> in VBS Plan, and click <b>New ORBAT</b>.</li></ul> <p>For more information, see:</p> <ul style="list-style-type: none"><li>• <a href="#">Mission Designer Interface (on page 28)</a></li><li>• Instructor Interface in the VBS4 Instructor Manual</li><li>• VBS Plan UI Overview in the VBS Plan Manual</li><li>• Units Tool in the VBS Plan Manual</li><li>• CAS Units Tool in the VBS Plan Manual</li></ul>
<b>Resize</b>	To resize the ORBAT Editor dialog, drag the bottom-right corner.
<b>Browse</b>	To browse and select entries in the <a href="#">ORBAT Tree (on the previous page)</a> , use the mouse, or: <ul style="list-style-type: none"><li>• <b>Up / Down</b> arrows to select entries.</li><li>• <b>Left / Right</b> arrows to collapse / expand the ORBAT Tree hierarchy.</li></ul>
<b>Modify</b>	<p>Use the mouse to create and modify the ORBAT (see <a href="#">Defining the ORBAT / Group (on page 370)</a>).</p> <p>Use the mouse or press <b>Delete</b> to delete or unlink entities (see <a href="#">Duplicating / Deleting Entities (on page 377)</a> and <a href="#">Unlinking Entities (on page 378)</a>).</p>

## 9.5.2 Creating New ORBATS

You can create a new VBS4 ORBAT.

### NOTE

Only one ORBAT can be created at a time in the ORBAT Editor.

**Follow these steps:**

1. Set the main ORBAT Settings - see [Defining the ORBAT / Group \(on page 370\)](#).
2. Add units / vehicles / groups / existing groups to the ORBAT - see [Adding Units / Vehicles \(on page 370\)](#) and [Adding Groups / Existing Groups \(on page 374\)](#).

### NOTE

ORBATs can be added to other ORBATs as existing groups.

3. If necessary, modify the ORBAT formation - see [ORBAT Formations Editor \(on page 381\)](#).
4. To place the ORBAT, see [Placing Entities \(on page 376\)](#).
5. To save the ORBAT, select the **Global Settings** tab.
6. Modify the **Save Settings** in the following steps.
7. In **File Name**, enter the ORBAT file name.

8. In **Category**, set the following:

 **NOTE**

The following **Category** settings only appear when saving the ORBAT for the first time.

- **Affiliation** - ORBAT affiliation. Select any of the affiliations (usually, based on country codes) available in the drop-down.
- **Type** - Select any of the ORBAT types available in the drop-down.
- **Subtype** - Select any of the ORBAT sub-types available in the drop-down.
- **Label** - Enter the ORBAT entity label.

For each of the **Category** settings, click the **Plus icon** to modify the sub-settings:



- **Name** - Enter the affiliation / type / sub-type name.
- **Symbol** - Enter the Symbol Identification Coding (SIDC), or click **Change** to open the Change SIDC dialog, where you can also set a custom SIDC:
  - a. In the Change SIDC dialog, either choose the **Affiliation**, **Battle Dimension**, **Status**, **Size**, and **Function ID**, based on a selection from one of the existing VBS4 ORBATS, or enter the **SIDC** directly.
  - b. Click **Apply** to apply the SIDC, or **Cancel** to cancel.

9. Click **Save**.

The ORBAT is saved.

 **NOTE**

For any modifications to ORBATS that are already saved, it is only enough to click **Save**, without filling **Global Settings > Save Settings**.

The new ORBAT is created.

 **NOTE**

The ORBAT is saved as a JSONC file in:

*\Documents\VBS4\Doctrine\*

### 9.5.2.1 Defining the ORBAT / Group

Define the main settings of your ORBAT / group.

#### Follow these steps:

In the right panel of the ORBAT Editor, select the **Item Settings** tab, set the following:

- **Description** - Enter the ORBAT / group description.
- **SIDC** - Enter the Symbol Identification Coding (SIDC), or click **Change** to open the Change SIDC dialog, where you can also set a custom SIDC:

 **NOTE**

The SIDC at the ORBAT root level designates which affiliation (for example, BLUFOR, OPFOR) the entities are created under.

1. In the Change SIDC dialog, either choose the **Affiliation**, **Battle Dimension**, **Status**, **Size**, and **Function ID**, based on a selection from one of the existing VBS4 ORBATS, or enter the **SIDC** directly.
2. Click **Apply** to apply the SIDC, or **Cancel** to cancel.

The main settings of the ORBAT / group are defined.

### 9.5.2.2 Adding Units / Vehicles

Add units / vehicles to the ORBAT / group.

#### Follow these steps:

1. Do one of the following:
  - Click the **Ellipsis icon**, and then click **Add Unit / Add Vehicle**.  

  - Select the **Add Item** tab, and then select **Unit / Vehicle**.

2. In the **Affiliation** drop-down, select the unit / vehicle affiliation:

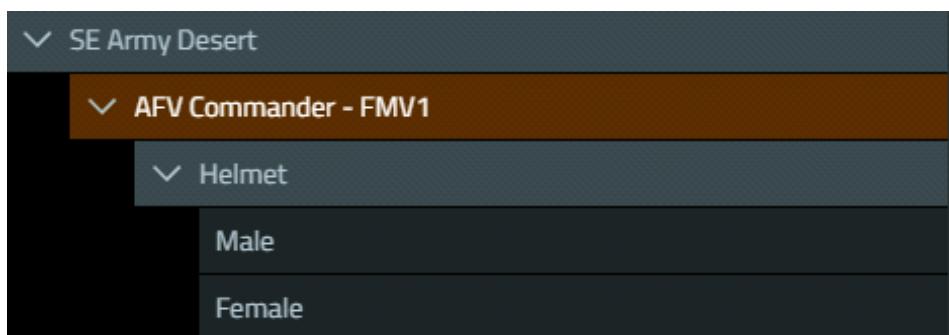
- **All** - Displays all the units / vehicles in VBS4.
- **Favorites** - Displays units / vehicles from the Favorites list, created by the user (see [Unit and Vehicle Editor Object Filters \(on page 62\)](#)).
- **BLUFOR** - Displays all the BLUFOR units / vehicles in VBS4.
- **OPFOR** - Displays all the OPFOR units / vehicles in VBS4.
- **Independent** - Displays all the Independent units / vehicles in VBS4.
- **Civilian** - Displays all the Civilian units / vehicles in VBS4.

3. In the **Customer** drop-down, select the customer for which the unit / vehicle is available:

- **All** - Displays content available to all the customers.
- **US Customer** - Displays content available to the US customer.
- **UK Customer** - Displays content available to the UK customer.
- **AU/NZ Customer** - Displays content available to the AU / NZ customer.
- **CA Customer** - Displays content available to the CA customer.
- **CZ Customer** - Displays content available to the CZ customer.
- **NL Customer** - Displays content available to the NL customer.
- **SE Customer** - Displays content available to the SE customer.

4. In **Search**, enter any part of the unit / vehicle name to narrow down the matching results.

5. Under **Search**, expand the unit / vehicle list to select the unit / vehicle that you want to add.



6. (Vehicle only) Check **Add Crew** to add a crew to the vehicle.

**NOTE**

The crew members (units) of a vehicle can be modified using the ORBAT Editor (by adding an existing vehicle and editing its crew members), or in the ORBAT JSONC files (see Create Custom ORBATS in the VBS Plan Manual).

Bohemia Interactive Simulations recommends using the ORBAT Editor to modify crew members.

7. Click **Add** to add the unit / vehicle.

The unit / vehicle is added to the ORBAT Tree.

8. (Unit only) To make the unit the ORBAT / group leader:

- Select the unit in the ORBAT Tree.
- Click the **Ellipsis icon** and select **Make Leader**.

**NOTE**

The following considerations apply:

- The option is only available to non-leader units.
- The option applies for the entire ORBAT or the group, of which the unit is a member.
- Any first unit added to a group automatically becomes the group leader.

The **Chevron icon** appears next to the unit name, indicating that the unit is a leader.



9. (Vehicle only) To add crew members to the vehicle, follow step 1 using the unit options.
10. To define the unit / vehicle, see [Defining Units / Vehicles / Groups \(below\)](#).
11. To duplicate / delete the unit / vehicle, see [Duplicating / Deleting Entities \(on page 377\)](#).

### 9.5.2.3 Defining Units / Vehicles / Groups

Define units / vehicles and / or new / existing groups.

**Follow these steps:**

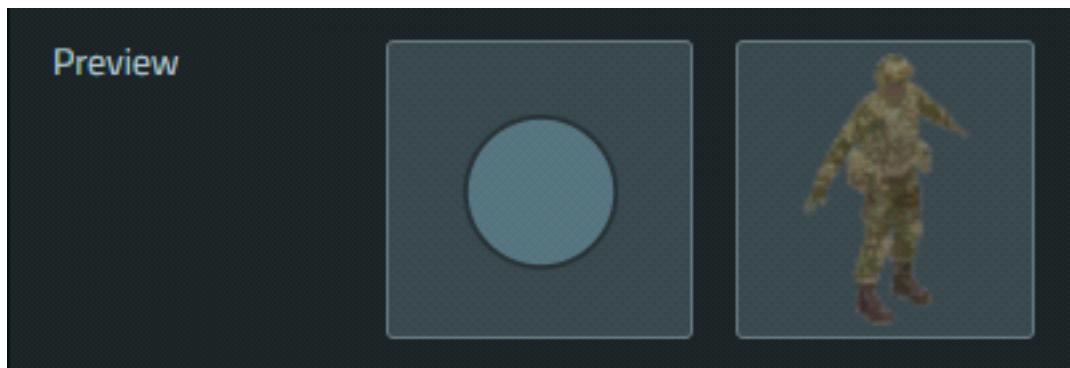
1. Select the unit / vehicle / group in the ORBAT Tree.

**NOTE**

Units / vehicles / groups that are part of existing groups are linked to their ORBAT source and need to be unlinked, before they can be modified - see [Unlinking Entities \(on page 378\)](#).

2. Select the **Item Settings** tab.
  3. (Unit and vehicle only) In **Type**, click **Change** and follow steps 2 - 6 in [Adding Units / Vehicles \(on page 370\)](#). Then, click **OK**.
  4. In **Description**, enter the unit / vehicle / group description.
  5. (Unit and vehicle only) In **URN**, enter the Unit Reference Number (URN) for the unit / vehicle.
  6. (Unit only) In **Loadout**, click **Change** to change the unit loadout in the Equipment Inventory.
- The Unit Template dialog opens. For the dialog controls, see [Unit Template Dialog \(on the next page\)](#).
7. In **SIDC** (if you do not want to automatically assign an SIDC to the unit / vehicle / group), enter the Symbol Identification Coding (SIDC), or click **Change** to open the Change SIDC dialog, where you can also set a custom SIDC:
    - a. In the Change SIDC dialog, either choose the **Affiliation**, **Battle Dimension**, **Status**, **Size**, and **Function ID**, based on a selection from one of the existing VBS4 ORBATS, or enter the **SIDC** directly.
    - b. Click **Apply** to apply the SIDC, or **Cancel** to cancel.

Use the **Preview** to display the SIDC symbol and unit / vehicle model.

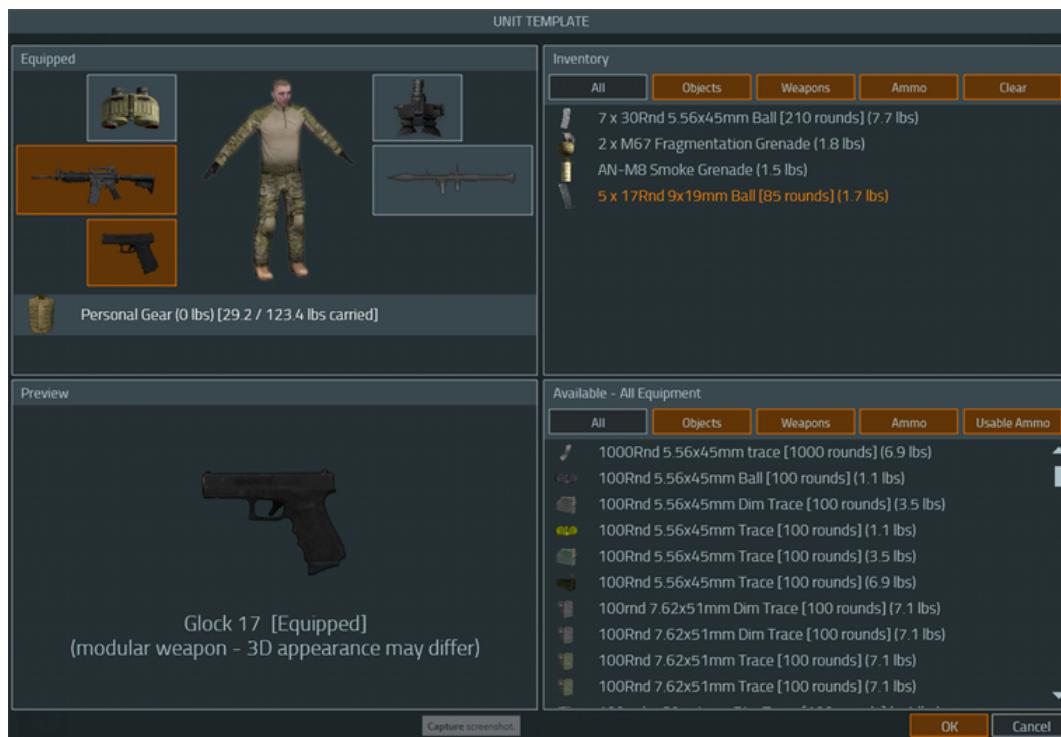


8. To duplicate / delete the unit / vehicle / group, see [Duplicating / Deleting Entities \(on page 377\)](#).

The units / vehicles and / or new / existing groups are defined.

### 9.5.2.3.1 Unit Template Dialog

Use the Unit Template dialog to customize the starting loadout of your units.



The Unit Template dialog has the following controls:

1. Use the force categories in the bottom-left panel and the equipment filters in the bottom-right panel to filter the list of equipment displayed.
2. Drag equipment from the bottom-right to the top-right or top-left to add the equipment to the unit loadout. If prompted, select an amount in the pop-up, and click **OK**.

The Editor adds the equipment to the unit loadout and adds its weight to the Personal Gear.

**NOTE**

If a UCS weapon (name prefixed by **modular weapon**) is added, the Create Custom Weapon dialog opens. For more information, see [Edit Weapon Components \(on page 665\)](#).

3. Click **OK** to confirm the loadout change.

The unit loadout is saved.

### 9.5.2.4 Adding Groups / Existing Groups

Add new groups / existing groups to the ORBAT / group.

**Follow these steps:**

1. Do one of the following:

- Click the **Ellipsis icon**, and then click **Add New Group** (to add a new group) / **Add ORBAT** (to add an existing group).



- Select the **Add Item** tab, and then select **New Group** (to add a new group) / **ORBAT** (to add an existing group).

For a new group, a new empty group is added to the ORBAT Tree:

- To add units / vehicles to the new group, see [Adding Units / Vehicles \(on page 370\)](#).
- To add new / existing sub-groups, repeat this procedure.

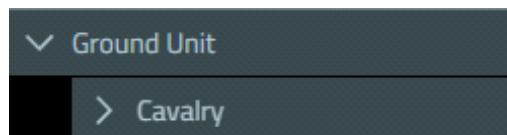
For an existing group, follow the next steps.

2. In the **Affiliation** drop-down, select the existing group affiliation, such as:

- **AU** - Australian affiliation.
- **GB** - UK affiliation.
- **Generic OPFOR** - Generic enemy (OPFOR) affiliation.
- **SE** - Swedish affiliation.
- **US** - US affiliation.

3. In **Search**, enter any part of the existing group name to narrow down the matching results.

4. Under **Search**, expand the existing-groups list to select the existing group that you want to add.



5. Check **Maintain link to ORBAT**, if you want any changes to be reflected everywhere the ORBAT is used.

6. Click **Add**.

The new / existing group is added to the ORBAT / group.

7. To define the new / existing group, see [Defining Units / Vehicles / Groups \(on page 372\)](#).
8. To duplicate / delete the new / existing group, see [Duplicating / Deleting Entities \(on page 377\)](#).

### 9.5.2.5 Placing Entities

Place the ORBAT entities (units, vehicles, groups) on the map.

#### Follow these steps:

Choose one of the following placement methods.

From the ORBAT Editor UI:

1. Select the **Global Settings** tab.

2. Modify the **Placement Settings**:

- Use the **Playable** toggle to define if the ORBAT is playable.

3. Click **Place**, then click a location on the map where you want to place the ORBAT.

**i** **NOTE**

The formation in which the ORBAT entities are placed on the map depends on the formation selected in the **Formations** tab. For more information, see [ORBAT Formations Editor \(on page 381\)](#).

From the VBS Editor UI:

1. Select (**F9**) **ORBAT** in the Editor Objects List.

2. Double-click a location on the map, where you want to place the ORBAT.

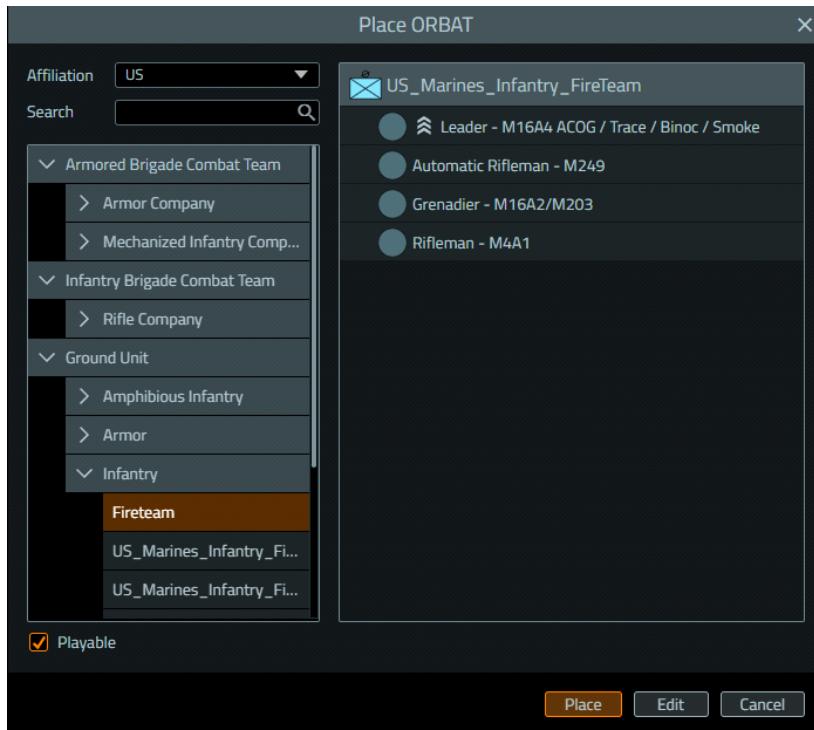
The Place ORBAT dialog opens.

3. In the **Affiliation** drop-down, select any of the affiliations (usually, based on country codes).

4. In **Search**, enter any part of the ORBAT name to narrow down the matching results.

5. Under **Search**, expand the ORBAT Tree to select the ORBAT you want to place.

The selected ORBAT preview appears on the right of the Place ORBAT dialog.



6. Use the **Playable** toggle to define if the ORBAT is playable.

7. Click **Place**.



#### TIP

If you want to edit the ORBAT before placing it, click **Edit** (the result is the same as when loading an existing ORBAT - see [Modifying Existing ORBATS \(on page 379\)](#)).

The ORBAT entities are placed on the map.

#### 9.5.2.6 Duplicating / Deleting Entities

Duplicate / delete the ORBAT entities (units, vehicles, groups).

**Follow these steps:**

1. Click the **Ellipsis icon**.



2. Select **Duplicate / Delete** to duplicate the unit / vehicle / group in the ORBAT Tree, or delete it.

 **NOTE**

If you press **Delete**, with a linked entity selected, you are prompted to confirm the unlinking (see [Unlinking Entities \(below\)](#)). In this case, the entity gets unlinked, rather than deleted. On the other hand, if you press **Delete**, with an unlinked entity selected, the entity is deleted.

The ORBAT entities are duplicated / deleted.

### 9.5.2.7 Unlinking Entities

Units / vehicles / groups that are part of existing groups are linked to their ORBAT source and need to be unlinked, before they can be modified.

**Follow these steps:**

To unlink a unit / vehicle / group from its ORBAT source:

 **WARNING**

After unlinking, any changes of the unit / vehicle / group in the ORBAT source no longer affect any of the unit / vehicle / group instances. The unlinking cannot be undone.

1. In the ORBAT Tree, select the group of the unit / vehicle / group that you want to unlink.
2. Click the **Link icon** next to it.



3. Click **Unlink Group** to confirm.

The unit / vehicle / group is unlinked from its ORBAT source.

To modify the ORBAT source of a unit / vehicle / group:

 **WARNING**

The following considerations apply:

- After selecting to modify the ORBAT source, any unsaved ORBAT changes are lost.
- Modifying the unit / vehicle / group in the ORBAT source affects all the unit / vehicle / group instances using the ORBAT source.

- a. In the ORBAT Tree, select the unit / vehicle / group that you want to edit in the ORBAT source.
- b. Click the **Edit icon** next to it.



- c. Click **Edit Source** to confirm.

The unit / vehicle / group ORBAT source is modified.

### 9.5.3 Modifying Existing ORBATS

You can modify an existing VBS4 ORBAT.

**NOTE**

Only one ORBAT can be modified at a time in the ORBAT Editor.

**Follow these steps:**

1. Click **Load ORBAT**.

The Load ORBAT dialog opens.

**NOTE**

You can also edit the ORBAT of an existing group that is already placed in the VBS Editor:

- a. In the VBS Editor, right-click a group (only applies to groups, not standalone units or vehicles) on the terrain (3D View) / map (2D View) or in the ORBAT tab of the [Scenario Objects Panel \(on page 39\)](#).
- b. Select **More... > Export as ORBAT**.

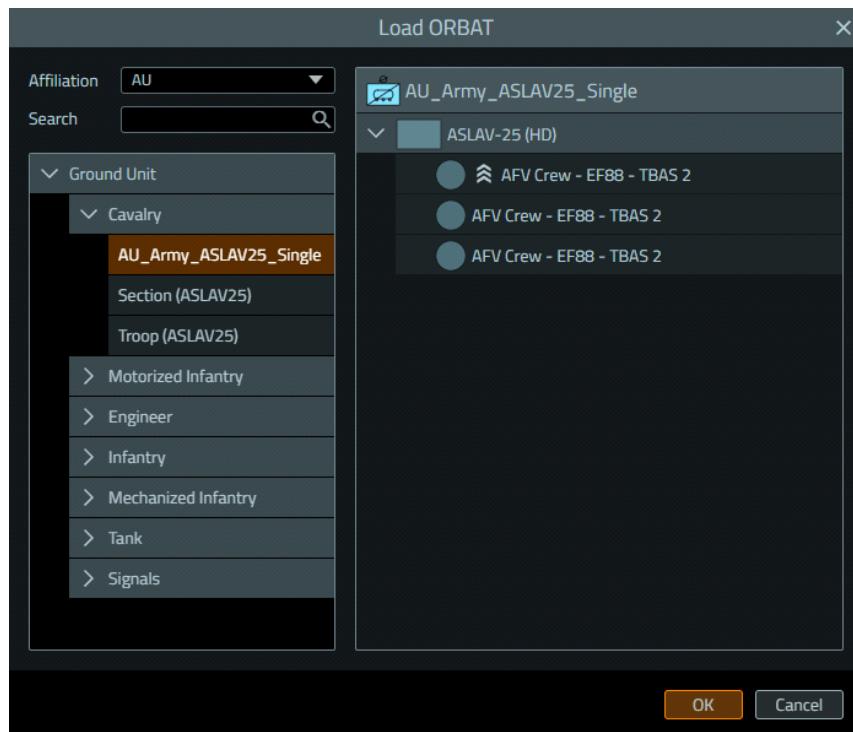
The group ORBAT is exported to the ORBAT Editor.

- c. Skip to step 6 of this procedure.

2. In the **Affiliation** drop-down, select any of the affiliations (usually, based on country codes).
3. In **Search**, enter any part of the ORBAT name to narrow down the matching results.

- Under **Search**, expand the ORBAT Tree to select the ORBAT you want to load.

The selected ORBAT preview appears on the right of the Load ORBAT dialog.



- Click **OK**, or **Cancel** to cancel the ORBAT loading.

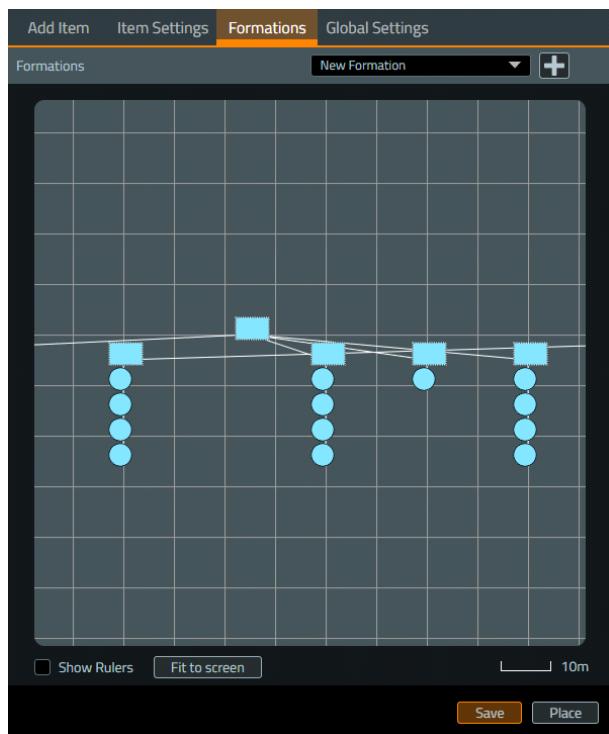
The ORBAT is loaded.

- To modify any of the ORBAT units / vehicles / groups, see [Defining Units / Vehicles / Groups \(on page 372\)](#).
- To modify the ORBAT formation, see [ORBAT Formations Editor \(on the next page\)](#).

The existing ORBAT is modified.

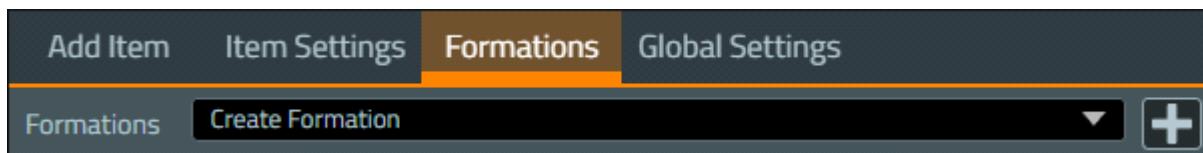
## 9.5.4 ORBAT Formations Editor

The ORBAT Formations Editor allows you to customize the formation of your ORBAT.



### Follow these steps:

1. To open the ORBAT Formations Editor, select the **Formations** tab in the ORBAT Editor.



2. If your ORBAT does not have any previously created formations, click the **Plus icon** to create a new one.



#### **NOTE**

If you are modifying the formation of an existing ORBAT for the first time, after you click the **Plus icon**, the ORBAT Formations Editor loads the default formation for that ORBAT.

The ORBAT Formations Editor displays the formation in the 2D Map View.

3. Use the following controls to modify the formation of the entities (units / vehicles / sub-groups):

- Click an entity to select it. Hold the **LMB** and release it to move it on the map.
- Hold the **RMB** and move the mouse to move the map.
- Use the **Mouse Scroll Wheel** to zoom in / out on the map (click **Fit to Screen** to reset to the default zoom level). The map scale changes according to the zoom level.

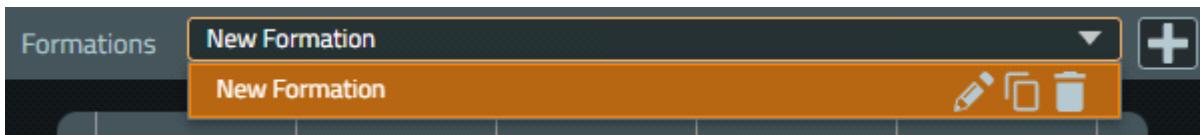


- Check **Show Rulers** to show the map distance between the entities in the formation.

**i** **NOTE**

To distance is displayed for the currently selected entity.

- Expand the **Formations** drop-down, and use the following icons from left to right to rename / duplicate / delete the formation - **Pencil icon** / **Clipboard icon** / **Trash icon**.



- **Rename** - Click the **Pencil icon**, enter the new formation name, and press **Enter** to confirm.
- **Duplicate** - Click the **Clipboard icon** to create a duplicate of the formation.
- **Delete** - Click the **Trash icon** to delete the formation.

**i** **NOTE**

The formation in which the ORBAT entities are placed on the map (see [Placing Entities \(on page 376\)](#)) depends on the formation selected in the **Formations** drop-down.

- In the VBS Editor, reset the group formation back to the original one: right-click the group, and select **Interventions > Reset Formation** in the context menu.

**!** **WARNING**

Resetting formations discards any unsaved formation changes. To save the ORBAT and its formations, click **Save** in the ORBAT Formations Editor.

- In the VBS Editor Prepare mode, change the ORBAT formation, based on the formation selected in the **Formations** drop-down: right-click the ORBAT group marker, and select **More... > Change Formation > Formation Name** in the context menu.

**i** **NOTE**

The **Change Formation** context-menu option is only available in the VBS Editor:

- In Prepare mode.
- When the ORBAT group marker is selected on the map or in the [Scenario Objects Panel \(on page 39\)](#) (the group marker of the ORBAT that is placed, using the [Placing Entities \(on page 376\)](#) procedure). The option is not available, if any of the ORBAT units / vehicles / sub-groups are selected instead.

The ORBAT formation is customized.

## 9.6 Creating Command Structures

VBS4 enables you to create a hierarchy of groups known as the ORBAT (Order of Battle). ORBAT is a command hierarchy of Higher Echelons and Groups that enable the creation of command structures without the need to create mixed groups.

### TIP

Bohemia Interactive Simulations recommends using the [ORBAT Editor \(on page 366\)](#), which is a more advanced and easier to use tool that allows you to create ORBATS and place their instances in the scenario on the map, in Prepare / Preview / Execute Modes, in either the VBS Editor or VBS Plan (see VBS Plan UI Overview in the VBS Plan Manual).

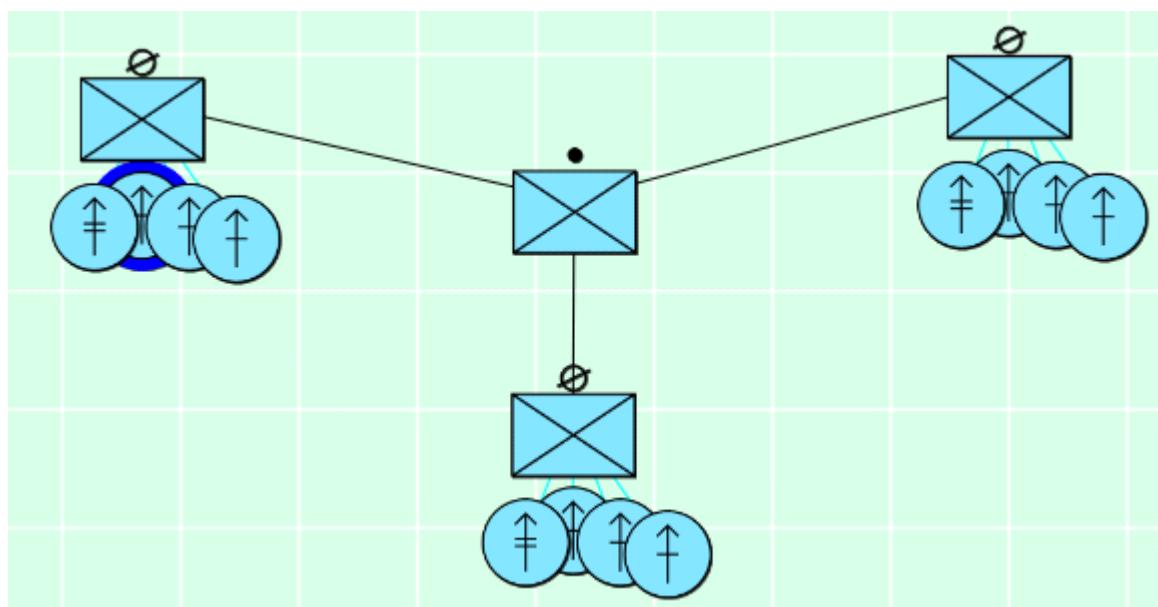
VBS Editor enables an additional layer of empty groups, Higher Echelons, that define the command hierarchy. Each Higher Echelon has an assigned command group, and the leader of that group has command options for the other groups in the echelon. The command structure enables a chain of command for multi-player simulation, with commanders at each command level able to submit orders to their subordinates in the hierarchy.

### NOTE

VBS Plan provides faster methods for placing ORBAT structures. For more information, see in the VBS Plan Manual.

Create ORBAT command hierarchies in VBS Editor.

**Image-65: ORBAT Command Structure in VBS Editor**



## 9.6.1 Create Higher Echelons

A Higher Echelon group is an empty command group with subordinate groups and echelons.

**Follow these steps:**

1. Select the **(F2) Group** option, right-click a position on the map, and select **New Object**.
2. Input a description, select a side, and select the **Higher Echelon** category.

**i NOTE**

To view the available higher echelon groups, use the Empty Groups filter.

3. Select a formation for subordinate groups and echelons.

Formation settings affect only the organization of the next command level down.

When an echelon receives movement orders, the AI elements in the subordinate groups move in echelon formation. Individual groups and units can break formation, if their movement is ordered directly.

**i NOTE**

When an echelon moves in formation, the AI for individual characters and vehicles may display unexpected behavior such as moving into water obstacles.

4. Click **OK**.

VBS Editor adds the Higher Echelon to the map and adds it to the Object Tree.

To edit higher echelons, use the Object Tree.

In this diagram the command structures assume the following formations:

Image-66: Formation Levels	Company Level	The <b>Column</b> setting at company level sets a formation for the platoons, one behind the other.
	Platoon Level	The <b>Line</b> setting at each platoon level sets a formation for the squads, side-by-side within each platoon.
	Squad Level	The <b>Wedge</b> setting for each squad sets a formation for the units, as an inverse V-wedge within each squad.

## 9.6.2 Create Order of Battle

A ORBAT links groups together into a command structure and formation using Higher Echelon groups.

### Follow these steps:

1. Right-click a group or echelon, select **Orders > Attach to Higher Echelon**, and click the Higher Echelon to command the group.

VBS Editor links the group to the higher echelon and updates the Object Tree.

2. Repeat step 1 for all groups in the echelon and all echelon groups required to make a deeper hierarchy.

3. Right-click the highest echelon, and select **Interventions > Reset Formation**.

VBS Editor moves all groups and echelons into their assigned formations based on the position of the lead unit of each group and the lead elements of each echelon.

Admins can also use this function during a mission, but it instantly transports all units and groups into position.

### Note the following limitations:

- Link groups and Higher Echelons to create a chain of command.
- Each group should only contain other groups or units / vehicles, not both.

#### NOTE

Changing a vehicle from multiple crew to single crew removes the vehicle group and disconnects the vehicle from the command structure. To reattach the vehicle to the command structure, add an empty group, use **Orders > Group With** to assign the single crew vehicle to the group, and attach the group to the appropriate Higher Echelon.

- Only the lowest level groups should contain units or vehicles.
- To create a single unit group, add a Higher Echelon element, add the unit, and link it to the echelon with the **Orders > Group With** function.

#### NOTE

You cannot attach other groups to this single unit group. If you want this unit to be a part of the overall command structure, its group must be attached to a Higher Echelon element representing the command structure.

- The first group attached to a higher echelon becomes the default lead element. The command unit of the group is also the leader of the echelon and has command options for the echelon structure.

- To reassign command of an echelon, right-click the group or echelon and select **Orders > Make Command Group**.

**i NOTE**

This assigns command for the echelon directly above the group. For longer command chains, assign command at subordinate echelon levels as well.

Deleting a subordinate group or echelon may cause a loss of command for echelons. To correct this error, reassign the command group.

**Image-67: ORBAT in the Scenario Objects Panel**



### 9.6.3 ORBAT during Execution

During a scenario execution, the Higher Echelon markers stack with their command element. This enables the rapid location of command elements in VBS Editor or C2 views.

## 9.7 Customizable Symbology

Entity symbology can be customized in Prepare Mode, Execute Mode, or in After Action Review (AAR). Symbols appear above the entities they are configured for on the 2D Map / in 3D Camera View. Textual information can be added around the symbols. In addition, range rings and specific main gun symbology can be applied to vehicles with gun turrets on the 2D Map.

### NOTE

The symbology used is based on the MIL-STD-2525C standard.

### TIP

You can also customize the symbology for entire ORBATs (Orders of Battle), using the [ORBAT Editor \(on page 366\)](#).

Symbology customization is achieved using the **Unit Symbols** dialog. The dialog is accessed from the following locations:

- **Editor Toolbar**

1. Select the entity you want to customize the symbology for.
2. Go to **View > Unit Symbol Configuration**.

- **Scenario Objects**

1. In the Scenario Objects Tree, right-click the **entity** you want to customize the symbology for.
2. Click **More... > Unit Symbol Configuration** in the context menu.

### NOTE

This method is not available when customizing symbology in AAR.

- **Context Menu**

1. Right-click the **entity** you want to customize the symbology for.
2. Click **More... > Unit Symbol Configuration** in the context menu.

### NOTE

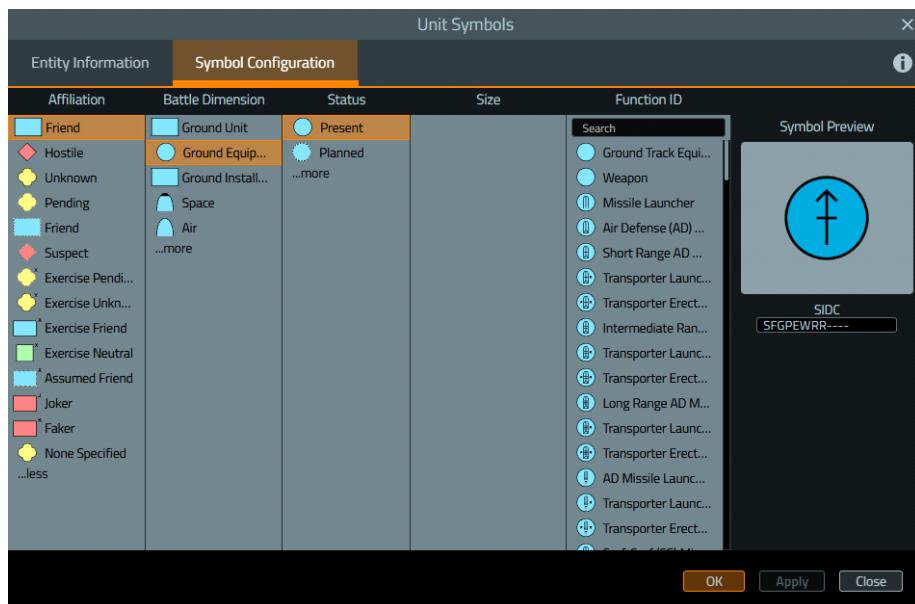
This method is not available when customizing symbology in AAR.

The Unit Symbols dialog opens. It has the following tabs:

- [Symbol Configuration \(on the next page\)](#)
- [Entity Information \(EIS\) \(on page 390\)](#)

## 9.7.1 Symbol Configuration

The standard symbols automatically assigned to entities in VBS are customized using the settings in the **Symbol Configuration** tab.



### Follow these steps:

1. Click a setting in each of the following columns, so that it is highlighted, to create your customized symbol, or enter an SIDC (Symbol Identification Code) in the **SIDC** field. An invalid SIDC results in the object defaulting to **S-----**, if its a new object. If you change a previously valid SIDC to something invalid, it does not apply the change.

Column	Description	Column	Description
<b>Affiliation</b>	Side for the entity, such as Hostile, Unknown, Exercise Neutral.	<b>Size</b>	Size of the entity, such as Squad, Section, Platoon.
<b>Battle Dimension</b>	Battle dimension, such as Ground Unit, Air, Sea Surface.	<b>Function ID</b>	Function ID of the entity, such as Air Defense, Gun Unit, Infantry. If necessary, use the <b>Search</b> field to find a specific function.
<b>Status</b>	Status for the entity, such as Present, Planned, Destroyed.	<b>Symbol Preview</b>	Shows what your customized symbol looks like.

2. Click **Apply**, then click **OK**.

### NOTE

The **Apply** button applies the configured settings simultaneously in both the Entity Information and Symbol Configuration tabs.

3. Click **Close** or **X** to close the dialog.

The new symbol appears on the 2D Map and in 3D Camera View.

## 9.7.2 Entity Information (EIS)

The **Entity Information** tab allows you to do the following:

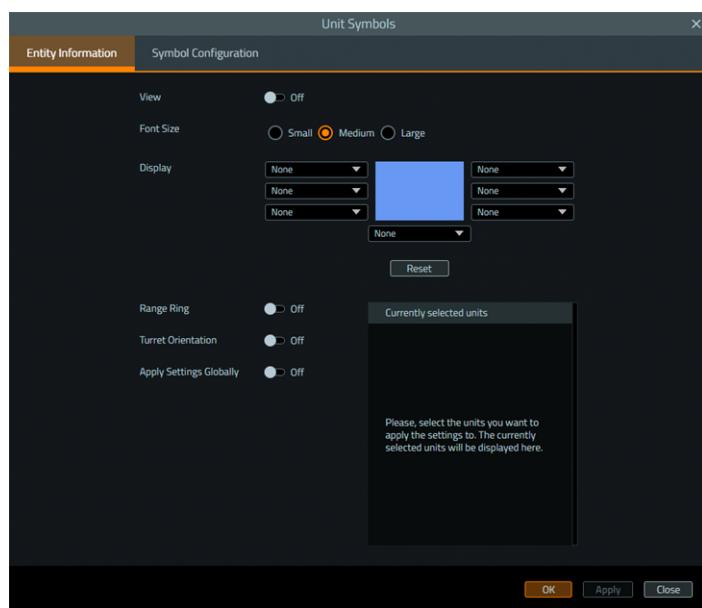
- Add informational text around symbols (displayed on the 2D Map and in 3D Camera View).
- Enable / disable range rings for vehicles with gun turrets (displayed on the 2D Map only).
- Enable / disable main turret gun orientation symbology (displayed on the 2D Map only).
- Apply the aforementioned settings globally or to selected entities only.

### TIP

Either select at least one entity on the 2D Map before configuring the settings in the Entity Information tab, or enable the **Apply Settings Globally** toggle (see step 7 in the following procedure) to apply all settings to all entities in the scenario.

### FEATURE NOTICE

The **Display Information** is visible to Trainees in C2 Mode (see Command and Control (C2) Screen in the VBS4 Trainee Manual) and on the 2D Map. **Turret Orientation** and **Range Rings** are only visible to Trainees on the 2D Map.



### NOTE

The **blue** square represents the symbol you want to display the text around. The color is not representative of a specific side, it is purely for illustration purposes.

## Follow these steps:

1. Click the **View** toggle to enable / disable the **Font Size** and **Display** settings.
2. Use the radio buttons to select the **Font Size** you want to use for the text.
3. In the **Display** section, use the drop-downs to select the type of textual information you want to display around the symbol. All of the drop-downs contain the following options, meaning that the selected textual information can be displayed at any position around the symbol.

Option	Description	Option	Description
<b>None</b>	No text is displayed.	<b>Speed</b>	Speed of the entity, in Km/h.
<b>Description</b>	Description added to the Object Properties dialog.	<b>Heading</b>	Direction the entity is facing (N, S, E, W).
<b>Entity Name</b>	Name of the entity.	<b>URN</b>	Uniform Resource Locator.
<b>Altitude ASL</b>	Altitude above sea level, in meters.	<b>Waypoint</b>	Waypoint type.
<b>Altitude AGL</b>	Altitude above ground level, in meters.	<b>Health</b>	Health of the entity, as a percentage (%)
<b>Entity Type</b>	The type of entity.	<b>Vehicle Status</b>	Status of a vehicle, including Catastrophic / Firepower / Mobility Kill.

### NOTE

Waypoint text is not shown in AAR as waypoints are not recordable.

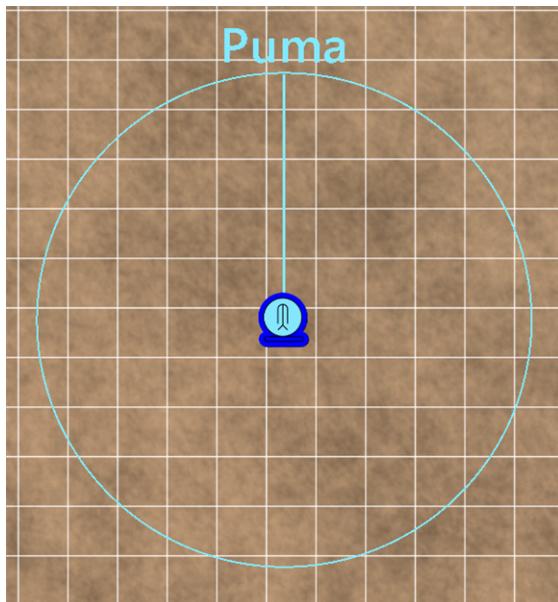
How the textual information is displayed in VBS is shown in [Display text \(on page 393\)](#).

4. If necessary, click **Reset** to reset all of the **Display** settings to **None**.

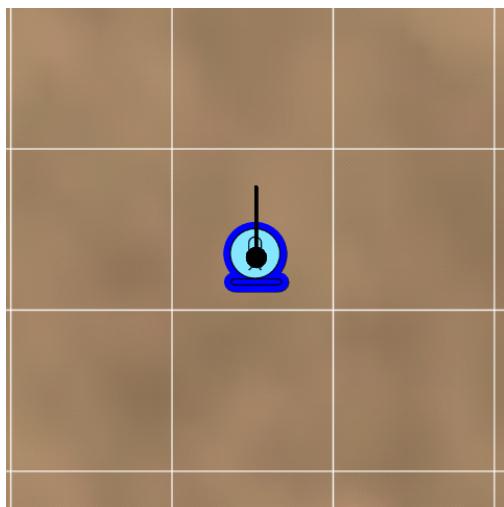
- Click the **Range Ring** toggle to enable / disable range rings for vehicle turrets on the 2D Map.

**NOTE**

Range rings indicate the maximum potential range of the projectile fired from the main gun of the vehicle turret.



- Click the **Turret Orientation** toggle to enable / disable the gun symbology (icon), which indicates the orientation of the main turret gun on the 2D Map.



**TIP**

The main turret gun icon can be customized. For more information, see [Turret Orientation Icons \(on page 394\)](#).

- Click the **Apply Settings Globally** toggle to enable / disable your settings configuration for all entities in the scenario.

**NOTE**

If enabled, your settings configuration is applied to all entities in the scenario. If disabled, your settings configuration is applied to selected entities only.

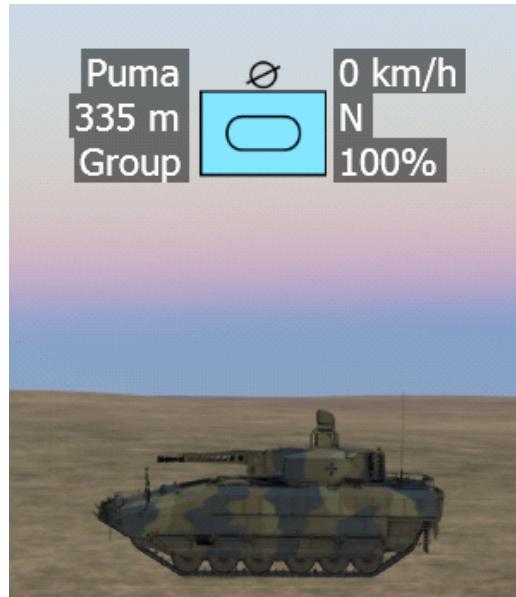
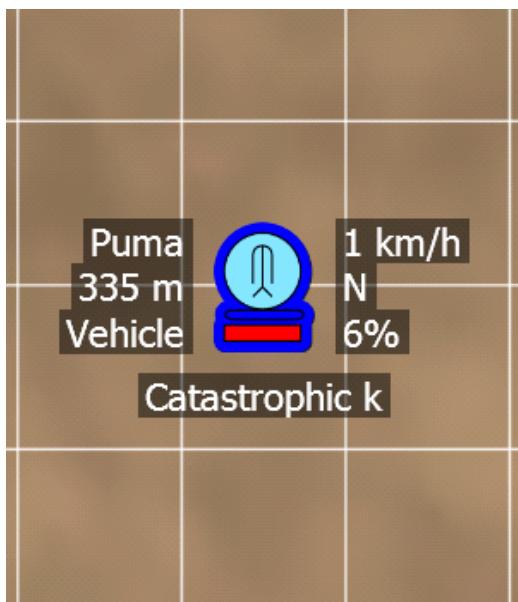
- Click **Apply** then **OK** to save the settings.

**NOTE**

The **Apply** button applies the configured settings simultaneously in both the Entity Information and Symbol Configuration tabs.

- Click **Close** or **X** to close the dialog.

**Image-68: Display text**



**TIP**

Further adjustments to the appearance and behavior of symbols / text can be made in the **User Interface** tab of the VBS4 Settings dialog. For more information, see **Symbology Settings** in the VBS4 Administrator Manual.

## ⚠️ WARNING

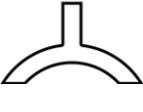
Changes that you make to the EIS settings of a group in **Execute Mode** using the context menu (**right-click > More... > Unit Symbol Configuration**) are only applied to one entity in the group. To apply changes to all entities in the group, access the EIS settings from **View > Unit Symbol Configuration**.

### 9.7.2.1 Turret Orientation Icons

Custom pre-configured icons for the Turret Orientation feature are available at the following location:

`\VBS_Installation\vbs2\editor\Data\ico\`

The `ico` folder contains the following icons.

Icon	File Name	Icon	File Name
	<code>turret_icon_1_ca.paa</code>		<code>turret_icon_3_ca.paa</code>
	<code>turret_icon_2_ca.paa</code>		<code>turret_icon_4_ca.paa</code>

The relevant classes (`CfgSymbologyCustomization`, `TurretIcon`) and parameters (`texture`, `size`, `offset`, `onTop`, `color`) used to configure icons can be found in Class `CfgSymbologyCustomization` in the VBS Developer Reference.

To change the appearance of existing icons, Bohemia Interactive Simulations recommends using the Config Patch Builder to reconfigure the aforementioned parameters, and export the resulting automatically generated `.pbo` file to VBS4. For more information, see Config Patch Builder in the VBS4 Administrator Manual.

## 9.8 Look At Editor Object

The Look At Editor Object forces units / vehicles to look at / face a given position.

### **i** NOTE

The Look At Editor Object only applies to vehicles with turrets, and you cannot use it with aircraft.

1. Place the Look At Editor Object on the map to designate the position you want a unit / vehicle to look at / face.
2. Right-click the Look At Editor Object and select either the **Attach to Unit** or **Attach to Vehicle** (if the vehicle is occupied, use **Attach to Group**) and drag the arrow to the unit / vehicle to establish the link.

### **i** NOTE

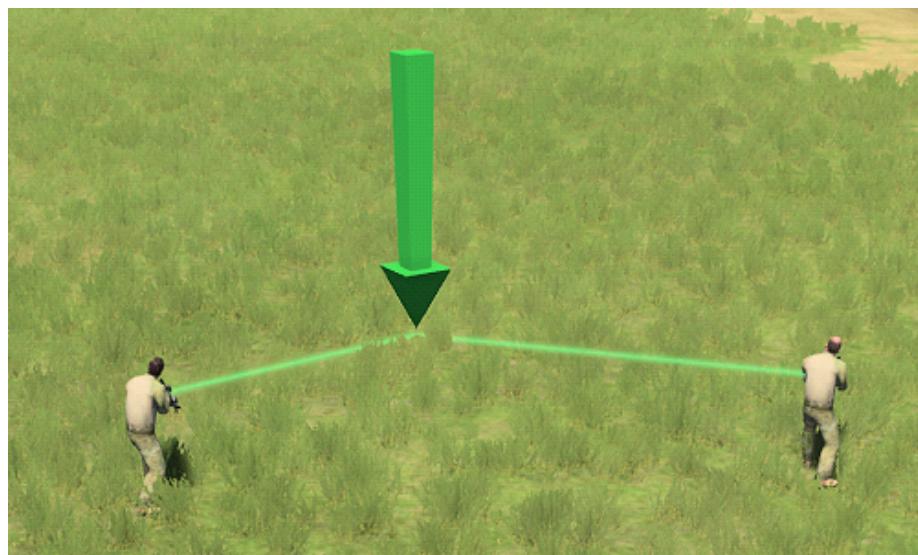
To establish links, you can also list unit names (separated by commas) in the **Unit Names** field in the Look At Editor Object Properties dialog.

The unit / vehicle looks in the direction of the Look At Editor Object.

**Image-69: Look At Editor Object**



**Image-70: Look At Editor Object in 3D view**



## 9.8.1 Limitations

The Look At Editor Object has the following limitations:

- In Preview / Execute mode, the Look At Editor Object is not displayed, if you open, close, and then reopen the VBS Editor.
- When the Look At Editor Object is linked to a group, only the group leader looks at the given position.

## 9.9 Select Animation Style

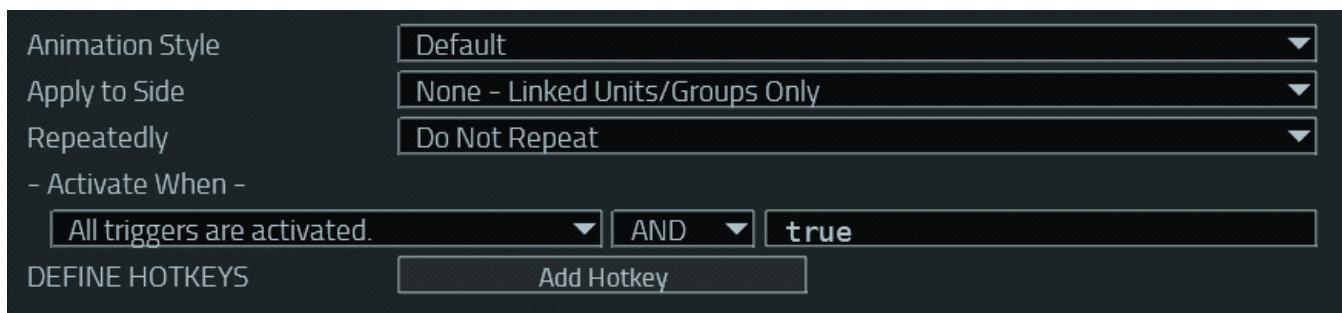
Allows the setting of normal (Default) or CQB (Close Quarters Battle) animation styles for dismounted units.

Before setting up a Select Animation Style module, place several units or groups on the map.

### Follow these steps:

1. In VBS Editor, select **Module** from the Editor Objects List.
2. Right-click a location on the map, and select **New Object**.
3. Expand the **Module** drop-down, select **Select Animation Style**, and click **OK**.

The Select Animation Style Object Properties dialog opens:



4. Expand the **Animation Style** drop-down and select the **Default** or **CQB** animation style.

#### **NOTE**

One animation style is used per one Select Animation Style Editor Object. If you want to have another animation style, you need to add another Select Animation Style Editor object for it.

5. Expand the **Apply to Side** drop-down and select the side you want to apply the animation style to. The options are:

- None - linked units / groups only
- All Sides
- BLUFOR
- OPFOR
- Independent
- Civilian

6. Expand the **Repeatedly** drop-down and select if the animation should be repeated or not:
  - **Do Not Repeat** - The animation occurs only once.
  - **Repeat When Condition is True Again** - The animation occurs repeatedly.
7. Expand the first **Activate when** drop-down and select one of the following options:
  - **At least one trigger is activated** - At least one Trigger must be activated for the animation to occur.
  - **All triggers are activated** - All Triggers on the map must be activated for the animation to occur.
8. 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.
9. Enter **true** or **false** in the condition code field. If you set this to **false**, the effects do not occur.
10. Click **Add Hotkey** next to **DEFINE HOTKEYS** if you want to add a hotkey. Clicking **Add Hotkey** opens the Hotkey Editor dialog.
11. Once all fields are filled, click **OK**.

The Select Animation Style icon appears on the 2D map:



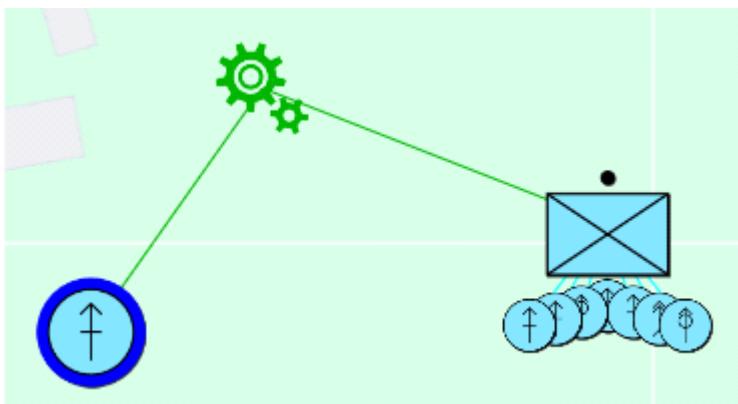
## 9.9.1 Linking

Link the unit / group to the Select Animation Style Editor Object, so that the actors in the scenario adopt the configured behavior.

**Follow these steps:**

1. Right-click on the **Select Animation Style** icon and select **Link to Unit** or **Link to Group**.  
The list closes and a black arrow is attached to your cursor.
2. Drag the cursor and click on a **unit** or a **group**. The arrow changes color to **green** which means that the unit / group is linked to the Select Animation Style Editor Object.

3. Repeat steps 1 and 2 to link other units / groups to the Select Animation Style Editor Object, as in the following screenshot:



4. Preview the Mission.

Notice that units / groups that have the CQB animation style applied adopt a more defensive and cautious stance.

## 9.10 AI Rules of Engagement

The AI Rules of Engagement (ROE) Editor Object (EO) is a tool that is used to influence some basic attributes and behaviors of AI entities. It enables you to fix AI into predetermined locations and postures, and apply engagement rules based on perceived hostile targets.

### Follow these steps:

1. In VBS Editor, select **Module** from the Editor Objects List.
2. Right-click a location on the map, and select **New Object**.
3. Expand the **Module** drop-down, select **AI Rules of Engagement**, and click **OK**.

The AI Rules of Engagement Object Properties dialog opens:



4. Specify the [Selection Methods \(on page 403\)](#) to control how AI entities are selected and influenced by the AI ROE EO properties. These properties can be combined to form a variety of selection criteria. However, the type of selection method can exclude certain properties. In the drop-down, the options methods are:
5. Input fields the remaining [Parameters \(below\)](#), and click **OK**.

The AI Rules of Engagement icon appears on the map, and when the mission runs AI entities behave as defined by the module parameters.

Parameters	Description
<b>Description</b>	Name that appears in the object tooltip and in the Scenario Objects Panel.
<b>Selection Method</b>	See <a href="#">Selection Methods (on page 403)</a> .

Parameters	Description
<b>Applies to</b>	Allows you to refine the selection process further by only applying the AI ROE EO properties to specific sides. When this option is not relevant, the entire AI ROE control is disabled, or entries are removed when a specific side is used by another AI ROE EO.
<b>Move Options</b>	<p> <b>FEATURE NOTICE</b></p> <p>Only the <b>Full</b> option is supported for AI. See One AI in the VBS4 Release Notes.</p> <p>Choose from the options and is available for all AI ROE EO types with no restrictions applied. The available options are:</p> <ul style="list-style-type: none"><li>• <b>None</b> - The default setting that prevents all AI entities from performing any type of lateral movement. This includes fleeing, moving to waypoints, and any form of advance to engage the enemy.</li><li>• <b>Limited</b> - Limited movement allows AI entities to follow waypoints and, when enabled, perform fleeing or seek cover actions. However, all aggressive advance to engage the enemy and flanking maneuvers is disabled.</li><li>• <b>Full</b> - Enables the default AI movement options with no restrictions on the AI, unless disabled using <b>Seek Cover</b> or <b>Allow Fleeing</b>.</li></ul> <p>In addition, the following check-boxes are available:</p> <ul style="list-style-type: none"><li>• <b>Seek Cover</b> - Disabled by default, when no movement is allowed for the AI. If enabled, AI entities seek cover from a perceived threat. When used with the <b>Inside Area</b> selection method, AI entities do not advance outside the defined area.</li><li>• <b>Allow Fleeing</b> - Disabled by default, when no movement occurs. This option allows you to enable or disable the default fleeing behavior (this functionality does not account for any area restrictions).</li></ul>
<b>Weapon Control Status</b>	Set the combat mode, or how AI entities on all sides respond to perceived threats. This setting also applies to all AI under player control, and can be overridden using the Object Properties dialog for units and vehicles (see <a href="#">Adding Units (on page 344)</a> and <a href="#">Adding Vehicles (on page 599)</a> ) or the Weapon Control Status options (see the various <a href="#">Waypoints (on page 421)</a> ).

 **NOTE**

If the AI ROI EO is deleted or when the AI entities get out of the AI ROE area, the AI entities use **Inherit** as their combat mode (inherit the combat mode from the group the entity is in, unless the entity is not part of a group).

Parameters	Description
Stance	<p><b>★ FEATURE NOTICE</b></p> <p>Temporarily disabled for AI. See One AI in the VBS4 Release Notes.</p> <p>In addition to the <b>Weapon Control Status</b>, you can configure a specific stance for the AI entity, instead of the default behavior, allowing the AI to automatically adopt a stance suitable for situation. This stance is applied while the AI entity is controlled by an AI ROE EO. If AI ROI EO is removed, the AI entity reverts back to its default behavior. The stance options are:</p> <ul style="list-style-type: none"><li>• <b>Default</b> - The default behavior, where the AI entity automatically adopts the stance it considers most appropriate.</li><li>• <b>Prone</b> - Maintains a prone stance, regardless of any move orders.</li><li>• <b>Crouched</b> - Remains crouched, regardless of any move orders.</li><li>• <b>Upright</b> - Remains standing, regardless of any move orders.</li></ul> 

Parameters	Description
<b>Weapon Inaccuracy</b>	<p>Specifies the accuracy of AI weapons fire. <b>Weapon Inaccuracy 0</b> never misses, the default <b>Level 1</b> represents a trained weapons user, and <b>Level 20</b> approximates firing anywhere within a 90° firing arc.</p> <p><b>NOTE</b> Overrides the <b>Weapon Inaccuracy</b> in <a href="#">Advanced Unit Settings (on page 348)</a>:</p> <ul style="list-style-type: none"><li>• If the AI Rules of Engagement EO is placed in Prepare Mode, it overrides the weapon accuracy of all the units it applies to.</li><li>• If the AI Rules of Engagement EO is placed in Preview / Execute Mode, it overrides all the units it applies to that are present in the scenario at that point. Therefore, the weapon inaccuracy of any units placed in the scenario after the AI Rules of Engagement EO placement is not overridden by the AI Rules of Engagement EO.</li></ul> <p>Use appropriate <b>Weapon Control Status</b> to enable the AI to fire.</p> <p>The <a href="#">setDispersionFactor</a> (<a href="https://sqf.bisimulations.com/display/SQF/setDispersionFactor">https://sqf.bisimulations.com/display/SQF/setDispersionFactor</a>) script command may be used to control the Weapon Inaccuracy for an individual unit. However, the Weapon Inaccuracy in the UI is exponential compared to the weapon inaccuracy (dispersion) factor set by the command:</p> <ul style="list-style-type: none"><li>• Level 1 = factor 1</li><li>• Level 2 = factor 4</li><li>• Level 5 = factor 25</li><li>• and so on</li></ul>

## 9.10.1 Selection Methods

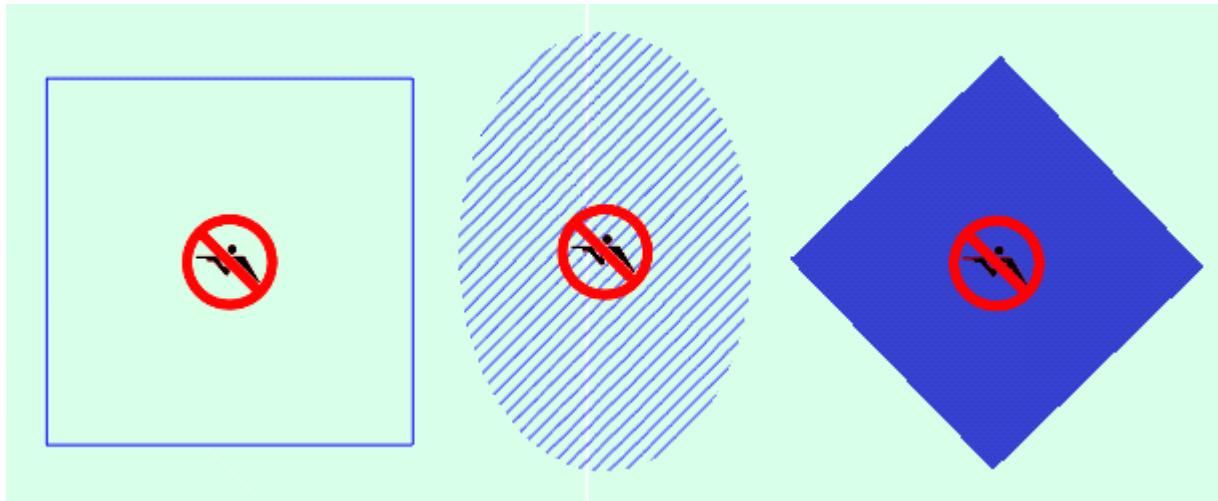
### All

This selection method relates to all AI entities in the scenario and is the most basic way to apply restrictions and behaviors to AI entities. However, the method comes with a number of restrictions and exclusions. In some cases, you can only have one type of AI ROE EO influencing factions in a mission. For example, you can only have one AI ROE EO of type **All** influencing all sides at any point in time. While you cannot have more than one AI ROE EO influencing AI entities on the **All** side, you can have multiple AI ROE EOs influencing each of the specific sides.

### Inside Area

This selection method allows you to influence all AI in a specific area. Unlike the **All** option, you can have multiple areas that also overlap (in overlapping areas, only one AI ROE EO has control over the AI). The sub-properties of **Inside Area**, that become available if **Inside Area** is selected, are:

- **Area** - Defines the shape of the applied area. There are two options: **Rectangular** and **Round**.
- **Height(Meters)** - Defines the dimensions of the given area in meters (can also be the radius).
- **Width(Meters)** - Defines the dimensions of the given area in meters (can also be the radius).
- **Style** - Defines the draw style and fill pattern used when displaying the area in 2D map view, for example:



## Linked

This selection method allows you to select individual entities or groups for specific behaviors, and for a more precise selection of control over entities compared to the **All** and **Inside Area** options. Linking and unlinking AI ROE EOs is performed in the same way you would link any other Editor Object or group (see [Linking Editor Objects \(on page 69\)](#)). For example, you can exclude entities from the behaviors of the alternative selection methods, as its properties override all other AI ROE EOs.

Like the **Inside Area** selection method, there is no limit to the number of AI ROE EOs that can use the linking method. The side option is not enabled for this method as it is irrelevant. However, there are some specific limitations that apply:

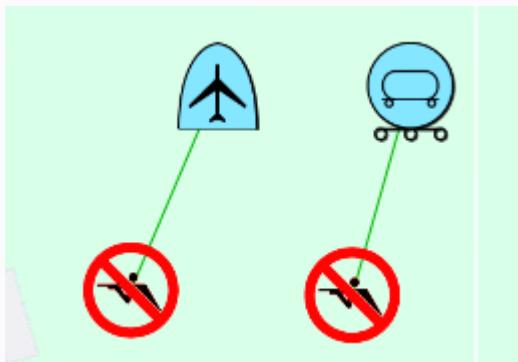
- You cannot link two AI ROE EOs to the same group leader or unit / vehicle.
- You cannot link to individual subordinates of a group.
- You cannot link to echelons.

Each selection method has a hierarchy of influence - AI ROE EOs with the **Linked** selection method have priority over all types. Likewise, the **Inside Area** selection method takes priority over the **All** selection method.



## EXAMPLE

If you want all AI ground entities to remain stationary, yet still allow fixed wing aircraft freedom of movement, you need to link the aircraft with an AI ROE EO set to allow all movement.



## 9.11 Surrender

AI units have the ability to surrender:

By using the Surrender Editor Object (EO). The Surrender EO forces linked groups to surrender, as long as the base conditions are met (see [Custom Condition \(below\)](#)). This does not work, if the surrendering side is the same as that of the player, unless both sides are Civilian.

### Follow these steps:

1. In the Editor Objects List, select **Surrender** and place the Surrender EO on the map.
2. Set the Object Properties:

Distance	20
Side	BLUFOR Player
Custom Condition	this
Link Selected Units	false

3. Click **OK**.

Object Properties	Description
<b>Distance</b>	Minimum distance the unit / group must be from the player before surrendering.
<b>Side</b>	Side to which the unit / group surrenders.
<b>Custom Condition</b>	Customizable SQF conditions (see Basic Scripting in the VBS4 Scripting Manual) that have to be met for the unit / group to surrender. Override the default condition to specify the surrender requirements. <ul style="list-style-type: none"><li>• The <a href="https://sqf.bisimulations.com/display/SQF/this">this</a> (<a href="https://sqf.bisimulations.com/display/SQF/this">https://sqf.bisimulations.com/display/SQF/this</a>) variable value (the default value of <b>Custom Condition</b>) contains the result of the EO condition (being closer than <b>Distance</b> to <b>Side</b>).</li><li>• The <b>_unit</b> and <b>_group</b> variables can be used in the setting.<ul style="list-style-type: none"><li>◦ For linked units: <b>_unit</b> is the linked unit, and <b>_group</b> is its the direct parent group.</li><li>◦ For linked groups: <b>_unit</b> is used for every unit in the linked group (<b>_group</b>).</li></ul></li></ul> <p>ORBAT groups with multiple levels are supported. All units from subordinate groups are evaluated and surrendered.</p>

Object Properties	Description
<b>Link Selected Units</b>	If set to true, links the Surrender EO to units that were selected prior to placing the Surrender EO. Units or groups can also be manually linked to the Surrender EO by right-clicking the EO and selecting, one of the following: <ul style="list-style-type: none"><li>• <b>Link to Unit</b></li><li>• <b>Link to Group</b></li><li>• <b>Link to Trigger</b></li></ul> For more information, see <a href="#">Linking Editor Objects (on page 69)</a> .

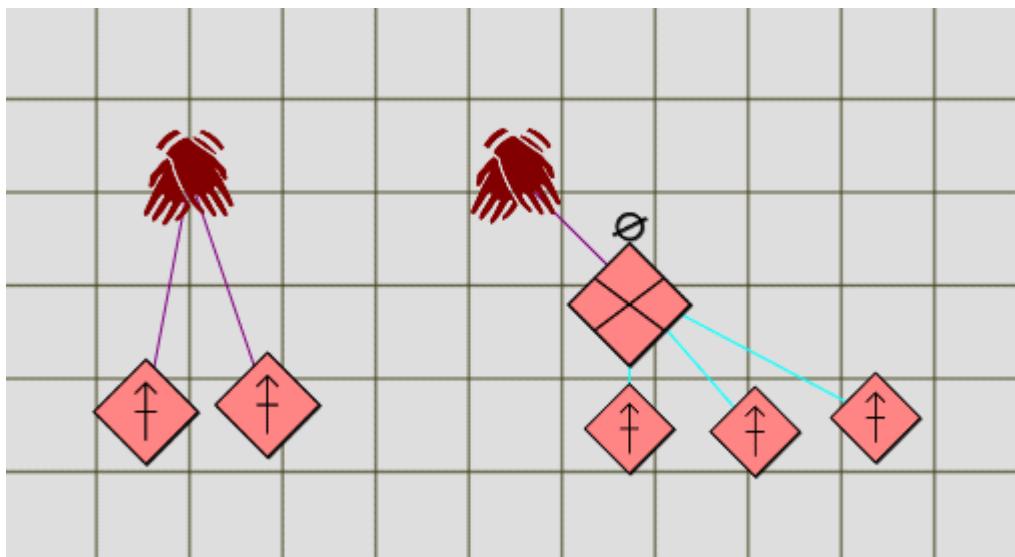


### FEATURE NOTICE

Temporarily disabled for AI. See One AI in the VBS4 Release Notes.

The Surrender EO is created and set up.

**Image-71: Individual units and a group linked to different Surrender EOs**



The following actions are available for use on surrendered units:

- Capture / Release
- Handcuff / Uncuff

For more information, see [Prisoners of War \(POW\) in the VBS4 Trainee Manual](#).

**NOTE**

If the unit is released at any point, they rejoin the group that they were previously a part of, otherwise a new group is created if the original no longer exists.

## 9.12 Unit Path Recording (UPR)

Unit Path Recording (UPR) enables the playback of pre-recorded character movement and actions during a mission. The AI character assigned to the path follows the recorded path reliably and repeatedly without any random deviations.

UPR is designed to record basic land movement.

### Follow this process:

1. [Create UPRs \(below\)](#) using VBS Editor in Prepare Mode to record a character path.
2. [Use UPRs \(on page 411\)](#) using VBS Editor in Prepare Mode to add recorded paths to a Scenario.
3. **Optional:** Use [UPR Scripts \(on page 413\)](#) to execute UPR commands with SQF scripting.

For vehicle path recording, see [Vehicle Path Recording \(VPR\) \(on page 645\)](#).

### UPR Records:

- Character movement and stance.
- Primary, secondary, and pistol weapons firing.
- Grenade throwing.

### UPR Limitations:

- UPR ignores vertical movement, unless there are stairs.
- UPR does not record opening doors or climbing ladders.
- UPR does not record underwater diving - it replays as floating on the surface.
- UPR does not record skydiving.
- If the AI unit stops to engage the enemy, it does not return to its recorded path after the engagement.

UPR requires a UPR Editor Object, a recording, and an AI character unit.

### 9.12.1 Create UPRs

Create a UPR by recording a character path while controlling the character.

#### Follow these steps:

1. Ensure that there is a control binding for **Player Path Recording**. Open the Controls Settings, and filter for **Editor Controls**. By default, **Player Path Recording** is bound to P.
2. Open the VBS Editor in Prepare Mode on the terrain where you want to use the recording later.

3. Place the character unit you intend to use during playback.

**NOTE**

The unit is not strictly tied to the recording. It is possible to use a different unit for playback, but the visual simulation of the character may be degraded (for example, if the unit does not carry the same weapons).

4. Preview the mission (press **Scenario Preview (H)**).
5. Open the VBS Editor in Preview Mode (press **Map (M)**).
6. Open the **Tools** menu and select **Enable Record Path Hot Key**.
7. Press **Esc** to return to the simulation.
8. Maneuver the character to the point where you want the recorded path to start.
9. Press **Player Path Recording (P)** to start Unit Path Recording.

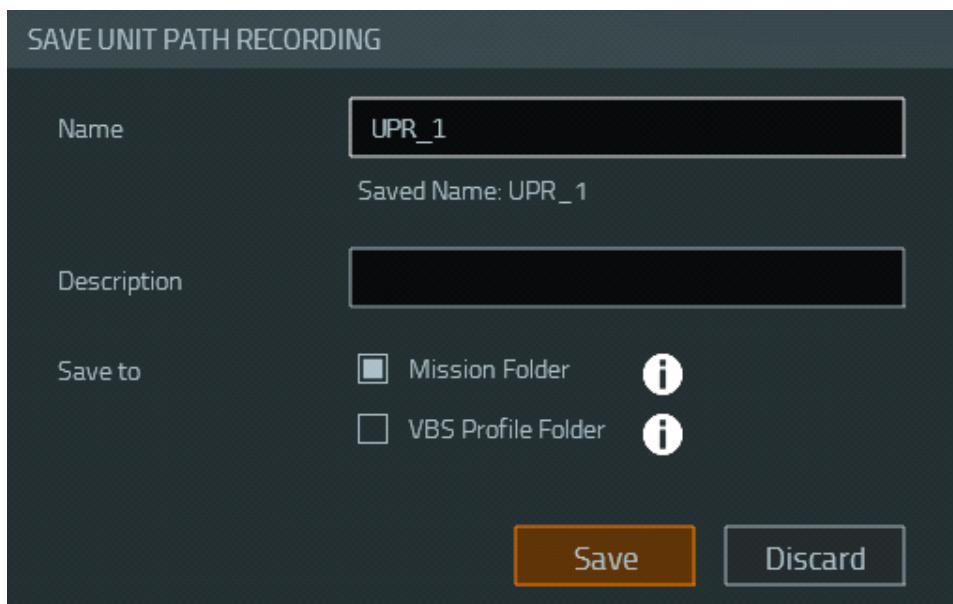
The HUD displays the current duration of the recording.



10. Maneuver the character along the path you require, performing posture changes, and weapon use as required.
11. To finish your recording, press **Player Path Recording (P)** to open the Save Recording dialog.

**NOTE**

Recording automatically stops if the character enters a vehicle, is killed, or a body part is amputated.



12. Input a **Name** and a **Description** for the recording.

13. Do one of the following:

- Check **Mission Folder**, if you want to save the recording to the Battlespace folder:

`\Battlespace Folder\UnitPathRecordings\`

- Check **VBS Profile Folder**, if you want to save the recording to the VBS4 Profile folder:

- Default VBS4 Profile location:

`\Documents\VBS4\UnitPathRecordings\`

- Other VBS4 Profile location:

`Path\User\UnitPathRecordings`

`Path` is specified using the `-profiles=Path` command-line option.

For more information, see Command Line and Launcher Options in the VBS4 Administrator Manual.

 **NOTE**

The following considerations apply:

- When there are two recordings with the same name in the **Mission Folder** and **VBS Profile Folder**, the former takes priority.
- To use the UPR in a multiplayer network mission, copy the path recording from your **VBS Profile Folder** location to the following folder on the server hosting the mission, or to the mission folder you want to pack:

`\Documents\VBS4\Battlespaces\Battlespace\Missions\Battlespace\UnitPathRecordings\`

14. Click **Save** to save the recording. If you want to discard the recording, click **Discard**.

The UPR recording is saved as a `Recording_Name.path` file, and you can also use it with an AI character.

## 9.12.2 Use UPRs

Select UPRs in a scenario to replay the recorded path as part of the scenario.

### Follow these steps:

1. Open or create a mission on the terrain you wish to use the recording on.
2. Select the **Unit Path Recording** Editor Object, right-click on the map, and select **New Object**.

The UPR Object Properties dialog opens:

Recording:	UPR_1
Replay Condition	<code>time &gt; 10</code>
Engage Enemy	No
Take Damage	No
Positioning:	Relative to Unit

3. Set the following object properties, and click **OK**:

- **Recording:** Select the recording you want to use.

**i** **NOTE**

Only recordings made on the same terrain are available. The editor displays the recording names without their timestamps, so multiple recordings with the same name may appear. Recordings are listed in time order, oldest first.

- **Replay Condition:** Select a condition for the recording to play. The default is a 10 second delay, but you can specify any valid script syntax. Use scripting that returns a Boolean true or false result.
- **Engage Enemy:** Select this to enable the AI character to stop following the recording and respond to enemy action instead.
- **Take Damage:** Select this to enable the AI character to take damage during playback.
- **Positioning:** Select **As Recorded** to use the start position of the recording or **Relative to Unit** to use the linked character position as the start point.

**i** **NOTE**

Using **Relative to Unit** may have undesirable results. Due to changes in the relative positions of objects and buildings, the AI character may encounter obstacles that were not present on the recorded path. AI characters always follow the recorded path and walk through these obstacles as if they were not present.

The map displays a green icon with the name of the recording and a path indication.



4. Add the AI character unit that you want to follow the path to the map as an AI character.

**i** **NOTE**

If you use **As Recorded**, the character teleports to the start position when the path start condition is met. Place the character as close as possible to the start point with the appropriate orientation.

5. Right-click the UPR Editor Object icon, select **Link to Unit**, and click on the AI character.

When the mission starts, the AI character follows the recorded path when the conditions are met and performs the same posture changes and primary weapon actions. When the recording ends, the AI character resumes its previous behavior.

## 9.12.3 UPR Scripts

VBS4 includes scripting functionality to support Unit Path Recording. For more information, see the following topics in the [VBS Scripting Reference](#) (<https://sqf.bisimulations.com/display/SQF/VBS+Scripting+Reference>):

### Script Commands:

- [uprStartRecording](#) (<https://sqf.bisimulations.com/display/SQF/UPRStartRecording>)
- [uprStopRecording](#) (<https://sqf.bisimulations.com/display/SQF/UPRStopRecording>)
- [uprSaveRecording](#) (<https://sqf.bisimulations.com/display/SQF/UPRSaveRecording>)
- [uprDiscardRecording](#) (<https://sqf.bisimulations.com/display/SQF/UPRDiscardRecording>)
- [uprStartPlayback](#) (<https://sqf.bisimulations.com/display/SQF/UPRStartPlayback>)
- [uprStopPlayback](#) (<https://sqf.bisimulations.com/display/SQF/UPRStopPlayback>)
- [uprGetMetaInfo](#) (<https://sqf.bisimulations.com/display/SQF/UPRGetMetaInfo>)
- [uprGetTimelineInfo](#) (<https://sqf.bisimulations.com/display/SQF/UPRGetTimelineInfo>)
- [uprRecordingUnits](#) (<https://sqf.bisimulations.com/display/SQF/UPRRecordingUnits>)
- [uprPlaybackUnits](#) (<https://sqf.bisimulations.com/display/SQF/UPRPlaybackUnits>)

### Event Handlers:

- [uprRecordEnd](#)  
(<https://sqf.bisimulations.com/display/SQF/VBS+Event+Handlers#VBSEventHandlers-UPRRecordEnd>)
- [uprPlaybackEnd](#)  
(<https://sqf.bisimulations.com/display/SQF/VBS+Event+Handlers#VBSEventHandlers-UPRPlaybackEnd>)

## 9.13 Verbal Command

The Verbal Command Editor Object allows in-game players to "speak". When set up, a player can issue a verbal command by pressing a particular **Key (below)**. Players set to receive the command (and within distance) see the command text displayed on their screens.

### Follow these steps:

1. In the Editor Objects List, select **Verbal Command** and place it on the map.

#### **WARNING**

Adding / deleting this Editor Object in the VBS Editor during a multiplayer scenario may not be reflected on other clients.

Text	Stop Or I Will Shoot
Sound	None
Key	Move Forward
Available To	side player == WEST
Received By	side player == EAST
Distance	50

2. Set the Object Properties:

Setting	Description
<b>Text</b>	Text that is displayed on the screens of recipients.
<b>Sound</b>	Verbal command sound that is played.   <b>NOTE</b> Select <b>None</b> , if none of the available sounds fit the scenario purpose.
<b>Key</b>	Predefined in-game user action, linked to a key, to issue the verbal command. For more information on predefined keys and user actions, see <a href="https://sqf.bisimulations.com/display/SQF/VBS+Key+Actions">VBS Key Actions</a> ( <a href="https://sqf.bisimulations.com/display/SQF/VBS+Key+Actions">https://sqf.bisimulations.com/display/SQF/VBS+Key+Actions</a> ).
<b>Available To</b>	Script block that evaluates to true or false. If <b>Available To</b> evaluates to true on the local computer, then the verbal command option becomes available.
<b>Received By</b>	Script block that evaluates to true or false. If <b>Received by</b> evaluates to true, then the verbal command is received on the local computer.
<b>Distance</b>	Minimum distance from the unit at which the verbal command is received.

3. Click **OK**.

The Verbal Command Editor Object is created and set up.

# 10. Control AI UI Overview

The Control AI functionality in VBS4 consists of the following:

- [Control AI Editor Objects \(below\)](#) - Control AI Editor Objects, available in VBS Editor (Prepare / Execute Mode).
- [Control AI Menu \(on page 419\)](#) - Available in VBS Editor (Prepare / Execute Mode), allows you to reload Control AI behaviors and contains the Control AI visualizations for Control AI Editor Objects.

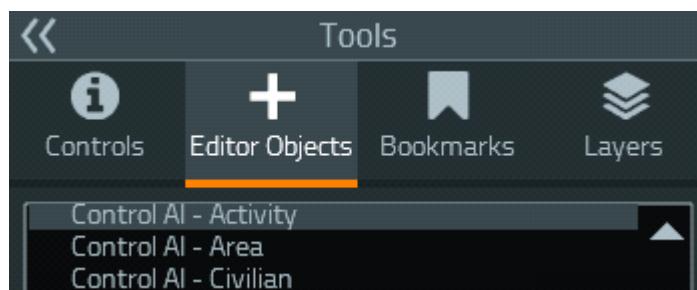
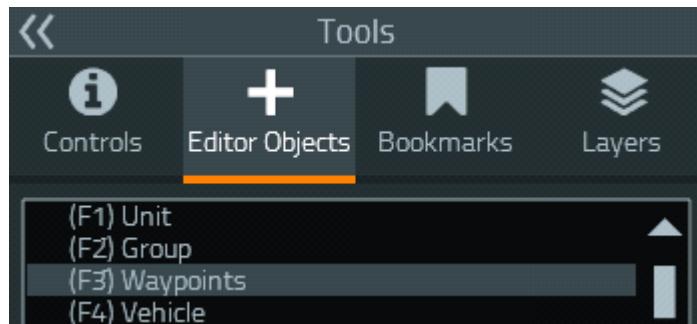
## 10.1 Control AI Editor Objects

Predefined Control AI has the following Editor Objects associated with it:

- [\(F3\) Waypoints Editor Object \(on the next page\)](#)
- [Control AI - Civilian Editor Object \(on page 418\)](#)
- [Control AI - Activity Editor Object \(on page 418\)](#)
- [Control AI - Area Editor Object \(on page 419\)](#)

You can also use a Custom Control AI behaviors - see [Custom Behaviors \(on page 418\)](#).

**Image-72: Control AI Editor Objects in VBS Editor**



## 10.2 (F3) Waypoints Editor Object

The (F3) Waypoints Editor Object in VBS Editor (Prepare / Execute Mode) is used to run various infantry and vehicle military behaviors, civilian riot behavior (protest marches and on-site demonstrations), and animal herd movement.

For how-tos on using this Editor Object with existing / predefined Control AI behaviors, see:

### [AI on Rails \(on page 426\)](#)

Provide an infantry entity with a sequence of orders that can be visualized in 3D.

AI on Rails uses the following orders:

- [Individual - Fire At Order \(on page 437\)](#) - The entity assumes the specified stance and speed, moves to target position, orients itself according to the specified heading, and fires at the specified target.
- [Individual - Move Order \(on page 440\)](#) - The entity assumes the specified stance and speed, moves to target position, and orients itself according to the specified heading.

### [Military AI \(on page 442\)](#)

Use the Editor Object to control general-purpose group infantry and vehicle AI.

The following orders / behaviors are available:

- [Assault Order \(on page 459\)](#)

The group (infantry / vehicles / both) moves in formation to the given position (the location of the [\(F3\) Waypoints Editor Object \(above\)](#) on the map), and assaults the enemy.

Infantry groups split into fireteams, form a line, and perform bounding to the given position to assault the enemy.

- [Advance Order \(on page 461\)](#)

The group (infantry / vehicle / both) advances in formation to the given position (the location of the [\(F3\) Waypoints Editor Object \(above\)](#) on the map), choosing the fastest path to the destination, while preferring speed of movement over engaging and eliminating the enemy.

- [Pursue Order \(on page 463\)](#)

The infantry team (only fireteam behavior) pursues the enemy, until it is eliminated. Then, the team takes cover at their current position.

- [Suppress Order \(on page 466\)](#)

The infantry and / or vehicle group forms a firing line and starts firing at the given position area (the location of the [\(F3\) Waypoints Editor Object \(above\)](#) on the map).

- [Defend Order \(on page 469\)](#)

The infantry and / or vehicle group moves to the given position (the location of the [\(F3\) Waypoints Editor Object \(on the previous page\)](#) on the map), forms a line and begins to defend it by firing at enemy forces in the position area.

- [Mount Order \(on page 471\)](#)

The infantry team moves to the given position (the location of the [\(F3\) Waypoints Editor Object \(on the previous page\)](#) on the map), and mounts the nearest vehicle at the selected vehicle positions (crew, cargo, or both).

- [Dismount Order \(on page 475\)](#)

The infantry teams dismounts the vehicle from the selected vehicle positions (crew, cargo, or both).

- [Return to Formation Order \(on page 478\)](#)

The infantry / vehicle group returns back under the command of a higher-echelon group.

- [Tactical Move Order \(on page 479\)](#)

The infantry group performs a tactical move to the given position (the location of the [\(F3\) Waypoints Editor Object \(on the previous page\)](#) on the map), using a given stance, formation, and a maximum range to engage enemy forces at.

## [Convoy AI \(on page 482\)](#)

Use the Editor Object to control vehicle convoy AI.

Convoy AI uses the [Convoy Order \(on page 494\)](#).

## [Bridge Laying Convoy AI \(on page 501\)](#)

Use the Editor Object to control bridge-laying vehicle convoy AI.

Bridge-laying convoy AI uses the [Deploy DSB Order \(on page 505\)](#).

## [Aircraft AI \(on page 508\)](#)

Use the Editor Object to control rotary-wing aircraft AI.

Aircraft AI uses the [Fly Order \(on page 513\)](#), [Land Order \(on page 516\)](#), and [Loiter Order \(on page 518\)](#).

## [Define Civilian Riot \(on page 537\)](#)

Use the Editor Object to add riot behavior to civilian groups, to simulate protest marches and on-site demonstrations.

### **NOTE**

Other aspects of the civilian AI use the [Control AI - Civilian Editor Object \(on the next page\)](#).

## [Animal AI \(on page 587\)](#)

Use the Editor Object to control animal-herd AI.

### [Waypoints \(on page 421\)](#)

Use the (F3) Waypoints Editor Object to add waypoints to create paths.

## 10.3 Custom Behaviors

The Custom behavior option is part of the (F3) Waypoints Editor Object in VBS Editor (Prepare / Execute Mode) and allows you to use your own Behavior Tree. A Custom behavior is any behavior specified by Behavior Trees for an individual entity and / or group.

For more information, see Custom Behaviors in the VBS Control Editor Manual .

Novice and intermediate Control AI developers can also see the following how-tos in the VBS Control Editor Manual, which rely on using the Custom behavior option in VBS4:

- How to Build Basic Behaviors
- How to Build Scripted Behaviors

## 10.4 Control AI - Civilian Editor Object

The Control - Civilian Editor Object in VBS Editor (Prepare / Execute Mode) is used to run civilian AI. It is used as a pattern of life generator, and can simulate a crowd of civilians, engaged in various activities.

For a how-to on using this Editor Object, see:

- [Civilian AI \(on page 521\)](#)

Create a civilian pattern of life.

Civilian AI uses the following Editor Objects:

- [Population Editor Object \(on page 574\)](#) - The primary Editor Object with which you can create a civilian pattern of life, consisting of civilian pedestrians and vehicles.
- [Activity Editor Object \(on page 577\)](#) - Allows you to define civilian pedestrian and vehicle flows.
- [Area Editor Object \(on page 584\)](#) - Allows you to create areas for civilian activities.

## 10.5 Control AI - Activity Editor Object

The Control AI - Activity Editor Object in VBS Editor (Prepare / Execute Mode) is used to set activities for civilian AI.

For a how-to on using this Editor Object, see [Civilian AI \(on page 521\)](#).

For the Editor Object properties reference, see [Activity Editor Object \(on page 577\)](#).

## 10.6 Control AI - Area Editor Object

The Control AI - Area Editor Object in VBS Editor (Prepare / Execute Mode) defines civilian behavior in the specified area.

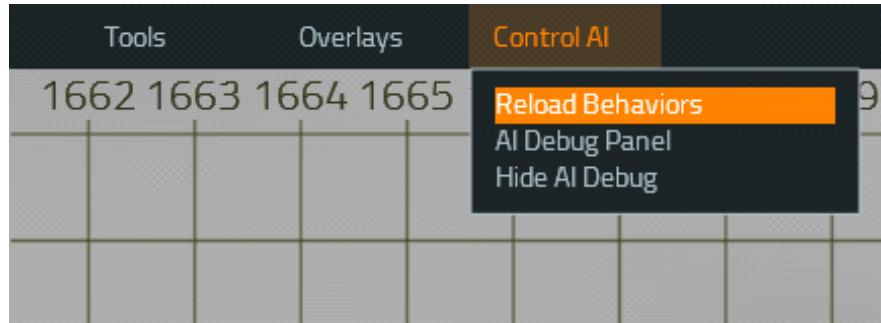
For a how-to on using this Editor Object, see [Civilian AI \(on page 521\)](#).

For the Editor Object properties reference, see [Area Editor Object \(on page 584\)](#).

## 10.7 Control AI Menu

The Control AI menu in VBS Editor (Prepare / Execute Mode) allows you to reload and debug behaviors.

**Image-73: The Control AI menu in VBS Editor (Prepare / Execute Mode)**



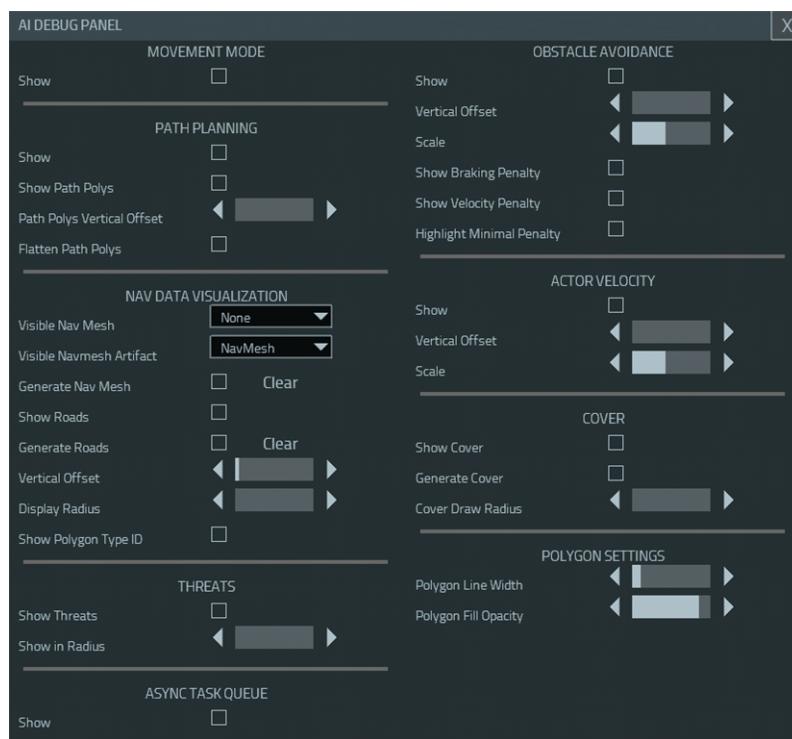
The Control AI menu contains the following menu options:

**Reload Behaviors** - Reloads behaviors. Used when the behaviors are updated and require reloading.

**AI Debug Panel** and **Hide AI Debug** - The AI Debug Panel provides Control AI debugging functionality and contains path-planning and navigation-mesh visualization (in the 3D view of the VBS Editor (Prepare / Execute Mode)).

To open the AI Debug Panel, in VBS Editor (Prepare / Execute Mode), open the menu **Control AI > AI Debug Panel**.

## Image-74: The AI Debug Panel



To hide all the debug visualizations, in VBS Editor (Prepare / Execute Mode) main menu, select **Control AI > Hide AI Debug**. To switch them on again, select **AI Debug Panel**.

For more information about the visualization settings, see Control AI Visualization in the VBS Control AI Manual.

## 10.8 Waypoints

Link an AI entity / group to a (F3) Waypoints Editor Object to use it as a waypoint. You can link several waypoints to create a complex path.

### **WARNING**

The (F3) Waypoints Editor Object behaviors are not fully optimized for VBS4, and can cause reduced performance, when used in large quantities in the Scenario.

For SQF waypoint functions and their parameters, see [Waypoint Functions and Parameters](#).

### **WARNING**

These SQF functions and their parameters are experimental and subject to change in future releases of VBS4.

Create an AI entity / group by adding units or vehicles using **(F1) Unit / (F4) Vehicle / (F2) Group** in the Editor Objects List (to link the units / vehicles to create a group, see [Creating and Adding to Groups with Links in the VBS4 Editor Manual](#)).

**To create a waypoint for an entity / group in the Editor (Prepare / Execute Mode), choose one of the following approaches:**

- Using only an entity / group object:
  1. Right-click the entity / group and select **Orders > Assign New Waypoint**, then click a position on the map to create a waypoint.
  2. In the **Behavior** list, select the AI Order (waypoint behavior), set the Order properties, and click **OK**.
- Using two Editor Objects - an entity / group object and a (F3) Waypoints Editor Object:
  1. Make sure that **(F3) Waypoints** is selected in the Editor Objects List (you can press **F3** to select it) and place it on the map to indicate the position of the waypoint.
  2. In the **Behavior** list, select the AI Order (waypoint behavior), set the Order properties, and click **OK** to create the waypoint.
  3. Right-click the entity / group and select **Orders > Assign Existing Waypoint**, then click the waypoint.

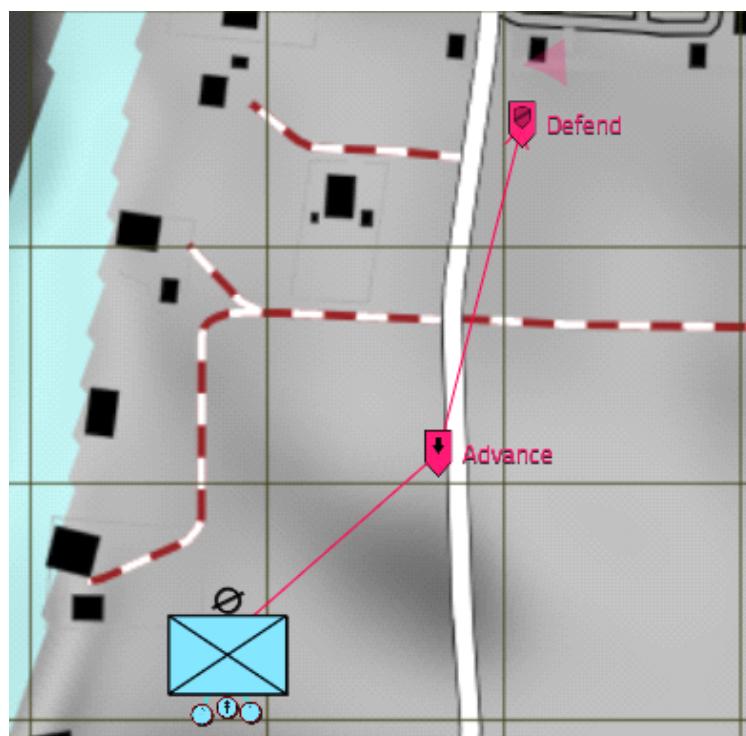
The entity / group has a waypoint.

To create a path / chain that consists of waypoints, choose one of the following approaches:

- Using one waypoint:
  1. Create a waypoint based on the previous procedure.
  2. Right-click the waypoint and select **Assign Next Waypoint**, then click a position on the map for the next waypoint.
- Using two or more waypoints:
  1. Create two or more waypoints based on the previous procedure.
  2. Press **Shift + LMB** on the first waypoint, and click the second waypoint to create a link that defines the order in which the waypoints are completed. Proceed in the same fashion with the remaining waypoints.
  3. (Optional) You can also create a loop / cycle of waypoints: right-click the last waypoint, select **Create Cycle**, then click the first waypoint.

The two or more waypoints are linked to create a more complex path.

**Image-75: An example path of two waypoints**



For information on how to link existing (F3) Waypoints Editor Objects and other Editor Objects, see [Linking Existing Waypoints to Other Editor Objects \(on the next page\)](#).

## 10.8.1 Linking Existing Waypoints to Other Editor Objects

You can link existing (F3) Waypoints Editor Objects to the following Editor Objects (EOs) in the Editor Objects List:

- **(F1) Unit** - Assigns a waypoint to a unit (see [Adding Units \(on page 344\)](#)).
- **(F2) Group** - Assigns a waypoint to a group (see [Adding Groups \(on page 359\)](#)).
- **(F4) Vehicle** - Assigns a waypoint to a vehicle (see [Adding Vehicles \(on page 599\)](#)).
- **(F7) Trigger** - Synchronizes a waypoint with a trigger (see [Triggers \(on page 810\)](#)). For waypoint-to-waypoint synchronization, see [Waypoint Synchronization \(on the next page\)](#).

### Follow these steps:

1. Do one of the following:
  - For the **(F1) Unit / (F2) Group / (F4) Vehicle** EO, right-click the (F3) Waypoints Editor Object, select **Link to Entity**.
  - For the **(F7) Trigger** EO, right-click the (F3) Waypoints Editor Object, select **Link to Trigger**.
2. Click the EO.

The link between the (F3) Waypoints EO and the other EO is established.

## 10.8.2 Branching Waypoints

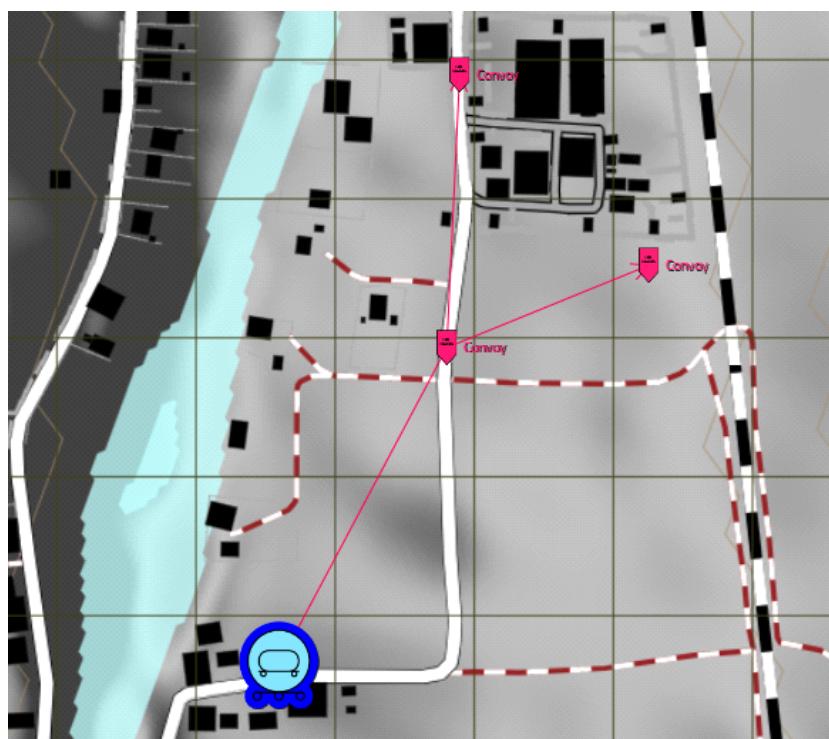
You can create branching waypoints for AI entities / groups to choose from (for example, based on trigger conditions).

### Follow these steps:

1. Create an AI unit (or a vehicle that contains AI units, if creating a convoy) and select it.
2. Right-click the unit and select **Orders > Assign New Waypoint**, and then click the map where you want the branching waypoint to be.
3. In the **Behavior** list, select the AI Order (waypoint behavior), set the Order properties, and click **OK**.
4. Right-click the branching waypoint and select **Assign Next Waypoint**, and click the map, where a branch of the waypoint should be. Update the branch settings as required and click **OK**.
5. Repeat step 4, until you have all the waypoint branches.

The AI now has a branching waypoint. For a more detailed example, see [Branching Orders](#).

### Image-76: Convoy branching waypoints



### 10.8.3 Waypoint Synchronization

You can synchronize the execution of one waypoint / Order with another.

**Follow these steps:**

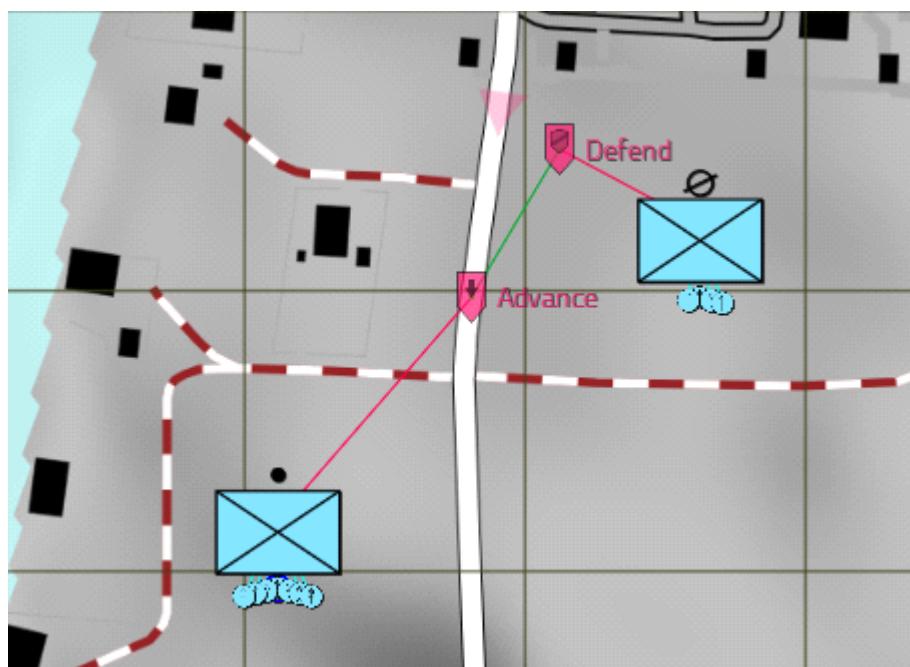
1. Create two waypoints.
2. Right-click one waypoint, and select **Sync to Waypoint**.
3. Click the other waypoint you want to synchronize with the first one.

The two waypoints are synchronized.

**NOTE**

You can synchronize one waypoint to more than one waypoint.

To remove the waypoint synchronization, right-click the waypoint you want to unsynchronize and select **Sync to Waypoint**, then either click the specific waypoint you want to unsynchronize from, or click an empty location on the map to unsynchronize the former waypoint from all the waypoints it is synchronized with.

**Image-77: Synchronized Advance and Defend waypoints**

#### 10.8.4 Waypoint Considerations

The following considerations apply to waypoints:

- It is possible to create chains of waypoints.
- Waypoint chains can contain branching waypoints.
- Deleting a waypoint in a chain automatically links the other waypoints to the next waypoint (if there is any).
- Waypoint name types and any waypoint status information is only displayed, if the waypoint is selected.

## 10.9 AI on Rails

You can specify the behavior of a Control AI entity by using the (F3) Waypoints Editor Object, to give the entity a sequence of orders to perform. These orders can be as simple as movement from point A to point B with no autonomy, or composed together and combined with triggers, to create complex, branching plans.

The following sections describe how to build a progressively more complex behavior:

- [Individual Move \(on the next page\)](#) - Add a sequence of move orders to a single soldier.
- [Individual Fire At \(on page 429\)](#) - Add a sequence of move-and-fire orders to a single soldier.
- [Delayed Order Execution \(on page 432\)](#) - Use triggers to control when further orders should be executed.
- [Branching Orders \(on page 434\)](#) - Allow entities to choose from several orders to execute.
- [AI on Rails Orders \(on page 436\)](#) - AI on Rails orders that can be used. Each order behavior is applied to an entity using the (F3) Waypoints Editor Object.

For an AI on Rails example mission, see Example Content.

## 10.9.1 Individual Move

You can create and link a move order to an ungrouped entity, for the entity to perform.

The green soldier proxy, displayed in the 3D Editor (Prepare / Execute Mode), reflects the target entity stance, position, and orientation.

### Follow these steps:

1. In the Editor (Prepare Mode), place a single, ungrouped Control AI entity on the map.
2. Shift-click the entity, and then click a position on the map (see [Waypoints \(on page 421\)](#)).
3. In the **Behavior** list, select **Individual - Move**.
4. Set the Order properties (see [Individual - Move Order \(on page 440\)](#)) and click **OK**.
5. Preview the mission.

The entity assumes the specified stance and moves to the destination.

**Image-78: An Individual - Move Order, at the end of which the soldier entity crouches**



You can link multiple move orders by linking multiple [Individual - Move Order \(on page 440\)](#) Editor Objects (see [Waypoints \(on page 421\)](#)). The entity performs these orders in sequence.

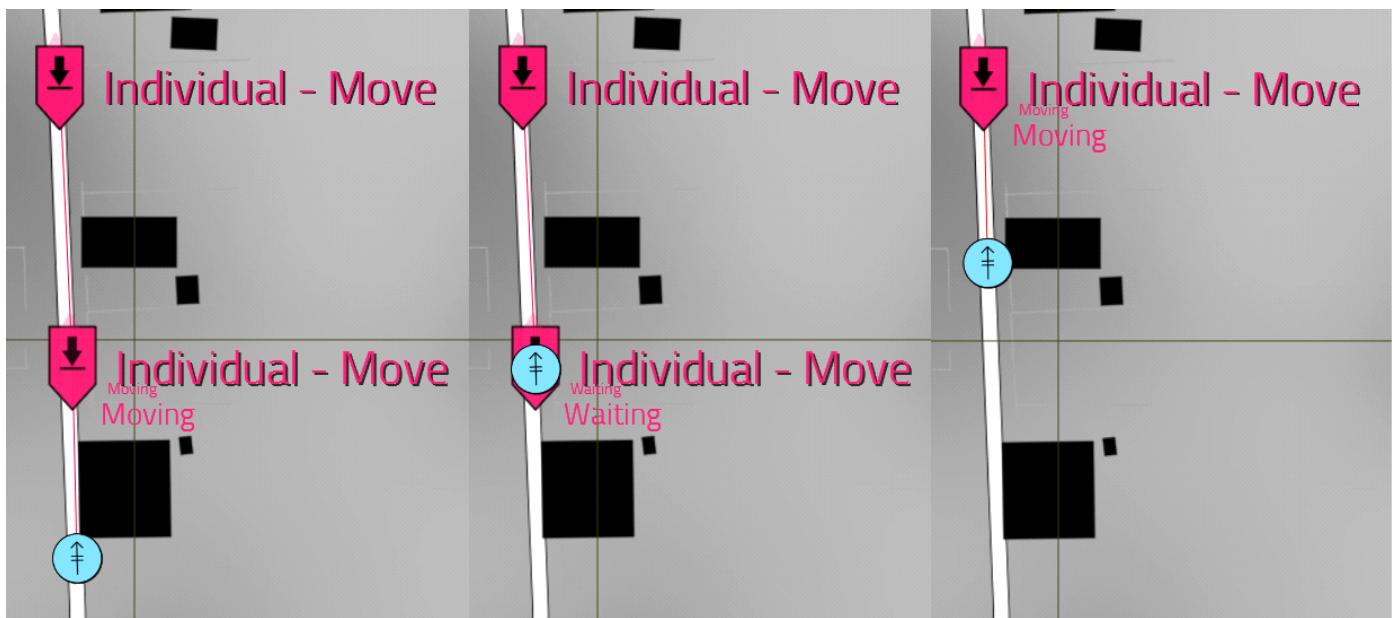
You can also set the entity to wait at its destination for a specified amount of time, before continuing with the next order.

**Follow these steps:**

1. Create an [Individual - Move Order \(on page 440\)](#), based on the previous procedure.
2. In the Order properties, enter the number of seconds for the entity to wait, before continuing with to the next order, in the **Wait After Finishing (s)** field.
3. Shift-click the order, and then click a position on the map for the next order.
4. Set the Order properties, based on the previous procedure.
5. Preview the mission.

The entity moves to the first destination, waits for the specified amount of time, and then continues moving to the second destination.

**Image-79: From left to right: the entity moves to the first waypoint, waits, and continues to the second waypoint**



## 10.9.2 Individual Fire At

You can create and link a move-and-fire order to an ungrouped entity, for the entity to perform. The green soldier proxy, displayed in the 3D Editor (Prepare / Execute Mode), reflects the entity stance, position, and orientation.

The entity first performs the move (similarly to [Individual Move \(on page 427\)](#)), and then fires at the specified target (the entity automatically reloads). You can fire at either an object, such as an enemy entity, or an ASL2 position on the terrain.

This section demonstrates an example, where a soldier performs the following order sequence:

1. Moves to the first position and fires at a falling target.
2. Moves to the next position and fires at an ASL2 position on the terrain.

### Follow these steps:

1. In the Editor (Prepare Mode), place a single, ungrouped Control AI entity on the map.
2. Place two falling-target objects (any object from [\(F8\) Objects > Targets - Falling](#)) on the map and give them names (for example, `ftarget1` and `ftarget2`).
3. Shift-click the entity, and then click a position on the map (see [Waypoints \(on page 421\)](#)).
4. In the **Behavior** list, select **Individual - Fire At**.
5. In **Target (SQF Code)**, specify the name of the first falling-target object (for example, `ftarget1`).

#### NOTE

It can be any SQF code that returns an Entity or Position (in ASL2 format). The SQF script is evaluated **only after** the move is performed. Therefore, the entity fires at the target **only after** it performs the move. If the target is moving, only the target position at the time of the SQF code evaluation is taken into account.

6. In **Weapon**, select the weapon the entity should use (based on the weapons the entity has) to fire at the target. In **Firing Mode**, select the firing mode, which can be either **Single** (single rounds) or **Burst** (burst rounds). In both firing modes, you can set the number of rounds / bursts to fire in **Rounds**, as well as the waiting period between each round / burst in **Wait Between Rounds (s)**.
7. Set the other Order properties (see [Individual - Fire At Order \(on page 437\)](#)) and click **OK**.
8. Shift-click the Fire At Order, and then click a position on the map, for the next move-and-fire waypoint.
9. In **Target (SQF Code)**, specify the ASL2 position of the second falling-target object (for example, using the SQF script: `ftarget2 modelToWorldASL2 [0,0,1]` - this fires 1m above the ASL2 position of the target, which would be on the ground).

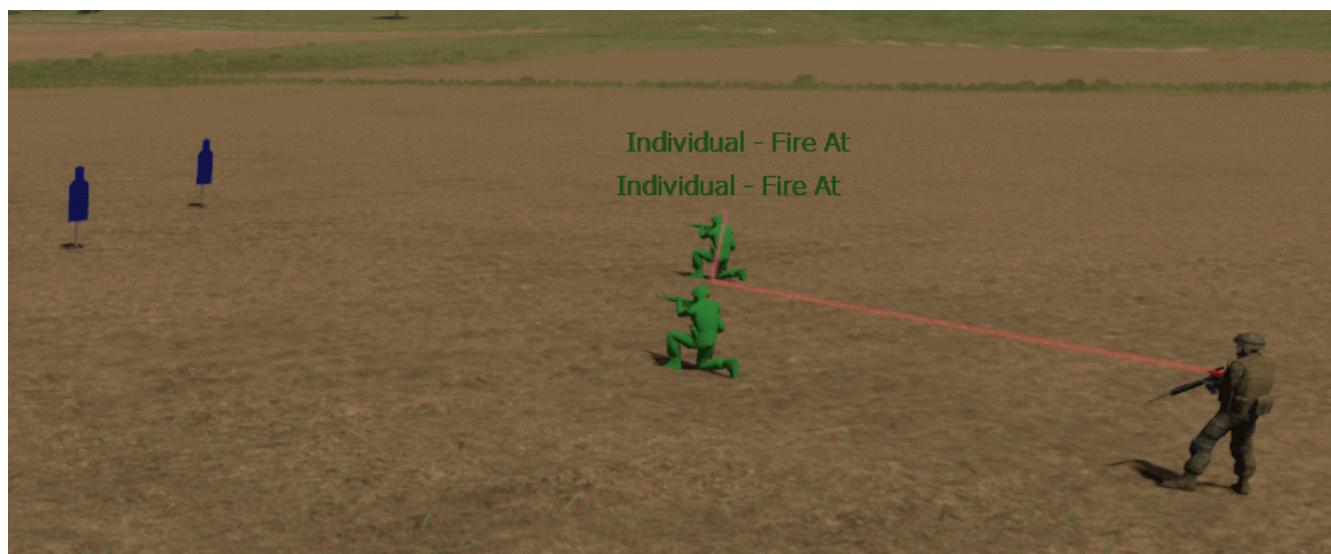
10. Set the other Order properties and click **OK**.

11. Preview the mission.

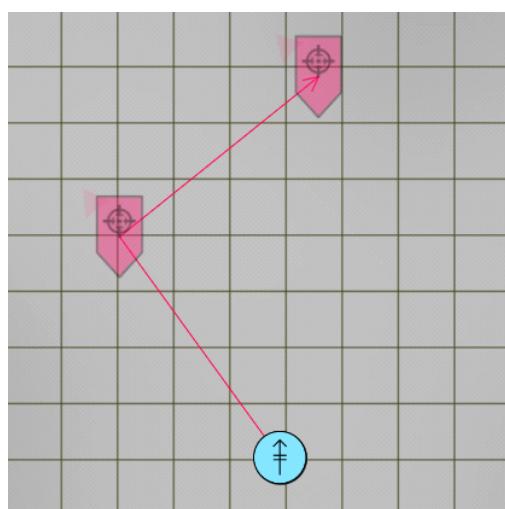
The entity does the following:

1. Moves to the first firing position.
2. Fires at the first target and the target falls down.
3. The entity then moves to the second firing position.
4. Fires 1m above the ASL2 ground position of the second target, which results in hitting the target.

**Image-80: Fire At Order settings and the finished example scenario**



**Image-81: Fire At Orders, connected as waypoints**



**Image-82: The entity aims and fires at a falling target****Considerations:**

- If the entity has a weapon, but no ammunition (which is indicated in the 2D Editor (Execute Mode)), it waits for the administrator to edit the entity loadout, to provide it with usable ammunition.
- If the entity has no weapon of the selected type, it waits at its firing position, until the administrator edits the entity loadout, to provide it with a weapon of this type.
- The entity cannot fire at dead targets (for example, if the target is killed by the first shot, the entity does not fire the remaining rounds).
- Setting the target to `enemySoldier` is not the same as `getPosASL2 enemySoldier`. The former aims at the chest of the target and considers target velocity, while the latter aims at a static position near the feet of the target / ground.
- Aiming can take some time, if the target is too far. If the waiting period between rounds / bursts is set to 0, re-aiming between rounds / bursts can still take more than 0 seconds.
- If the given target is too far, the entity waits at its firing position.

### 10.9.3 Delayed Order Execution

You can control when an order is executed by linking a trigger to it.

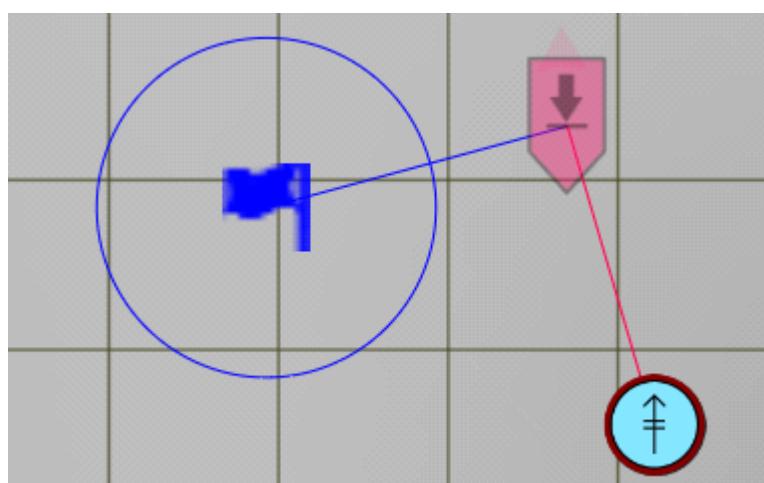
When a Control AI entity finishes an order, and the next order in the sequence has a linked trigger, the execution of the next order is delayed, until the trigger is activated. Similarly, if a trigger is linked to an existing order, and that order is linked to a Control AI entity, it does not start executing the order, until the trigger is activated.

**Follow these steps:**

1. Set up an **Individual - Move Order**, as described in [Individual Move \(on page 427\)](#).
2. Create a trigger, and set its **Activation** field to **Radio Alpha**.
3. Link the order to the trigger.
4. Link the order to an entity.
5. Preview the mission.

The entity does not begin executing the order, until the radio trigger is activated.

**Image-83: An Individual - Move Order linked to an entity and a trigger**



You can link multiple triggers to a single order. The order is then delayed, until any of the triggers is activated. This way, you can specify multiple activation conditions for an order. For example, a Control AI entity can be set to crest a ridge, when either a BLUFOR soldier enters a trigger area, or when a radio trigger is manually activated by an administrator.

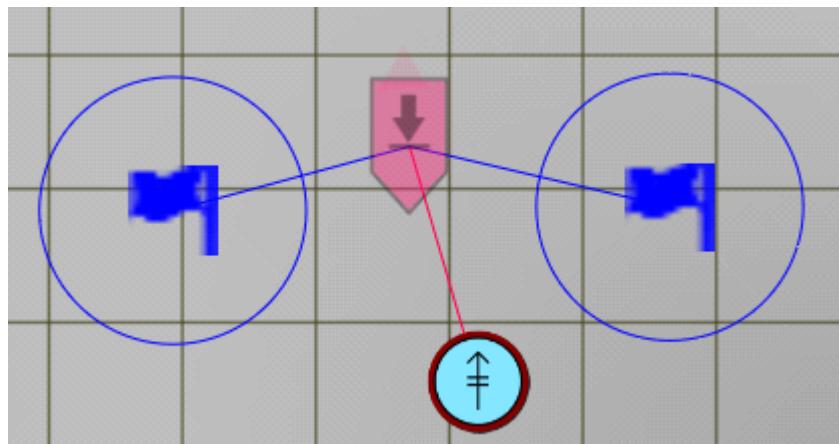
**Follow these steps:**

1. Set up an **Individual - Move Order** with a linked radio trigger, as described in the previous procedure.
2. Create a second trigger, and set its **Activation** field to **BLUFOR**, and its **Activation Type** field to **Present**.

3. Link the order to the second trigger.

4. Preview the mission.

**Image-84: An Individual Move - Order linked to an entity and two triggers**



## 10.9.4 Branching Orders

You can have an entity select one of several orders to execute.

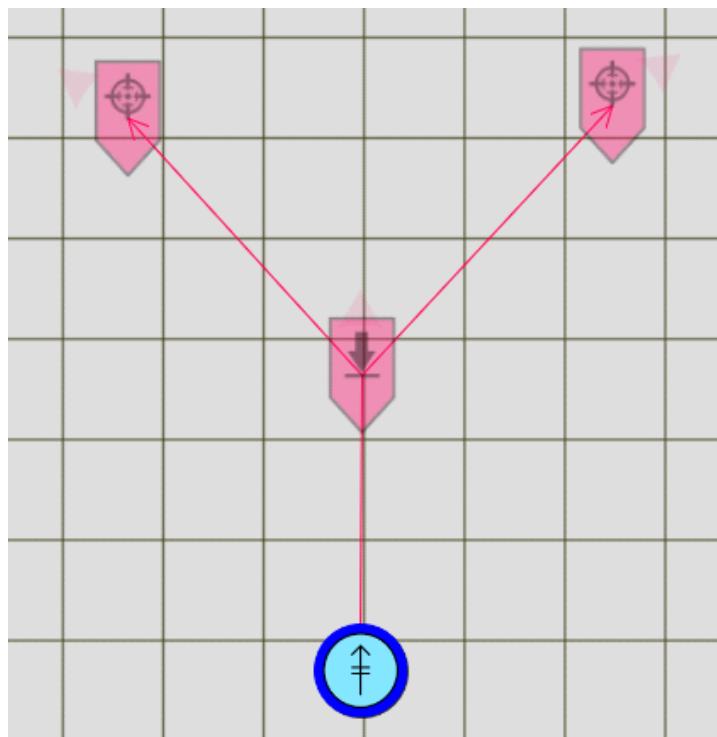
In the most basic case, when the entity finishes an order and there are subsequent orders to select from, the selection is done randomly.

**Follow these steps:**

1. Set up an **Individual - Move Order / Individual - Fire At Order**, as described in [Individual Move \(on page 427\)](#) / [Individual Fire At \(on page 429\)](#). Make sure the order is linked to an entity.
2. Create two additional Individual Orders and link them to the order created in step 1.
3. Preview the mission.

The entity executes the first order, and then randomly chooses one of the two subsequent orders.

**Image-85: Branching orders example**



You can also use branching orders together with triggers, to have an entity select an order based on scenario conditions or manual trigger activation, as described in the example below:

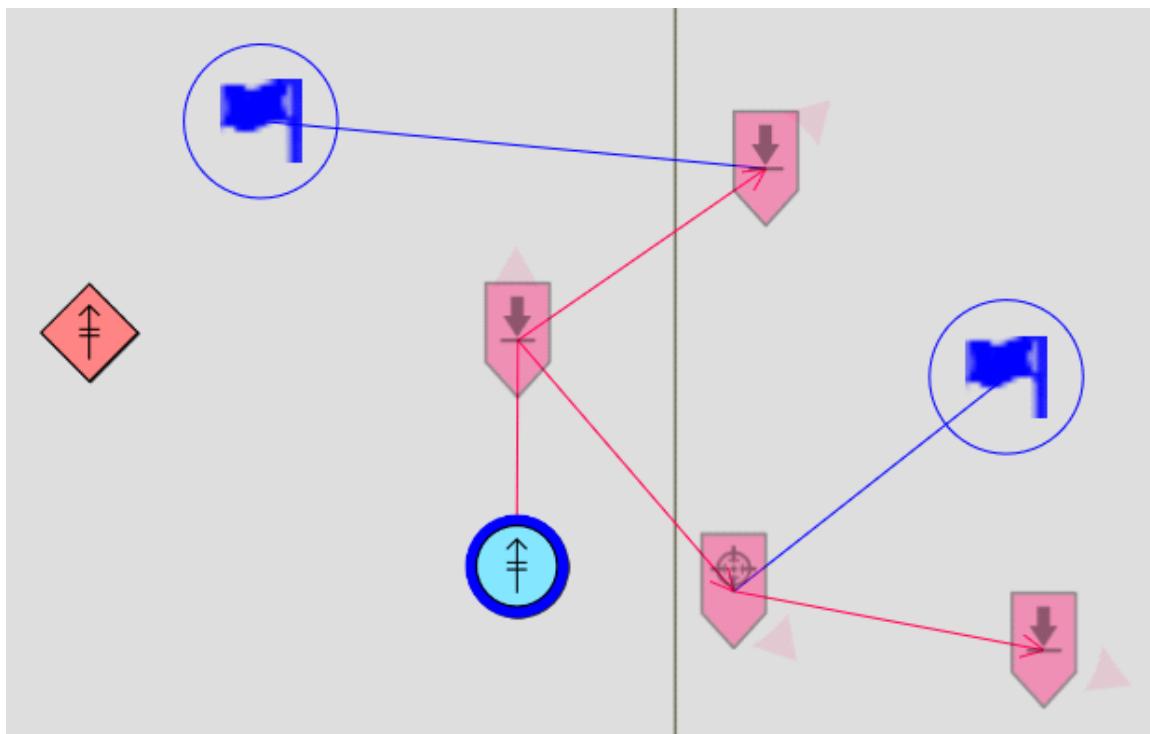
**Follow these steps:**

1. Set up an **Individual - Move Order**. In its properties, set all of its reactions to **Hold Fire**.
2. Create a trigger, and set its **Activation** field to **Radio Alpha**.
3. Create an **Individual - Move Order**. In its properties, set all of its reactions to **Hold Fire**. Link this order to the trigger created in step 2, and then link it to the order created in step 1.

4. Create a second trigger, set its **Activation** field to **OPFOR** and its name to "**Target\_Zone**" (without the quotation marks). Adjust its size as necessary.
5. Create an **Individual - Fire At Order**. In its properties, set all of its reactions to **Hold Fire**, and set the **Target (SQF Code)** field to "**(list Target\_Zone) select 0**" (without the quotation marks). Link this order to the trigger created in step 4, and then link it to the order created in step 1.
6. Create an **Individual - Move Order**. Link this order to the order created in step 5.
7. Link the order created in step 1 to a **BLUFOR** entity.
8. Create an **OPFOR** entity.
9. Preview the mission.

The BLUFOR entity moves to the first order. It waits there, until the OPFOR entity is moved into the trigger area created in step 4. Then it engages that entity and proceeds on. However, if the radio trigger is manually activated by an administrator before the OPFOR entity enters the trigger area, the entity moves away immediately.

**Image-86: Branching orders with triggers example**



## 10.9.5 AI on Rails Orders

AI on Rails uses the (F3) Waypoints Editor Object and consists of the following orders:

**NOTE**

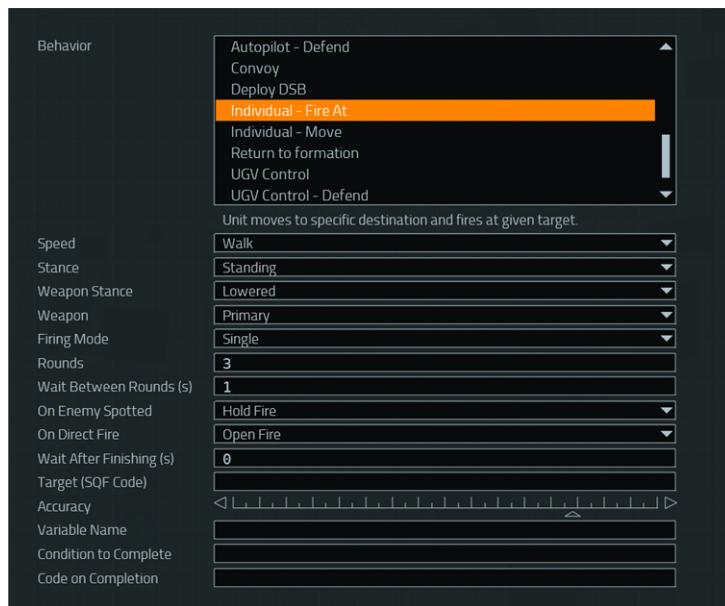
Each order can only be assigned to individual, ungrouped entities.

Order Type	Description
Individual - Fire At Order (on the next page)	The entity assumes the specified stance and speed, moves to target position, orients itself according to the specified heading, and fires at the specified target.
Individual - Move Order (on page 440)	The entity assumes the specified stance and speed, moves to target position, and orients itself according to the specified heading.

### 10.9.5.1 Individual - Fire At Order

Assigns a waypoint to an individual entity to fire at the given target (the entity automatically reloads). The speed, stance, reactions, and fire target of the entity can be configured. The position is the location of the (F3) Waypoints Editor Object on the map.

**Image-87: Individual Fire At - Order settings**



#### Follow these steps:

1. Select the **(F3) Waypoints** Editor Object from the Editor Objects List, and place it on the map.
2. In the **Behavior** list, select **Individual - Fire At**.
3. Set the [Individual Fire At Settings \(below\)](#).
4. Set the [Waypoint Completion Settings \(on the next page\)](#).
5. Click **OK** to confirm.

The Individual - Fire At Order behavior is set up.

#### Individual Fire At Settings

Setting	Description
<b>Speed</b>	Desired move speed of the entity. <ul style="list-style-type: none"> <li>• <b>Slow Walk</b></li> <li>• <b>Walk</b></li> <li>• <b>Run</b></li> </ul>

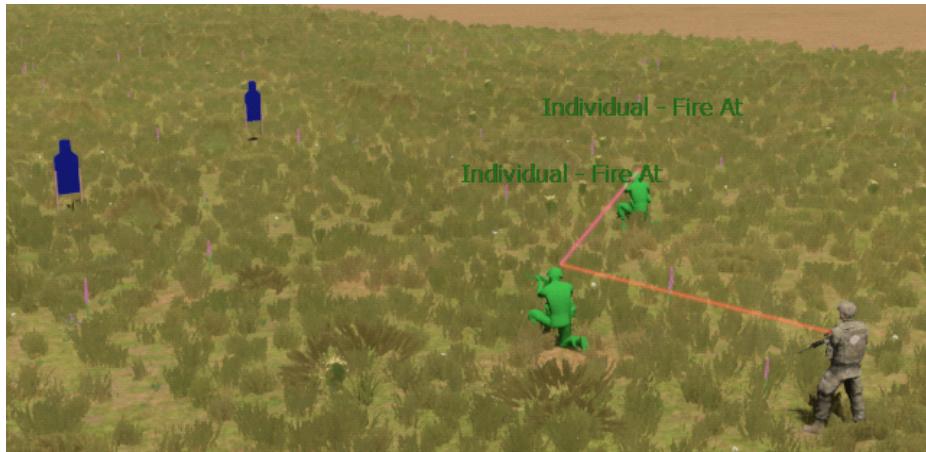
Setting	Description
<b>Stance</b>	Desired stance to assume during the move. <ul style="list-style-type: none"> <li><b>Standing</b> - Entity is upright and walks / runs to the destination.</li> <li><b>Crouched</b> - Entity is crouched and moves in a lowered stance to the destination.</li> <li><b>Prone</b> - Entity lays down and crawls to the destination.</li> </ul>
<b>Weapon Stance</b>	Defines how the weapon should be carried during the move. <ul style="list-style-type: none"> <li><b>Lowered</b> - Weapon is lowered.</li> <li><b>Raised</b> - Weapon is aimed and ready to fire.</li> </ul>
<b>Weapon</b>	The weapon the entity should use to fire at the target. <ul style="list-style-type: none"> <li><b>Primary</b> - The primary weapon of the entity.</li> <li><b>Pistol Weapon</b> - A pistol.</li> </ul>
<b>Firing Mode</b>	The firing mode. <ul style="list-style-type: none"> <li><b>Single</b> - Single rounds.</li> <li><b>Burst</b> - Burst rounds.</li> </ul>
<b>Rounds</b>	The number of rounds to fire at the target.
<b>Wait Between Rounds (s)</b>	The number of seconds to wait between each round / burst.
<b>On Enemy Spotted</b>	Controls how the entity reacts, when spotting the enemy. <ul style="list-style-type: none"> <li><b>Open Fire</b> - Entity stops and opens fire on any visible threats.</li> <li><b>Hold Fire</b> - Entity ignores visible threats.</li> </ul>
<b>On Direct Fire</b>	Controls how the entity reacts to incoming enemy fire (defined by shots impacting or passing around the entity at a short distance). <ul style="list-style-type: none"> <li><b>Open Fire</b> - Entity stops and opens fire on any visible threats.</li> <li><b>Hold Fire</b> - Entity ignores incoming fire.</li> </ul>
<b>Wait After Finishing (s)</b>	Controls how long (in seconds) the entity holds its target position after finishing the order, before continuing to execute further orders.
<b>Target (SQF Code)</b>	Target to fire at. Can be any SQF code that returns an Entity or Position (in ASL2 format).
<b>Accuracy</b>	Firing accuracy of the entity.
<b>Variable Name</b>	In <b>Variable Name</b> , enter the Order waypoint name, which can be used in SQF scripts.

## Waypoint Completion Settings

Set the Order waypoint completion settings:

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

**Image-88: Individual - Fire At example in the 3D Editor (Prepare Mode)**



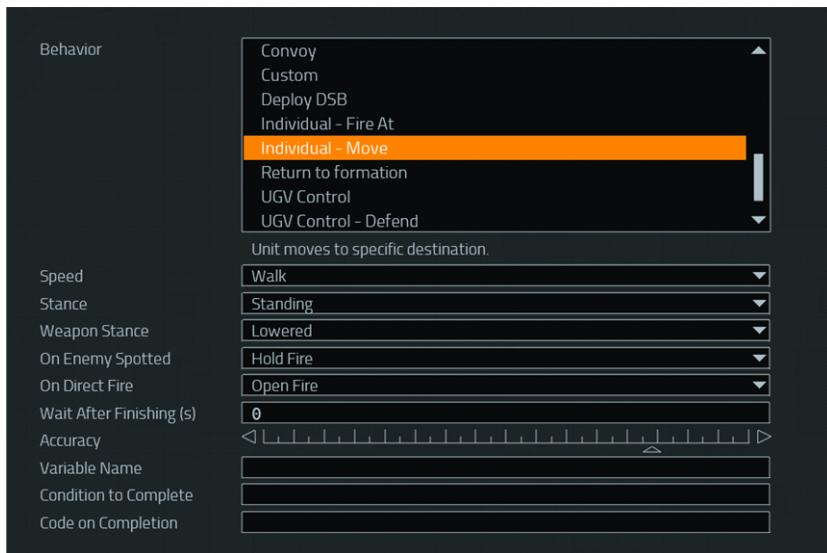
### Considerations:

- If the entity has a weapon, but no ammunition (which is indicated in the 2D Editor (Execute Mode)), it waits for the administrator to edit the entity loadout, to provide it with usable ammunition.
- If the entity has no weapon of the selected type, it waits at its firing position, until the administrator edits the entity loadout, to provide it with a weapon of this type.
- The entity cannot fire at dead targets (for example, if the target is killed by the first shot, the entity does not fire the remaining rounds).
- Setting the target to `enemySoldier` is not the same as `getPosASL2 enemySoldier`. The former aims at the chest of the target and considers target velocity, while the latter aims at a static position near the feet of the target / ground.
- Aiming can take some time, if the target is too far. If the waiting period between rounds / bursts is set to 0, re-aiming between rounds / bursts can still take more than 0 seconds.
- If the given target is too far, the entity waits at its firing position.

## 10.9.5.2 Individual - Move Order

Assigns a waypoint to an individual entity. The speed, stance, and reactions of the entity can be configured. The position is the location of the (F3) Waypoints Editor Object on the map.

**Image-89: Individual Move - Order settings**



### Follow these steps:

1. Select the **(F3) Waypoints** Editor Object from the Editor Objects List, and place it on the map.
2. In the **Behavior** list, select **Individual - Move**.
3. Set the [Individual Move Settings \(below\)](#).
4. Set the [Waypoint Completion Settings \(on the next page\)](#).
5. Click **OK** to confirm.

The Individual - Move Order behavior is set up.

### Individual Move Settings

Setting	Description
<b>Speed</b>	Desired move speed of the entity. <ul style="list-style-type: none"> <li>• <b>Slow Walk</b></li> <li>• <b>Walk</b></li> <li>• <b>Run</b></li> </ul>
<b>Stance</b>	Desired stance to assume during the move. <ul style="list-style-type: none"> <li>• <b>Standing</b> - Entity is upright and walks / runs to the destination.</li> <li>• <b>Crouched</b> - Entity is crouched and moves in a lowered stance to the destination.</li> <li>• <b>Prone</b> - Entity lays down and crawls to the destination.</li> </ul>

Setting	Description
<b>Weapon Stance</b>	Defines how the weapon should be carried during the move. <ul style="list-style-type: none"> <li><b>Lowered</b> - Weapon is lowered.</li> <li><b>Raised</b> - Weapon is aimed and ready to fire.</li> </ul>
<b>On Enemy Spotted</b>	Controls how the entity reacts, when spotting the enemy. <ul style="list-style-type: none"> <li><b>Open Fire</b> - Entity stops and opens fire on any visible threats.</li> <li><b>Hold Fire</b> - Entity ignores visible threats.</li> </ul>
<b>On Direct Fire</b>	Controls how the entity reacts to incoming enemy fire (defined by shots impacting or passing around the entity at a short distance). <ul style="list-style-type: none"> <li><b>Open Fire</b> - Entity stops and opens fire on any visible threats.</li> <li><b>Hold Fire</b> - Entity ignores incoming fire.</li> </ul>
<b>Wait After Finishing (s)</b>	Controls how long (in seconds) the entity holds its target position after finishing the order, before continuing to execute further orders.
<b>Accuracy</b>	Firing accuracy of the entity.
<b>Variable Name</b>	In <b>Variable Name</b> , enter the Order waypoint name, which can be used in SQF scripts.

## Waypoint Completion Settings

Set the Order waypoint completion settings:

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

**Image-90: Individual - Move example in the 3D Editor (Prepare Mode)**



## 10.10 Military AI

You can give Control AI general-purpose military infantry and vehicle groups orders to follow.

For vehicles, also see the specific [Convoy AI \(on page 482\)](#) and [Bridge Laying Convoy AI \(on page 501\)](#).

Each order behavior is applied to an infantry and / or vehicle group, using the [\(F3\) Waypoints Editor Object \(on page 416\)](#). The orders create VBS4 waypoints (see [Waypoints \(on page 421\)](#)), and can use branching (see [Branching Waypoints \(on page 423\)](#)).

The following topics are discussed:

- [Infantry Tutorial \(on the next page\)](#) - A tutorial that demonstrates the Control AI military behaviors for infantry.
- [Vehicle Tutorial \(on page 447\)](#) - A tutorial that demonstrates the Control AI military behaviors for vehicles.
- [Interoperability Tutorial \(on page 451\)](#) - A tutorial that demonstrates running group and sub-group Control AI behaviors in parallel.
- [Military AI Orders and Behaviors \(on page 456\)](#) - A list of general-purpose infantry and vehicle AI order behaviors.

## 10.10.1 Infantry Tutorial

This tutorial demonstrates the use of Control AI military behaviors for infantry.

The workflow of the tutorial is as follows:

1. In Prepare mode, create infantry groups A and B, using the ORBAT Editor - [Creating the Infantry Groups \(below\)](#).
2. Give group A an order to advance to a given location - [Creating an Advance Order \(below\)](#).
3. After group A performs the advance, give it an assault order to assault the enemy forces at the given location - [Creating an Assault Order \(on the next page\)](#).
4. Give group B a suppress order to provide fire support to group A - [Creating a Suppress Order \(on page 445\)](#).

### 10.10.1.1 Creating the Infantry Groups

First, create two infantry groups - group A and group B.

**Follow these steps:**

1. Open the VBS Editor in Prepare mode, and select (**F9**) ORBAT in the Editor Objects List.
2. Double-click a location on the map to place a US squad, referred to as group A.  
The [ORBAT Editor \(on page 366\)](#) opens in the Place ORBAT mode.
3. In the **Affiliation** drop-down, select **US**.
4. In the ORBAT Tree, select **Ground Unit > Infantry > Squad**.
5. Click **Place**.

The US squad is placed on the map.

6. Repeat steps 1 - 5 to place a second US squad, referred to as group B.

Groups A and B are placed on the map.

### 10.10.1.2 Creating an Advance Order

Give group A an [Advance Order \(on page 461\)](#) to move to a certain position. A group that performs an Advance Order prefers movement speed over engaging and eliminating the enemy.

**Follow these steps:**

1. Right-click group A and select **Orders > Assign New Waypoint**.
2. Click a location on the map where you want group A to advance to.  
The Object Properties dialog opens.
3. In the **Behavior** list, select **Advance**.

#### 4. Click **OK**.

Group A is given an Advance Order waypoint.

#### 5. Click **Preview** to preview the scenario.

Group A moves to the Advance Order waypoint position in a column of fireteams, and after reaching its destination, its members take cover.



### 10.10.1.3 Creating an Assault Order

If there are enemy forces expected near the location to which group A advances, an [Assault Order](#) (on page 459) is needed as well. The Advance Order is mainly focused on moving fast in a certain direction, whereas an Assault Order allows the group to perform basic bounding, so that while one part of the group advances, another part stays covered and surveys the area.

#### Follow these steps:

1. Right-click the Advance Order waypoint and select **Assign New Waypoint**.
2. Click a location on the map where you want the assault to happen.

The Object Properties dialog opens.

3. In the **Behavior** list, select **Assault**.
4. Click **OK**.

The Advance Order waypoint is followed up by an Assault Order waypoint.

5. Click **Preview** to preview the scenario.

After finishing the Advance Order, group A starts bounding to the Assault Order waypoint position, where one part of the group advances, while another part stays covered and surveys the area.



#### 10.10.1.4 Creating a Suppress Order

While group A advances and then assaults any expected enemy forces, group B can provide fire support to group A, using the [Suppress Order \(on page 466\)](#).

**Follow these steps:**

1. Right-click group B and select **Orders > Assign New Waypoint**.
  2. Click a location on the map where you want the fire support / suppression to happen (somewhere close to the Assault Order waypoint position).
- The Object Properties dialog opens.
3. In the **Behavior** list, select **Suppress**.
  4. In **Radius**, set the fire support radius (in meters).
  5. Click **OK**.

Group B is given a Suppress Order waypoint.

6. Click **Preview** to preview the scenario.

Group B forms a firing line from which they start firing at the Suppress Order waypoint position, supporting group A.

If the suppressing group B should suppress from another position, it can be first ordered to move to a certain position (using an Advance Order), followed by a Suppress Order waypoint as the next one in the waypoint chain.

The whole scenario now contains two infantry squad-sized groups - A and B. Group A first quickly moves to the position of the Advance Order waypoint, and then starts bounding to the position of the Assault Order waypoint. Meanwhile, group B provides fire support.

**Image-91: Group B providing fire support to group A**

## 10.10.2 Vehicle Tutorial

This tutorial demonstrates the use of Control AI military behaviors for vehicles.

The workflow of the tutorial is as follows:

1. In Prepare mode, create a mechanized infantry group, using the ORBAT Editor and VBS Editor - [Creating the Mechanized Infantry Group \(below\)](#).
2. Order the infantry part of the group to mount a vehicle as cargo - [Creating a Mount Order \(on the next page\)](#).
3. Give the vehicle an order to advance to a given location - [Creating an Advance Order \(on page 449\)](#).
4. Order the infantry part of the group to dismount the vehicle - [Creating a Dismount Order \(on page 450\)](#).

### 10.10.2.1 Creating the Mechanized Infantry Group

First, create a mechanized infantry group.

**Follow these steps:**

1. Open the VBS Editor in Prepare mode, and select **(F9) ORBAT** in the Editor Objects List.
2. Double-click a location on the map to place a US fireteam, to serve as the infantry part of the mechanized infantry group.

The [ORBAT Editor \(on page 366\)](#) opens in the Place ORBAT mode.

3. In the **Affiliation** drop-down, select **US**.
4. In the ORBAT Tree, select **Ground Unit > Infantry > Fireteam**.
5. Click **Place**.

The US fireteam is placed on the map.

6. In the VBS Editor, in the Editor Objects List, select **(F4) Vehicle**.
7. Double-click a location on the map where you want to place the vehicle to transfer the fireteam as cargo.

The Object Properties dialog opens.

**NOTE**

Place the vehicle about 200m from the fireteam. See the [Measure Distance Tool \(on page 71\)](#).

8. In **Filters**, type **Stryker** and select any of the US Strykers that can fit a US fireteam as cargo.

## 9. Click **OK**.

The Stryker vehicle is placed on the map.

The infantry group (fireteam) and vehicle, which constitute the overall mechanized infantry group, are placed on the map.

### 10.10.2.2 Creating a Mount Order

Order the fireteam to mount the Stryker as cargo, using the [Mount Order \(on page 471\)](#).

**Follow these steps:**

1. Right-click the infantry part of the group and select **Orders > Assign New Waypoint**.
2. Click a location on the map where you want the fireteam to mount the Stryker.

The Object Properties dialog opens.

#### **WARNING**

Make sure that the location is not farther away than 50m from the vehicle, for the vehicle mounting to happen.

3. In the **Behavior** list, select **Mount**.

4. Click **OK**.

The infantry is given an Mount Order waypoint.

5. Click **Preview** to preview the scenario.

The infantry moves to the Mount Order waypoint position and mounts the Stryker as cargo.



### 10.10.2.3 Creating an Advance Order

Give the Stryker an order to advance to a given location, using the [Advance Order \(on page 461\)](#).

#### Follow these steps:

1. Right-click the Stryker and select **Orders > Assign New Waypoint**.
2. Click a location on the map within 50m from the Mount Order waypoint.

The Object Properties dialog opens.

3. In the **Behavior** list, select **Advance**.

4. Click **OK**.

The Stryker is given an Advance Order waypoint.

5. Right-click the Advance Order waypoint and select **Sync to Waypoint** (see [Waypoint Synchronization \(on page 424\)](#)).

6. Click the Mount Order waypoint.

This synchronizes the Advance Order with the Mount Order, which means that the Stryker moves to the Advance Order waypoint location, and waits for the fireteam to complete the Mount Order.

7. Right-click the Advance Order waypoint and select **Assign New Waypoint**.

8. Click a location on the map where you want the Stryker to advance to, for the fireteam to dismount.

The Object Properties dialog opens.

9. In the **Behavior** list, select **Advance**.

10. Click **OK**.

The Stryker is given another Advance Order waypoint.

11. Click **Preview** to preview the scenario.

The Stryker drives to the pickup location for the fireteam to mount it, and then drives to another location, where the fireteam is supposed to dismount.



#### 10.10.2.4 Creating a Dismount Order

Order the fireteam to dismount the Stryker, using the [Dismount Order \(on page 475\)](#).

**Follow these steps:**

1. Right-click the Mount Order waypoint and select **Assign New Waypoint**.
2. Click a location on the map, next to the final Advance Order waypoint, where you want the fireteam to dismount.

The Object Properties dialog opens.

**NOTE**

The position of the Dismount Order waypoint has no effect on where the dismount occurs, which is controlled by the final Advance Order waypoint. However, visually, it is easier to place these Order waypoints together.

3. In the **Behavior** list, select **Dismount**.

4. Click **OK**.

The Stryker is given a Dismount Order waypoint.

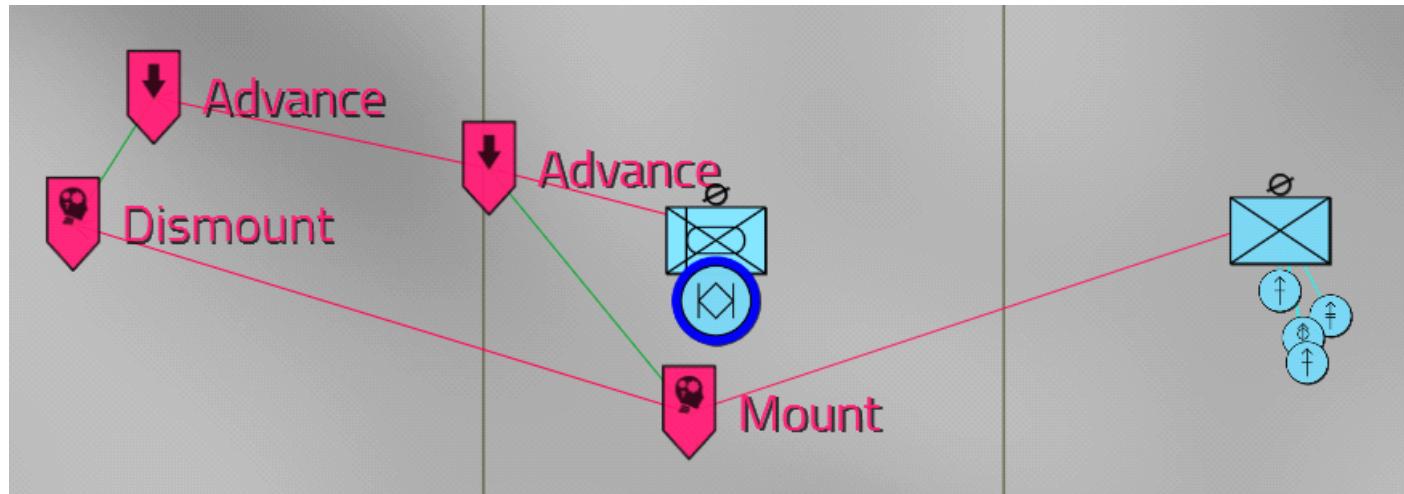
5. Right-click the Dismount Order waypoint and select **Sync to Waypoint**.

6. Click the final Advance Order waypoint.

The Dismount Order is synchronized with the final Advance Order.

7. Click **Preview** to preview the scenario.

After the Stryker reaches the final Advance Order waypoint, the fireteam dismounts.



## 10.10.3 Interoperability Tutorial

This tutorial demonstrates Control AI interoperability, which means that while a military group executes a primary order, secondary orders can be assigned to sub-groups to be executed in parallel with the primary one. The tutorial builds on the concepts discussed in the [Infantry Tutorial \(on page 443\)](#) and the [Vehicle Tutorial \(on page 447\)](#).

### Scenario Workflow

1. A **US > Armored Brigade Combat Team > Mechanized Infantry Company > Platoon (M2A3)** group starts advancing to the given location.
2. One **M2A3 Bradley** sub-group separates from the **Platoon (M2A3)** group and moves to a pickup location, for a **US > Ground Unit > Infantry > Fireteam** group to mount it as cargo (the **Fireteam** group first advances to the pickup location, and waits for the **M2A3 Bradley** sub-group to arrive).
3. Another **M2A3 Bradley** sub-group separates from the **Platoon (M2A3)** group and also moves to the **M2A3 Bradley** sub-group pickup location, to defend it and the **Fireteam** group.
4. After the **Fireteam** group mounts the first **M2A3 Bradley** sub-group, the latter proceeds to advance to a drop-off location, where the **Fireteam** group dismounts, and the returns to formation and continues advancing with the **Platoon (M2A3)** group. At the same time, the second **M2A3 Bradley** sub-group proceeds to advance from the defend location to return to formation and continues advancing with the **Platoon (M2A3)** group.

The following aspects are discussed:

- [Creating the Groups \(below\)](#)
- [Assigning Orders \(on the next page\)](#)
- [SQF Commands / Functions Interoperability \(on page 455\)](#)

### 10.10.3.1 Creating the Groups

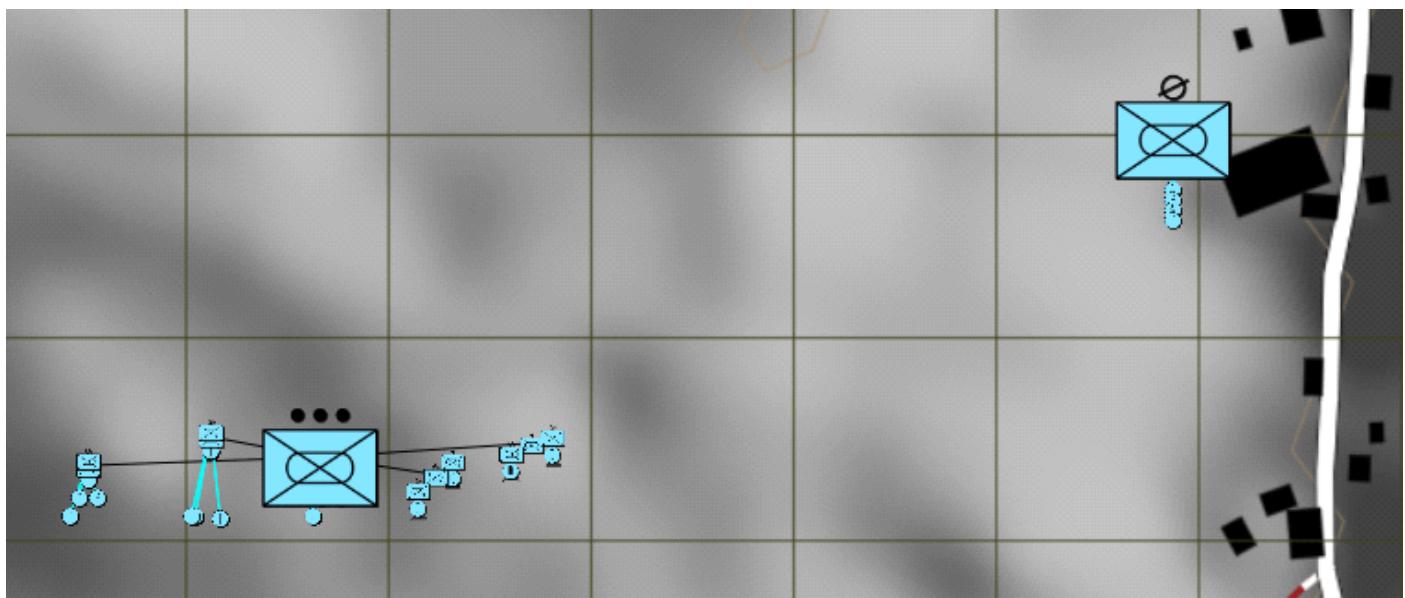
First, create the groups.

#### Follow these steps:

1. Open the VBS Editor in Prepare mode, and place the following two groups, using the [ORBAT Editor \(on page 366\)](#):
  - **US > Armored Brigade Combat Team > Mechanized Infantry Company > Platoon (M2A3)**
  - **US > Ground Unit > Infantry > Fireteam**
2. Position the groups, so that the **Platoon (M2A3)** group is situated left of the **Fireteam** group.

The military groups are placed.

### Image-92: Platoon (M2A3) and Fireteam groups on the map



#### 10.10.3.2 Assigning Orders

Now, assign the orders to the groups and sub-groups.

First, set up one of the **M2A3 Bradley** sub-groups to pick up and drop off the **Fireteam** group.

**Follow these steps:**

1. Right-click the **Platoon (M2A3)** group, and select **Orders > Assign New Waypoint**.
2. Click a map location northeast of the group, and north of the **Fireteam** group.  
The Object Properties dialog opens.

3. In the **Behavior** list, select **Advance** and click **OK**.

The **Platoon (M2A3)** group is assigned an [Advance Order \(on page 461\)](#) waypoint, serving as the primary Advance Order.

4. Right-click the **Fireteam** group, and select **Orders > Assign New Waypoint**.

5. Click a map location slightly north of the **Fireteam** group.  
The Object Properties dialog opens.

6. In the **Behavior** list, select **Advance** and click **OK**.

The **Fireteam** group is assigned an Advance Order waypoint, to move to the pickup location.

7. Right-click one of the **M2A3 Bradley** sub-groups, and select **Orders > Assign New Waypoint**.
8. Click a map location right next to the **Fireteam** group.  
The Object Properties dialog opens.

9. In the **Behavior** list, select **Advance** and click **OK**.

The **M2A3 Bradley** sub-group is assigned an Advance Order waypoint, to move to the pickup location.

10. Right-click the Advance Order waypoint of the **Fireteam** group, and select **Orders > Assign Next Waypoint**.

11. Click a map location right next to the Advance Order waypoint of the **Fireteam** group.

The Object Properties dialog opens.

12. In the **Behavior** list, select **Mount**.

13. In the **Crew Role Category** drop-down, select **Cargo** and click **OK**.

The **Fireteam** group is assigned a [Mount Order \(on page 471\)](#) waypoint, to mount the M2A3 Bradley vehicles in the **M2A3 Bradley** sub-group.

 **WARNING**

Make sure the **M2A3 Bradley** and the **Fireteam** Advance Order waypoints are within 50m of the Mount Order waypoint, for the **Fireteam** to mount the M2A3 Bradley vehicles.

14. Right-click the Mount Order waypoint, and select **Sync to Waypoint**.

15. Click the **M2A3 Bradley** Advance Order waypoint.

This synchronizes the **M2A3 Bradley** Advance Order with the **Fireteam** Mount Order, which means that the M2A3 Bradley vehicles move to the Advance Order waypoint location, and wait for the fireteam to complete the Mount Order.

16. Right-click the **M2A3 Bradley** Advance Order waypoint, and select **Assign Next Waypoint**.

17. Click a map location north of the **M2A3 Bradley** Advance Order waypoint.

The Object Properties dialog opens.

18. In the **Behavior** list, select **Advance** and click **OK**.

The **M2A3 Bradley** sub-group is assigned an Advance Order waypoint, to move to the drop-off location.

19. Right-click the Mount Order waypoint, and select **Assign Next Waypoint**.

20. Click a map location right next to the drop-off Advance Order waypoint.

The Object Properties dialog opens.

21. In the **Behavior** list, select **Dismount**.

22. In the **Crew Role Category** drop-down, select **Cargo** and click **OK**.

The **Fireteam** group is assigned a [Dismount Order \(on page 475\)](#) waypoint at the drop-off location.

23. Right-click the Dismount Order waypoint, and select **Sync to Waypoint**.

24. Click the drop-off Advance Order waypoint.

This synchronizes the drop-off **M2A3 Bradley** Advance Order with the **Fireteam** Dismount Order, for the fireteam to dismount the M2A3 Bradley vehicles.

25. Right-click the drop-off Advance Order waypoint, and select **Assign Next Waypoint**.

26. Click a map location right next or close to the drop-off Advance Order waypoint.

The Object Properties dialog opens.

27. In the **Behavior** list, select **Return to Formation** and click **OK**.

The **M2A3 Bradley** sub-group is assigned a [Return to Formation Order \(on page 478\)](#) waypoint to return to the **Platoon (M2A3)** formation.

Next, set up the second **M2A3 Bradley** sub-group to defend the first **M2A3 Bradley** sub-group and the **Fireteam** group, while the latter mounts the M2A3 Bradley vehicles.

**Follow these steps:**

1. Right-click the second **M2A3 Bradley** sub-group, and select **Orders > Assign New Waypoint**.
2. Click a map location right next to the pickup Advance Order of the first **M2A3 Bradley** sub-group.

The Object Properties dialog opens.

3. In the **Behavior** list, select **Defend** and click **OK**.

The second **M2A3 Bradley** sub-group is assigned a [Defend Order \(on page 469\)](#) waypoint.

4. Right-click the Defend Order waypoint, and select **Sync to Waypoint**.

5. Click the **Fireteam** Mount Order waypoint.

This synchronizes the second **M2A3 Bradley** sub-group Defend Order with the **Fireteam** Mount Order, which means that the defense takes place, until the **Fireteam** finishes mounting the first **M2A3 Bradley** sub-group vehicles.

6. Right-click the Defend Order waypoint, and select **Assign Next Waypoint**.

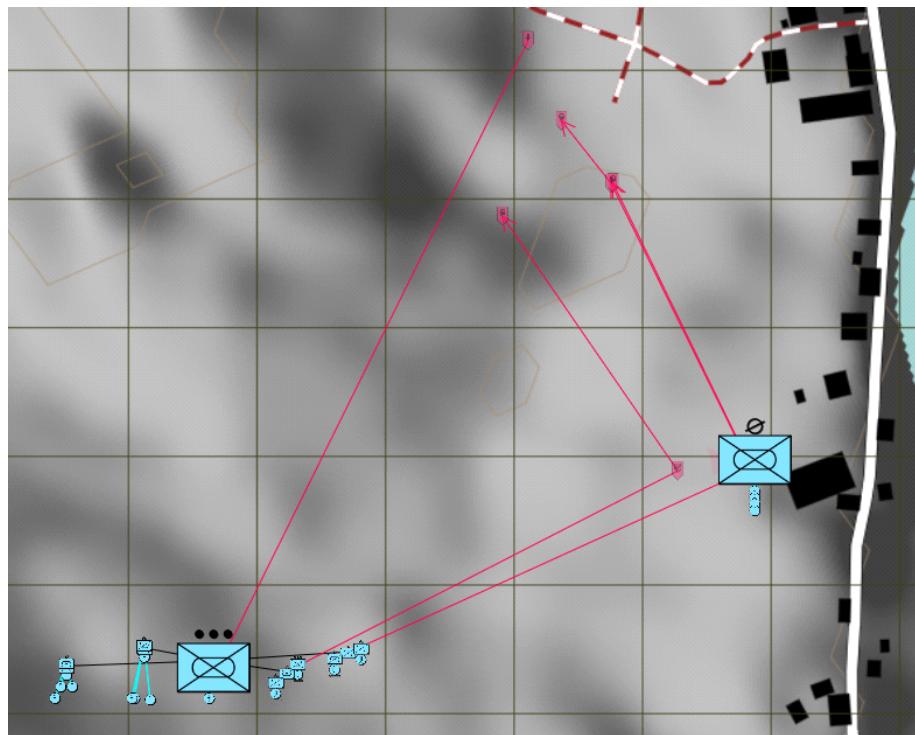
7. Click a map location right next to the Return to Formation Order waypoint of the first **M2A3 Bradley** sub-group.

The Object Properties dialog opens.

8. In the **Behavior** list, select **Return to Formation** and click **OK**.

The second **M2A3 Bradley** sub-group is assigned a Return to Formation Order waypoint to return to the **Platoon (M2A3)** formation.

**Image-93: Final waypoints on the map**



Click **Preview** to preview the scenario and see how the [Scenario Workflow \(on page 451\)](#) is executed.

#### 10.10.3.3 SQF Commands / Functions Interoperability

Additionally, you can use the SQF commands / functions listed in the [AI Parity](#) (<https://sqf.bisimulations.com/display/SQF/AI+Parity>) section of the VBS Scripting Reference to assign secondary orders to sub-groups to perform in parallel with the primary group orders.

## 10.10.4 Military AI Orders and Behaviors

Military AI uses the [\(F3\) Waypoints Editor Object \(on page 416\)](#) and consists of the following orders / behaviors:

Order / Behavior Type	Description
Assault Order (on the next page)	The group (infantry / vehicles / both) moves in formation to the given position (the location of the <a href="#">(F3) Waypoints Editor Object (on page 416)</a> on the map), and assaults the enemy. Infantry groups split into fireteams, form a line, and perform bounding to the given position to assault the enemy.
Advance Order (on page 461)	The group (infantry / vehicle / both) advances in formation to the given position (the location of the <a href="#">(F3) Waypoints Editor Object (on page 416)</a> on the map), choosing the fastest path to the destination, while preferring speed of movement over engaging and eliminating the enemy.
Pursue Order (on page 463)	The infantry team (only fireteam behavior) pursues the enemy, until it is eliminated. Then, the team takes cover at their current position.
Suppress Order (on page 466)	The infantry and / or vehicle group forms a firing line and starts firing at the given position area (the location of the <a href="#">(F3) Waypoints Editor Object (on page 416)</a> on the map).
Defend Order (on page 469)	The infantry and / or vehicle group moves to the given position (the location of the <a href="#">(F3) Waypoints Editor Object (on page 416)</a> on the map), forms a line and begins to defend it by firing at enemy forces in the position area.
Mount Order (on page 471)	The infantry team moves to the given position (the location of the <a href="#">(F3) Waypoints Editor Object (on page 416)</a> on the map), and mounts the nearest vehicle at the selected vehicle positions (crew, cargo, or both).
Dismount Order (on page 475)	The infantry teams dismounts the vehicle from the selected vehicle positions (crew, cargo, or both).
Return to Formation Order (on page 478)	The infantry / vehicle group returns back under the command of a higher-echelon group.
Tactical Move Order (on page 479)	The infantry group performs a tactical move to the given position (the location of the <a href="#">(F3) Waypoints Editor Object (on page 416)</a> on the map), using a given stance, formation, and a maximum range to engage enemy forces at.

### NOTE

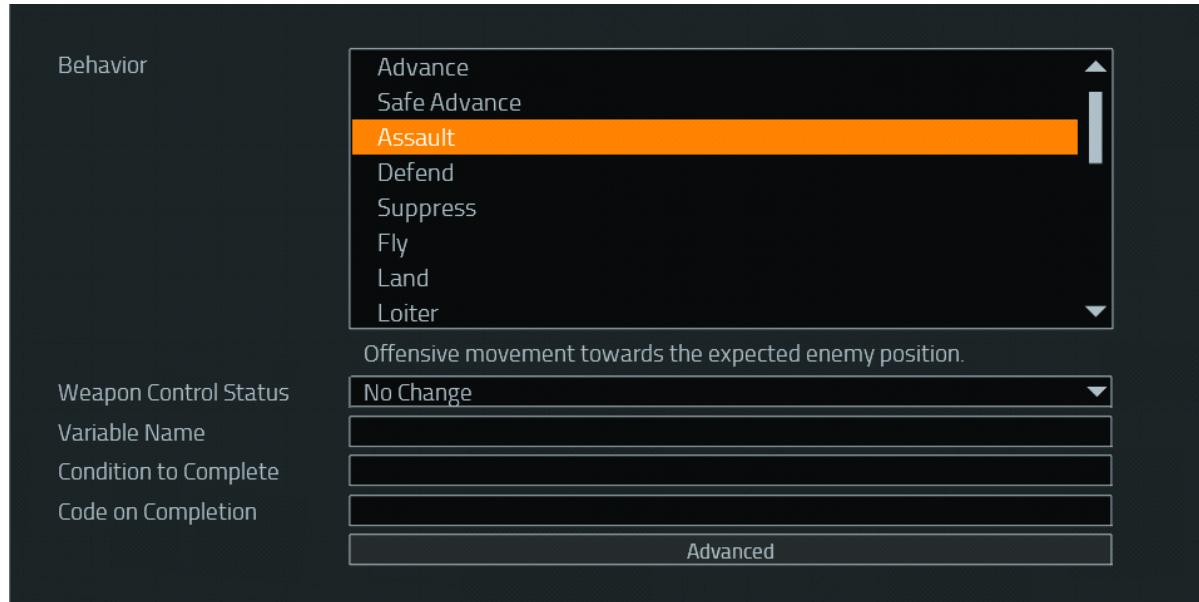
VBS Plan (see VBS Plan Overview in the VBS Plan Manual) relies on the military AI behaviors. For more information on how to use them, see Order Tactical Tools in Tactical Objects in the VBS Plan Manual.

### 10.10.4.1 Assault Order

The group (infantry / vehicles / both) moves in formation to the given position (the location of the **(F3) Waypoints Editor Object** (on page 416) on the map), and assaults the enemy.

Infantry groups split into fireteams, form a line, and perform bounding to the given position to assault the enemy.

**Image-94: Assault Order settings**



#### Follow these steps:

1. Select the **(F3) Waypoints** Editor Object from the Editor Objects List, and place it on the map.
2. In the **Behavior** list, select **Assault**.

3. In the **Weapon Control Status** drop-down, select the behavior for engaging enemy forces, when they are encountered:

Option	Description
No Change	No change in the behavior upon encountering enemy forces.
Weapons Free	Fire at enemy forces, when they are encountered.
Hold Fire	Do not fire at enemy forces, when they are encountered.

 **NOTE**

The Weapon Control Status is related to the following SQF commands:

- [combatMode](https://sqf.bisimulations.com/display/SQF/combatMode) (<https://sqf.bisimulations.com/display/SQF/combatMode>)
- [setCombatMode](https://sqf.bisimulations.com/display/SQF/setCombatMode) (<https://sqf.bisimulations.com/display/SQF/setCombatMode>)
- [unitCombatMode](https://sqf.bisimulations.com/display/SQF/unitCombatMode) (<https://sqf.bisimulations.com/display/SQF/unitCombatMode>)
- [setUnitCombatMode](https://sqf.bisimulations.com/display/SQF/setUnitCombatMode)  
(<https://sqf.bisimulations.com/display/SQF/setUnitCombatMode>)

4. In **Variable Name**, enter the Order waypoint name, which can be used in SQF scripts.

5. 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.

6. Click **OK**.

The Assault Order behavior is set up.

 **WARNING**

Bohemia Interactive Simulations advises scenario Administrators not to change the **Advanced** settings for the behavior to work correctly.

 **NOTE**

For some ORBATs, the Assault Order is identical to an [Advance Order](#) (on the next page).

### 10.10.4.2 Advance Order

The group (infantry / vehicle / both) advances in formation to the given position (the location of the [\(F3\) Waypoints Editor Object \(on page 416\)](#) on the map), choosing the fastest path to the destination, while preferring speed of movement over engaging and eliminating the enemy.

#### NOTE

The following considerations apply:

- In a chain of (F3) Waypoints Editor Object Orders (see [Waypoints \(on page 421\)](#)), the group occupies a position only if the Advance Order is the last (F3) Waypoints Editor Object.
- The Advance Order applies to infantry, land vehicles, and watercraft, while aircraft use the [Fly Order \(on page 513\)](#), [Loiter Order \(on page 518\)](#), and [Land Order \(on page 516\)](#) to move to the given position.
- Land forces can also use the [Tactical Move Order \(on page 479\)](#).

**Image-95: Advance Order settings**



#### Follow these steps:

1. Select the **(F3) Waypoints** Editor Object from the Editor Objects List, and place it on the map.
2. In the **Behavior** list, select **Advance**.

3. In the **Weapon Control Status** drop-down, select the behavior for engaging enemy forces, when they are encountered:

Option	Description
No Change	No change in the behavior upon encountering enemy forces.
Weapons Free	Fire at enemy forces, when they are encountered.
Hold Fire	Do not fire at enemy forces, when they are encountered.

 **NOTE**

The Weapon Control Status is related to the following SQF commands:

- [combatMode](https://sqf.bisimulations.com/display/SQF/combatMode) (<https://sqf.bisimulations.com/display/SQF/combatMode>)
- [setCombatMode](https://sqf.bisimulations.com/display/SQF/setCombatMode) (<https://sqf.bisimulations.com/display/SQF/setCombatMode>)
- [unitCombatMode](https://sqf.bisimulations.com/display/SQF/unitCombatMode) (<https://sqf.bisimulations.com/display/SQF/unitCombatMode>)
- [setUnitCombatMode](https://sqf.bisimulations.com/display/SQF/setUnitCombatMode)  
(<https://sqf.bisimulations.com/display/SQF/setUnitCombatMode>)

4. In **Variable Name**, enter the Order waypoint name, which can be used in SQF scripts.

5. 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.

6. Click **OK**.

The Advance Order behavior is set up.

 **WARNING**

Bohemia Interactive Simulations advises scenario Administrators not to change the **Advanced** settings for the behavior to work correctly.

### 10.10.4.3 Pursue Order

The infantry team (only fireteam behavior) pursues the enemy, until it is eliminated. Then, the team takes cover at their current position.

#### **WARNING**

For the Pursue Order to execute, the enemy needs to be within a 20m radius from the Pursue Order waypoint (the location of the [\(F3\) Waypoints Editor Object \(on page 416\)](#) on the map). Alternatively, you can explicitly set the target enemy to pursue - see [Target Specification \(on page 465\)](#).

**Image-96: Pursue Order settings**



#### Follow these steps:

1. Select the **(F3) Waypoints** Editor Object from the Editor Objects List, and place it on the map.
2. In the **Behavior** list, select **Pursue**.

3. In the **Weapon Control Status** drop-down, select the behavior for engaging enemy forces, when they are encountered:

Option	Description
No Change	No change in the behavior upon encountering enemy forces.
Weapons Free	Fire at enemy forces, when they are encountered.
Hold Fire	Do not fire at enemy forces, when they are encountered.

 **NOTE**

The Weapon Control Status is related to the following SQF commands:

- [combatMode](https://sqf.bisimulations.com/display/SQF/combatMode) (<https://sqf.bisimulations.com/display/SQF/combatMode>)
- [setCombatMode](https://sqf.bisimulations.com/display/SQF/setCombatMode) (<https://sqf.bisimulations.com/display/SQF/setCombatMode>)
- [unitCombatMode](https://sqf.bisimulations.com/display/SQF/unitCombatMode) (<https://sqf.bisimulations.com/display/SQF/unitCombatMode>)
- [setUnitCombatMode](https://sqf.bisimulations.com/display/SQF/setUnitCombatMode)  
(<https://sqf.bisimulations.com/display/SQF/setUnitCombatMode>)

4. In **Variable Name**, enter the Order waypoint name, which can be used in SQF scripts.

5. 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.

6. Click **OK**.

The Pursue Order behavior is set up.

 **WARNING**

Bohemia Interactive Simulations advises scenario Administrators not to change the **Advanced** settings for the behavior to work correctly.

### 10.10.4.3.1 Target Specification

You can explicitly set the target enemy to pursue in Prepare / Preview / Execute / Trainee (C2) mode.

**Follow these steps:**

1. Right-click the Pursue Order waypoint, and select **Select Target**.
2. Click the enemy group to pursue.

The enemy group is set as the target group to pursue.

 **NOTE**

It is not possible to set a single enemy unit as a target to pursue. The target has to be a group.

#### 10.10.4.4 Suppress Order

The infantry and / or vehicle group forms a firing line and starts firing at the given position area (the location of the [\(F3\) Waypoints Editor Object \(on page 416\)](#) on the map).

**Image-97: Suppress Order settings**



**Follow these steps:**

1. Select the **(F3) Waypoints** Editor Object from the Editor Objects List, and place it on the map.
2. In the **Behavior** list, select **Suppress**.

3. In the **Weapon Control Status** drop-down, select the behavior for engaging enemy forces, when they are encountered:

Option	Description
No Change	No change in the behavior upon encountering enemy forces.
Weapons Free	Fire at enemy forces, when they are encountered.
Hold Fire	Do not fire at enemy forces, when they are encountered.

 **NOTE**

The Weapon Control Status is related to the following SQF commands:

- [combatMode](https://sqf.bisimulations.com/display/SQF/combatMode) (<https://sqf.bisimulations.com/display/SQF/combatMode>)
- [setCombatMode](https://sqf.bisimulations.com/display/SQF/setCombatMode) (<https://sqf.bisimulations.com/display/SQF/setCombatMode>)
- [unitCombatMode](https://sqf.bisimulations.com/display/SQF/unitCombatMode) (<https://sqf.bisimulations.com/display/SQF/unitCombatMode>)
- [setUnitCombatMode](https://sqf.bisimulations.com/display/SQF/setUnitCombatMode)  
(<https://sqf.bisimulations.com/display/SQF/setUnitCombatMode>)

4. In **Radius**, set the fire support radius (in meters).
5. In **Variable Name**, enter the Order waypoint name, which can be used in SQF scripts.
6. 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.

7. Click **OK**.

The Suppress Order behavior is set up.

 **WARNING**

Bohemia Interactive Simulations advises scenario Administrators not to change the **Advanced** settings for the behavior to work correctly.

#### 10.10.4.4.1 Range Visualization

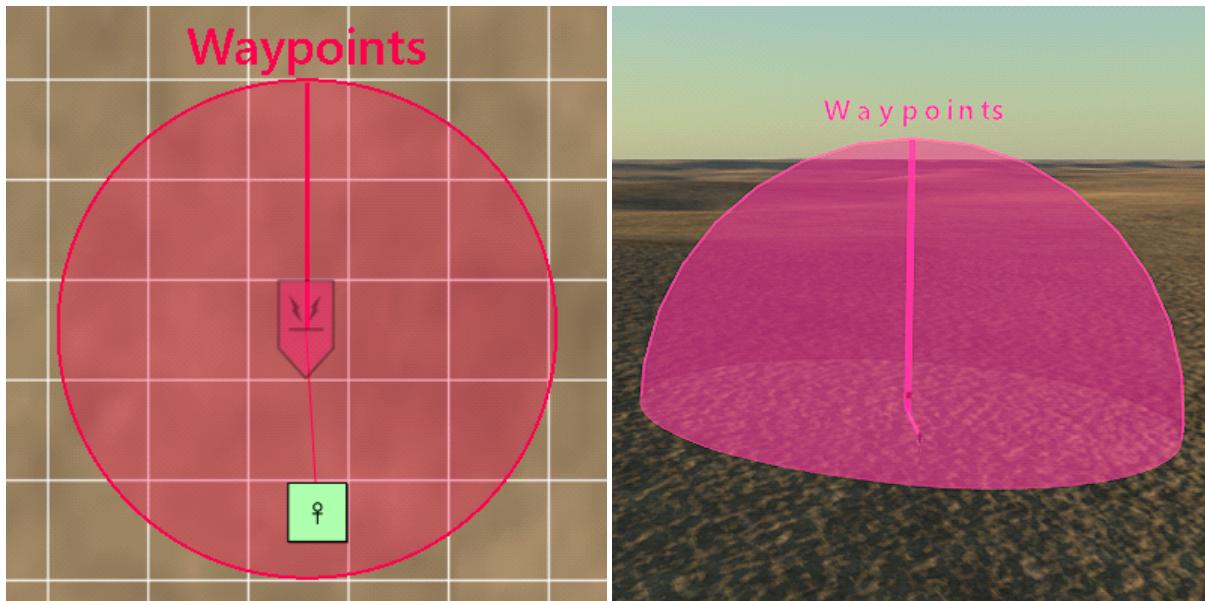
In VBS4, the **Radius** of the Suppress Order waypoint can be displayed as a range visualization.

##### 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-98: 2D 3D range visualizations**



## 10.10.4.5 Defend Order

The infantry and / or vehicle group moves to the given position (the location of the [\(F3\) Waypoints Editor Object \(on page 416\)](#) on the map), forms a line and begins to defend it by firing at enemy forces in the position area.

**Image-99: Defend Order settings**



### Follow these steps:

1. Select the **(F3) Waypoints** Editor Object from the Editor Objects List, and place it on the map.
2. In the **Behavior** list, select **Defend**.

3. In the **Weapon Control Status** drop-down, select the behavior for engaging enemy forces, when they are encountered:

Option	Description
No Change	No change in the behavior upon encountering enemy forces.
Weapons Free	Fire at enemy forces, when they are encountered.
Hold Fire	Do not fire at enemy forces, when they are encountered.

 **NOTE**

The Weapon Control Status is related to the following SQF commands:

- [combatMode](https://sqf.bisimulations.com/display/SQF/combatMode) (<https://sqf.bisimulations.com/display/SQF/combatMode>)
- [setCombatMode](https://sqf.bisimulations.com/display/SQF/setCombatMode) (<https://sqf.bisimulations.com/display/SQF/setCombatMode>)
- [unitCombatMode](https://sqf.bisimulations.com/display/SQF/unitCombatMode) (<https://sqf.bisimulations.com/display/SQF/unitCombatMode>)
- [setUnitCombatMode](https://sqf.bisimulations.com/display/SQF/setUnitCombatMode)  
(<https://sqf.bisimulations.com/display/SQF/setUnitCombatMode>)

4. In **Variable Name**, enter the Order waypoint name, which can be used in SQF scripts.

5. 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.

6. Click **OK**.

The Defend Order behavior is set up.

 **WARNING**

Bohemia Interactive Simulations advises scenario Administrators not to change the **Advanced** settings for the behavior to work correctly.

## 10.10.4.6 Mount Order

The infantry team moves to the given position (the location of the [\(F3\) Waypoints Editor Object \(on page 416\)](#) on the map), and mounts the nearest vehicle at the selected vehicle positions (crew, cargo, or both).

### **WARNING**

For the Mount Order to execute, the vehicle needs to be within the allowed radius from the Mount Order waypoint (the radius is determined by allotting 50 m for every ORBAT level). Alternatively, you can explicitly set the target vehicle to mount - see [Target Specification \(on page 474\)](#).

### **NOTE**

The following considerations apply:

- You can assign the Mount Order to a mixed group of units and vehicles. This means that the units already mounted do nothing, while the units on foot mount the vehicle. Assigning a Mount Order to a vehicle or a group of vehicle does nothing.
- When used with aircraft, only rotary-wing aircraft are supported.
- Can be used with watercraft. Units can only mount on land.

To order units to dismount from vehicles, see the [Dismount Order \(on page 475\)](#).

**Image-100: Mount Order settings**



**Follow these steps:**

1. Select the **(F3) Waypoints** Editor Object from the Editor Objects List, and place it on the map.
2. In the **Behavior** list, select **Mount**.
3. In the **Weapon Control Status** drop-down, select the behavior for engaging enemy forces, when they are encountered:

Option	Description
<b>No Change</b>	No change in the behavior upon encountering enemy forces.
<b>Weapons Free</b>	Fire at enemy forces, when they are encountered.
<b>Hold Fire</b>	Do not fire at enemy forces, when they are encountered.

**NOTE**

The Weapon Control Status is related to the following SQF commands:

- [combatMode](https://sqf.bisimulations.com/display/SQF/combatMode) (<https://sqf.bisimulations.com/display/SQF/combatMode>)
- [setCombatMode](https://sqf.bisimulations.com/display/SQF/setCombatMode) (<https://sqf.bisimulations.com/display/SQF/setCombatMode>)
- [unitCombatMode](https://sqf.bisimulations.com/display/SQF/unitCombatMode) (<https://sqf.bisimulations.com/display/SQF/unitCombatMode>)
- [setUnitCombatMode](https://sqf.bisimulations.com/display/SQF/setUnitCombatMode)  
(<https://sqf.bisimulations.com/display/SQF/setUnitCombatMode>)

4. In the **Crew Role Category** drop-down, select vehicle mount positions:

Option	Description
All	Mount both as crew and cargo.
Crew	Mount as crew.
Cargo	Mount as cargo.

 **NOTE**

The following considerations apply:

- If the capacity of one vehicle is exceeded and there are additional vehicles within the allowed radius from the Mount Order waypoint (the radius is determined by allotting 50 m for every ORBAT level), the units mount the next vehicle, as needed, occupying the positions of the selected type.
- If **Crew Role Category** is set to **Crew** or **All**, and if a non-cargo vehicle position (see Vehicle Positions in the VBS4 Trainee Manual), such as the Driver, Commander, Gunner, and so on, becomes free or is free and should be occupied, other units (including those in the cargo, if there are any) try to fill in for the missing unit at that position.
- Destroyed vehicles are not mounted. Also, if the vehicle is destroyed, any units inside the vehicle that are capable of dismounting (not dead or incapacitated) automatically do so.

5. In **Variable Name**, enter the Order waypoint name, which can be used in SQF scripts.

6. 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.

7. Click **OK**.

The Mount Order behavior is set up.

 **WARNING**

Bohemia Interactive Simulations advises scenario Administrators not to change the **Advanced** settings for the behavior to work correctly.

**TIP**

If you want the vehicle to drive to the pick-up location before the units mount, you can synchronize the Mount waypoint / Order with another Order (for example, the [Advance Order \(on page 461\)](#)). For more information, see [Waypoint Synchronization \(on page 424\)](#).

#### 10.10.4.6.1 Target Specification

You can explicitly set the target vehicle to mount in Prepare / Preview / Execute / Trainee (C2) mode.

**Follow these steps:**

1. Right-click the Mount Order waypoint, and select **Select Target**.
2. Click the vehicle to mount.

The vehicle is set as the target vehicle to mount.

### 10.10.4.7 Dismount Order

The infantry teams dismounts the vehicle from the selected vehicle positions (crew, cargo, or both).

#### NOTE

The following considerations apply:

- The Dismount Order can be assigned to a group of units, occupying one or more vehicles (that is, if the group of units is distributed among multiple vehicles). Alternatively, if the group of units is inside one vehicle, you can assign the Dismount Order to that vehicle.



#### WARNING

If the units are distributed among several vehicles, and you want them to dismount from crew or cargo positions, make sure the positions they occupy are of the same type (crew, cargo).

- The Dismount Order waypoint position (the location of the [\(F3\) Waypoints Editor Object \(on page 416\)](#) on the map) has no effect on where the units dismount - the dismount happens immediately as soon as the Dismount Order waypoint becomes active.
- You can assign the Dismount Order to a mixed group of units and vehicles. This means that the units already on foot do nothing, while the units inside the vehicle dismount. Assigning a Dismount Order to a group of units on foot does nothing.
- When used with aircraft (only rotary-wing aircraft are supported), units can only dismount if the aircraft is on the ground.
- Can be used with watercraft. Units can only dismount on land. The maximum dismount distance between the shore and the watercraft is 50 m.

To order units to mount vehicles, see the [Mount Order \(on page 471\)](#).

## Image-101: Dismount Order settings



### Follow these steps:

1. Select the **(F3) Waypoints** Editor Object from the Editor Objects List, and place it on the map.
2. In the **Behavior** list, select **Dismount**.
3. In the **Weapon Control Status** drop-down, select the behavior for engaging enemy forces, when they are encountered:

Option	Description
No Change	No change in the behavior upon encountering enemy forces.
Weapons Free	Fire at enemy forces, when they are encountered.
Hold Fire	Do not fire at enemy forces, when they are encountered.



### NOTE

The Weapon Control Status is related to the following SQF commands:

- [combatMode](https://sqf.bisimulations.com/display/SQF/combatMode) (<https://sqf.bisimulations.com/display/SQF/combatMode>)
- [setCombatMode](https://sqf.bisimulations.com/display/SQF/setCombatMode) (<https://sqf.bisimulations.com/display/SQF/setCombatMode>)
- [unitCombatMode](https://sqf.bisimulations.com/display/SQF/unitCombatMode) (<https://sqf.bisimulations.com/display/SQF/unitCombatMode>)
- [setUnitCombatMode](https://sqf.bisimulations.com/display/SQF/setUnitCombatMode)  
(<https://sqf.bisimulations.com/display/SQF/setUnitCombatMode>)

4. In the **Crew Role Category** drop-down, select vehicle dismount positions:

Option	Description
All	Dismount both crew and cargo units.
Crew	Dismount crew units.
Cargo	Dismount cargo units.

5. In **Variable Name**, enter the Order waypoint name, which can be used in SQF scripts.

6. 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.

7. Click **OK**.

The Dismount Order behavior is set up.



#### TIP

If you want the vehicle to drive away from the drop-off location after the units dismount, you can synchronize the Dismount waypoint / Order with another Order (for example, the [Advance Order \(on page 461\)](#)). For more information, see [Waypoint Synchronization \(on page 424\)](#).

### 10.10.4.8 Return to Formation Order

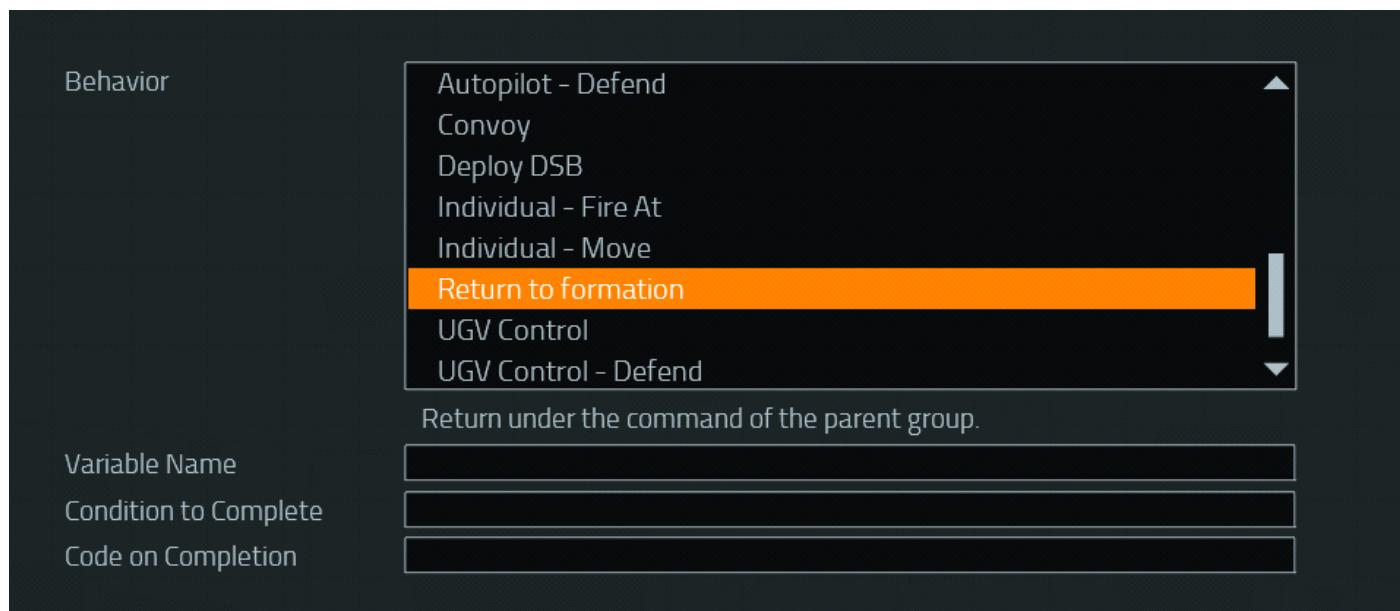
The infantry / vehicle group returns back under the command of a higher-echelon group.

#### **i** NOTE

Sub-groups can execute Orders apart from and in parallel with the Order executed by their larger group (for example, a higher echelon) - see [Interoperability Tutorial \(on page 451\)](#).

The Return to Formation Order is used to enable sub-groups to return to the formation of the larger group, and to continue executing the larger-group Order.

#### Image-102: Return to Formation Order settings



#### Follow these steps:

1. Select the **(F3) Waypoints** Editor Object from the Editor Objects List, and place it on the map.
2. In the **Behavior** list, select **Return to Formation**.
3. In **Variable Name**, enter the Order waypoint name, which can be used in SQF scripts.
4. Set the Order waypoint completion settings:

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

5. Click **OK**.

The Return to Formation Order behavior is set up.

### 10.10.4.9 Tactical Move Order

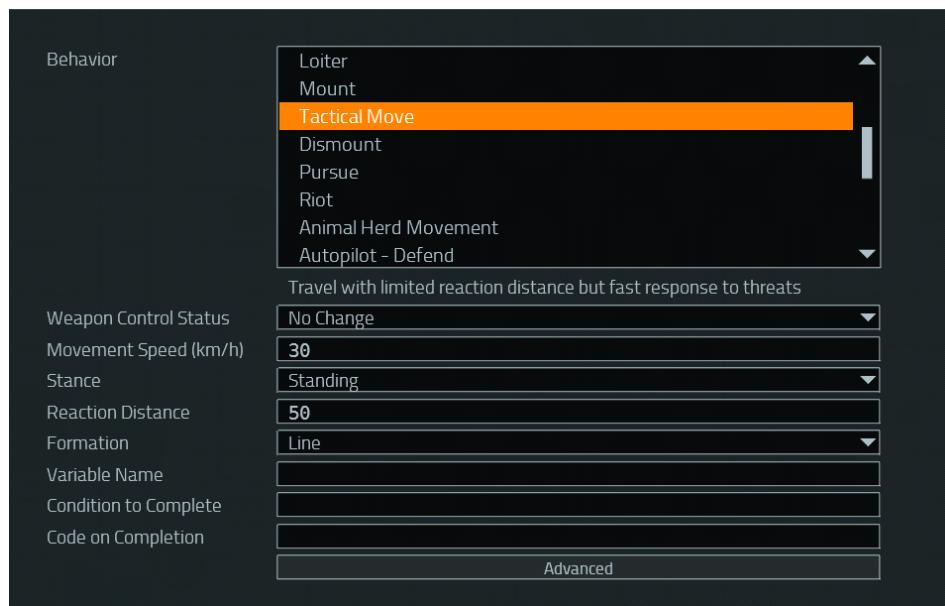
The infantry group performs a tactical move to the given position (the location of the [\(F3\) Waypoints Editor Object \(on page 416\)](#) on the map), using a given stance, formation, and a maximum range to engage enemy forces at.

#### NOTE

The following considerations apply:

- When an enemy is spotted within the given reaction distance, or on incoming fire from anywhere (regardless of range), the group takes cover near its current position and holds the position indefinitely.
- Unlike the [Advance Order \(on page 461\)](#), units do not take cover at the destination position.
- The Tactical Move Order can only be used with infantry groups.

**Image-103: Tactical Move Order settings**



#### Follow these steps:

1. Select the **(F3) Waypoints** Editor Object from the Editor Objects List, and place it on the map.
2. In the **Behavior** list, select **Tactical Move**.

3. In the **Weapon Control Status** drop-down, select the behavior for engaging enemy forces, when they are encountered:

Option	Description
No Change	No change in the behavior upon encountering enemy forces.
Weapons Free	Fire at enemy forces, when they are encountered.
Hold Fire	Do not fire at enemy forces, when they are encountered.

**NOTE**

The Weapon Control Status is related to the following SQF commands:

- [combatMode](https://sqf.bisimulations.com/display/SQF/combatMode) (<https://sqf.bisimulations.com/display/SQF/combatMode>)
- [setCombatMode](https://sqf.bisimulations.com/display/SQF/setCombatMode) (<https://sqf.bisimulations.com/display/SQF/setCombatMode>)
- [unitCombatMode](https://sqf.bisimulations.com/display/SQF/unitCombatMode) (<https://sqf.bisimulations.com/display/SQF/unitCombatMode>)
- [setUnitCombatMode](https://sqf.bisimulations.com/display/SQF/setUnitCombatMode)  
(<https://sqf.bisimulations.com/display/SQF/setUnitCombatMode>)

4. In **Movement Speed (km/h)**, set the maximum speed (in km/h) at which the infantry group should move to the destination position.
5. In the **Stance** drop-down, select the stance (Standing, Crouched, Prone) for the infantry group to move in.
6. In **Reaction Distance**, set the maximum range (in meters) to detect enemy forces at.
7. In the **Formation** drop-down, select the formation for the infantry group to move in:
- |                    |                |                 |
|--------------------|----------------|-----------------|
| • Line             | • Wedge        | • Echelon Right |
| • File             | • Column       | • Vee           |
| • Staggered Column | • Echelon Left | • Diamond       |
8. In **Variable Name**, enter the Order waypoint name, which can be used in SQF scripts.
9. 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.

10. Click **OK**.

The Tactical Move Order behavior is set up.

 **WARNING**

Bohemia Interactive Simulations advises scenario Administrators not to change the **Advanced** settings for the behavior to work correctly.

## 10.11 Convoy AI

You can create a convoy in VBS4 using the (F3) Waypoints Editor Object that simulates the movement of a vehicle convoy. For more information on convoy properties, see [Convoy Order \(on page 494\)](#).

The convoy can be assigned waypoints (see [Waypoints \(on page 421\)](#)) and use branching (see [Branching Waypoints \(on page 423\)](#)).

The convoy Control AI behavior has the following use cases:

- [Fully Autonomous Convoy \(on the next page\)](#) - A convoy that is fully autonomous, with vehicle crews that consist only of Control AI entities.
- [Pause / Resume Convoy \(on page 485\)](#) - A convoy that can pause / resume movement, using the [Convoy SQF Functions \(on page 492\)](#).
- [Player Units in Convoy \(on page 490\)](#) - Transporting player units in a convoy.

## 10.11.1 Fully Autonomous Convoy

You can create a fully autonomous convoy, with vehicle crews that are Control AI entities.

**Follow these steps:**

1. In the Editor (Prepare Mode), place several vehicles on the map using the **(F4) Vehicle** Editor Object in the Editor Objects List.

These vehicles are used for the convoy.

2. Rotate and position the vehicles so that they face the direction of the convoy movement.

The vehicles set the convoy order autonomously, based on how they are positioned on the road. The vehicle closest to the convoy destination is chosen as the lead.

3. To form the vehicles into a convoy, link the vehicles together, so that they are all in the same group.

 **NOTE**

It does not matter which vehicle is set as the group leader. Also, you can link new vehicles to the convoy group (by linking to the convoy leader) in the Editor (Execute Mode), while the convoy is already driving - the new vehicles follow as part of the convoy.

4. To assign a destination, create a convoy waypoint (see [Waypoints \(on page 421\)](#)) by right-clicking the convoy group marker, selecting **Orders > Assign New Waypoint**, and clicking a position on the map, where the convoy waypoint needs to be created.

 **WARNING**

If you need to create several convoy waypoints connected to one another, position them in such a way that would not require the convoy to turn around. For more information, see the **Convoy** section in Known Issues.

5. Set the convoy properties (see [Convoy Order \(on page 494\)](#)) and click **OK**.
6. Preview the mission.

The convoy starts moving.

**Road usage** controls whether the convoy drives in the middle of the road (the **Use only roads** option), whether it respects lanes (the **Use only roads, respect lanes** option), whether it drives off the road (the **Ignore roads** option), or whether it prefers driving on roads while also being able to drive off-road (the **Prefer roads** option). The **Use only roads, respect lanes** option should be used in case there are other vehicles on the road, such as civilian traffic (see Define Traffic Flows).

A convoy is able to move through most bushes and fences. All objects which cannot be moved through are excluded from the vehicle navigation mesh.

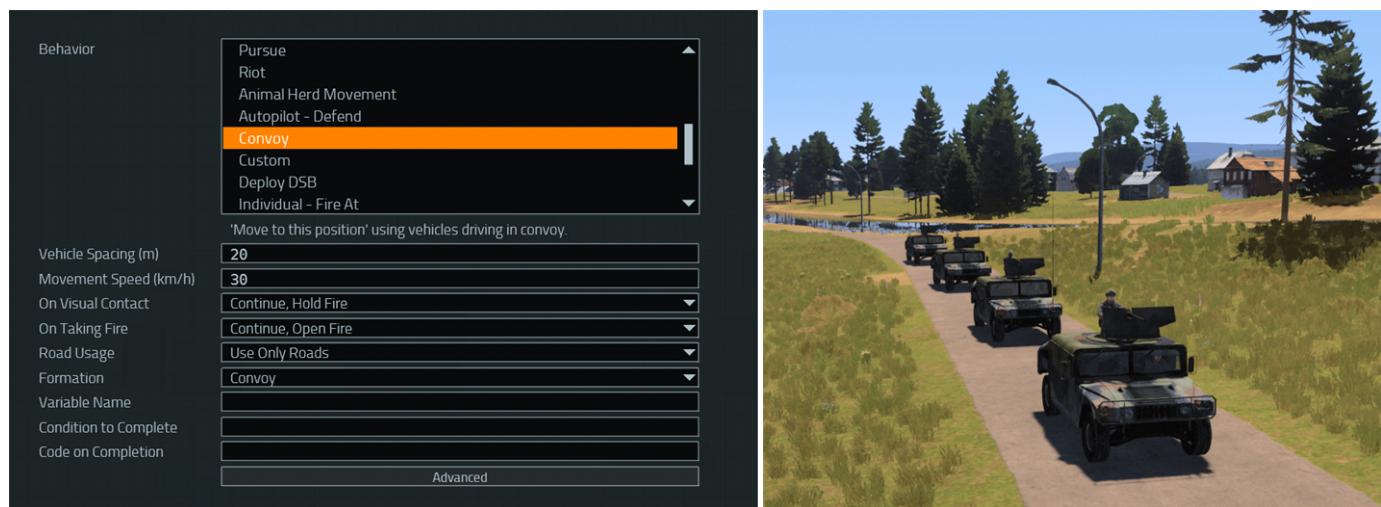
Convoy navigation with the **Ignore roads** option set may be limited in some areas:

Limitation	Solution
<b>Urban area</b>	Setting the convoy to drive on roads through the city or village may avoid issues with navigation through these areas.
<b>High object density area (for example, with small rocks, forests)</b>	Adding intermediate waypoints or removing objects from the high density area improves the navigation.

### TIP

For multi-lane traffic, if **Use Only Roads, Respect Lanes** is used, you can either use the **AI Debug** option in VBS Geo (see VBS Geo User Interface in the VBS Geo Manual), or the **Show Roads and Generate Roads** options in the AI Debug Panel (see Control AI Visualization in the VBS Control AI Manual), to see how your road network is set up. Also, to configure road lanes, see **Lanes** in Placing and Editing Roads in the VBS Geo Manual.

**Image-104: Convoy dialog and example**



## 10.11.2 Pause / Resume Convoy

You can control the convoy behavior during its execution by pausing / resuming its movement. Convoy movement can be paused / resumed using the SQF functions [fn\\_vbsCon\\_pauseConvoy \(on page 492\)](#) / [fn\\_vbsCon\\_resumeConvoy \(on page 493\)](#) in the following ways (each way is based on the [Fully Autonomous Convoy \(on page 483\)](#) setup), for example:

- Using a Radio Trigger (below)
- Using an Area Trigger (on page 487)
- Using the Player Quick Menu (on page 489)

### Using a Radio Trigger

You can create a basic user interface to control the convoy movement using two radio triggers - one to pause the convoy movement, and another to resume it.

#### Follow these steps:

1. Set up the convoy as described in the [Fully Autonomous Convoy \(on page 483\)](#) section.
2. Set the name of the lead convoy vehicle to `leadVehicle`.



#### TIP

Alternatively, you can use any other vehicle in the convoy. Since `leadVehicle` can get destroyed during the mission, it is best to save the convoy group of `leadVehicle` in a variable.

```
convoyGroup = group leadVehicle
```

3. Set the **Initialization Statements** of `leadVehicle` to:

```
convoyGroup = group leadVehicle
```

4. To populate the radio menu with a radio call to pause the convoy, create a trigger:

- **Text:** Pause convoy
- **Activation:** Radio Alpha
- **Repeatedly:** true
- **On Activation:**

```
convoyGroup call fn_vbsCon_pauseConvoy
```

5. To populate the radio menu with a radio call to resume the convoy, create a trigger:

- **Text:** Resume convoy
- **Activation:** Radio Bravo
- **Repeatedly:** true
- **On Activation:**

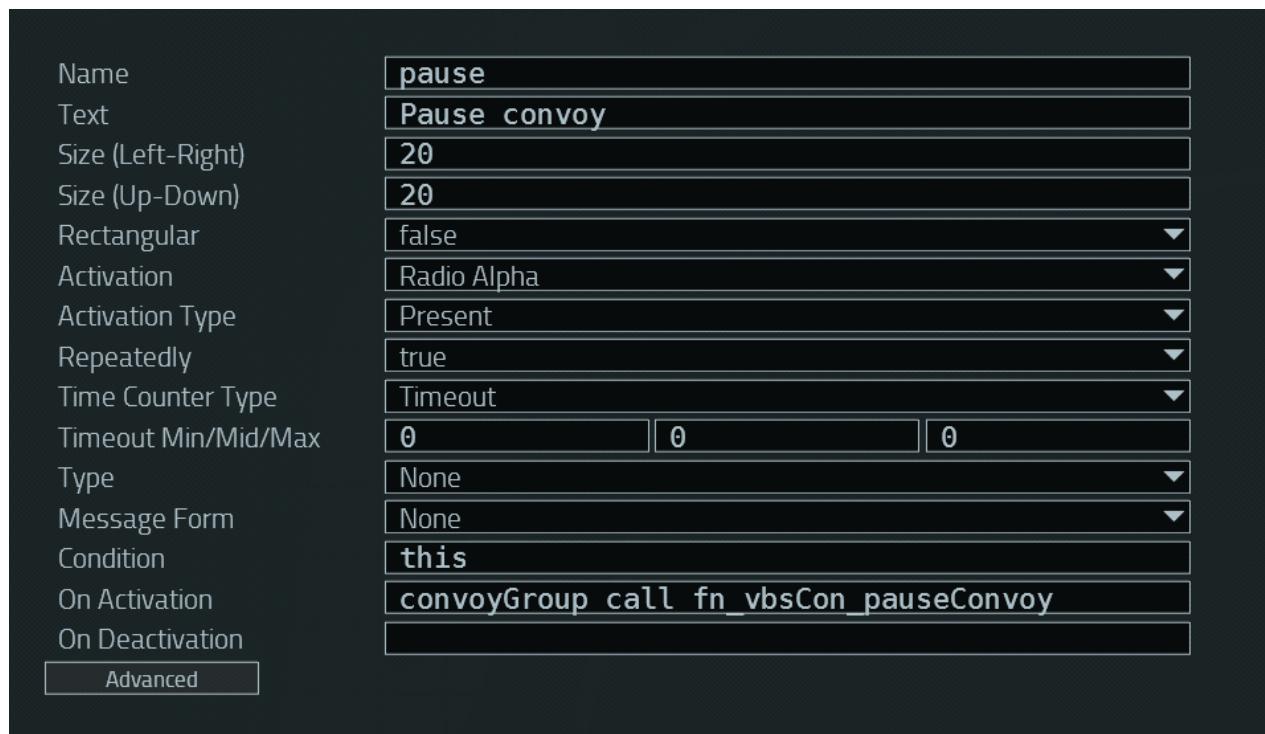
```
convoyGroup call fn_vbsCon_resumeConvoy
```

6. Preview the mission. To view the two radio calls:

- If you are an administrator, switch to the Editor (Execute Mode), then pause / resume the convoy by clicking the radio in the Editor (Execute Mode).
- Any group leader in the scenario can access the same convoy commands by pressing **0-0** to access the radio menu.

The two radio calls pause / resume the convoy movement.

**Image-105: The radio trigger dialog**



### Image-106: The radio menu with the two radio calls



### Using an Area Trigger

Alternatively to radio triggers, you can pre-script the convoy to pause / resume movement by using area triggers.

#### Follow these steps:

1. Set up the convoy as described in the [Fully Autonomous Convoy \(on page 483\)](#) section.
2. Set the name of the lead convoy vehicle to `leadVehicle`.



#### TIP

Alternatively, you can use any other vehicle in the convoy. Since `leadVehicle` can get destroyed during the mission, it is best to save the convoy group of `leadVehicle` in a variable.

```
convoyGroup = group leadVehicle
```

3. Set the **Initialization Statements** of `leadVehicle` to:

```
convoyGroup = group leadVehicle
```

4. Create a stopping zone for `leadVehicle` to enter, using an area trigger.

Set the area trigger to:

**Size:** Can be relatively small to avoid triggering the area by some other unit.

**Activation:** BLUFOR

**Activation Type:** Present

**On Activation:**

```
convoyGroup call fn_vbsCon_pauseConvoy
```

5. Preview the mission.

The convoy stops moving whenever any BLUFOR vehicle or unit enters the zone designated by the area trigger.



**TIP**

To modify the trigger so that it only causes the convoy to stop when `leadVehicle` enters the trigger, change the trigger **Condition** to:

```
this and (leadVehicle in thislist)
```

To resume convoy movement, run [fn\\_vbsCon\\_resumeConvoy \(on page 493\)](#).

**Image-107: The area trigger dialog**

The screenshot shows the 'Area Trigger' dialog box with the following settings:

Name	convoyIn
Text	Pause convoy once arrived
Size (Left-Right)	20
Size (Up-Down)	20
Rectangular	false
Activation	BLUFOR
Activation Type	Present
Repeatedly	false
Time Counter Type	Timeout
Timeout Min/Mid/Max	0   0   0
Type	None
Message Form	None
Condition	this
On Activation	<code>convoyGroup call fn_vbsCon_pauseConvoy</code>
On Deactivation	
Advanced	

## Using the Player Quick Menu

You can create user actions in the Quick Menu to pause / resume the convoy movement.

### Follow these steps:

1. Set up a convoy as described in the [Fully Autonomous Convoy \(on page 483\)](#) section.
2. Set the name of the lead convoy vehicle to `leadVehicle`.



#### TIP

Alternatively, you can use any other vehicle in the convoy.

3. Create an `init.sqf` file in the mission, with the following code to add to user actions (pause and resume) to the player:

```
_i1 = player addAction ["Pause convoy", "pause.sqf", leadVehicle];  
_i2 = player addAction ["Resume convoy", "resume.sqf", leadVehicle];
```

For more information, see [addAction](#) (<https://sqf.bisimulations.com/display/SQF/addAction>).

4. Create a `pause.sqf` file in the mission, with the following code:

```
_leadVehicle = _this select 3;  
_leadVehicle call fn_vbsCon_pauseConvoy
```

5. Create a `resume.sqf` file in the mission, with the following code:

```
_leadVehicle = _this select 3;  
_leadVehicle call fn_vbsCon_resumeConvoy
```

6. Preview the mission and use `Pause convoy` and `Resume convoy` user actions to pause / resume the convoy movement.

The convoy pauses / resumes its movement when the user action resumes.

## 10.11.3 Player Units in Convoy

You can transport player units in a Control AI convoy. The player can have different roles in a convoy vehicle:

- [Player Start as Driver \(below\)](#)
- [Player Entry as Cargo \(below\)](#)
- [Player Entry as Gunner or Commander \(on the next page\)](#)

### NOTE

Switching positions in Control AI convoy vehicles at runtime is not fully supported.

### Player Start as Driver

Players can start the mission as drivers in Control AI convoys.

#### Follow these steps:

1. In the Editor (Prepare Mode), place several vehicles on the map using the **(F4) Vehicle** Editor Object in the Editor Objects List, and make sure to select **Player** or **Playable** (if you want to allow Administrator / Instructor players to switch to Control AI drivers at mission runtime) in the Object Properties dialog for each vehicle.
2. Follow the process from Step 2 onwards in the [Fully Autonomous Convoy \(on page 483\)](#) section.

Players start the mission as convoy drivers.

### Player Entry as Cargo

Players can enter Control AI convoy vehicles as cargo at mission runtime.

#### Follow these steps:

1. Set up a convoy as described in the [Fully Autonomous Convoy \(on page 483\)](#) section.
2. Set the name of the lead convoy vehicle to `leadVehicle`.

### NOTE

Alternatively, you can use any other vehicle in the convoy. Make sure there are unoccupied seats in some of the convoy vehicles.

3. The goal is to keep the convoy paused at the beginning - so players have time to enter some of the vehicles. To achieve this, do one of the following:
  - Unlink the convoy waypoint from the group until the players are in the cargo.
  - Use one of the three [Pause / Resume Convoy \(on page 485\)](#) techniques.
4. Players can now get in the convoy vehicles using the IWV menu.

The players are in the convoy as cargo.

### Player Entry as Gunner or Commander

Players can enter Control AI convoy vehicles as gunners or commanders at mission runtime.

To set up a scenario where players are gunners or commanders in vehicles, use the same setup as with players as cargo.

#### Follow these steps:

1. Create a convoy that can be paused and pause it.
2. Players in the mission can enter the vehicles using the IWV interface (see Interact with Vehicles Interface (IWV) in the VBS4 Trainee Manual) and occupy any position in the vehicle (except the driver position), including gunner and commander positions.

#### **i** NOTE

If a position is already occupied by an AI unit, the unit is removed from the vehicle, according to the vehicle entry rules in VBS4. Control AI drivers can be created next to empty vehicles and moved into the these vehicles on mission start, using SQF commands. This prevents some positions from being already occupied.

3. Resume the convoy once all the players are inside the vehicles.

The players are in the convoy as gunners / commanders.

#### Image-108: The IWV interface in one of the convoy vehicles



## 10.11.4 Convoy SQF Functions

The SQF functions that pause / resume convoy movement are:

- [fn\\_vbsCon\\_pauseConvoy \(below\)](#)
- [fn\\_vbsCon\\_resumeConvoy \(on the next page\)](#)

### 10.11.4.1 fn\_vbsCon\_pauseConvoy

Pauses convoy movement.

The pause is executed as follows:

1. Convoy lead vehicle stops.
2. Other convoy vehicles continue driving until they reach the correct spacing distance from the vehicle before them.

#### NOTE

Gunner behavior remains unchanged. If the convoy reacts to lost vehicles, the reaction is completed before the convoy stops.

#### Syntax:

```
vehicle call fn_vbsCon_pauseConvoy
```

#### Alternative Syntax:

```
convoyGroup call fn_vbsCon_pauseConvoy
```

#### Parameters:

- vehicle: Object - Lead convoy vehicle.
- convoyGroup: Group - Convoy vehicle group.

#### Return Values:

Nothing



#### EXAMPLE

```
// Pauses convoy maneuver assigned to the group of vehicle leadVehicle1  
(group leadVehicle1) call fn_vbsCon_pauseConvoy  
  
// The same as the previous example, but the group is selected automatically  
leadVehicle1 call fn_vbsCon_pauseConvoy
```

## 10.11.4.2 fn\_vbsCon\_resumeConvoy

Resumes convoy movement after a pause.

The movement has to be paused using [fn\\_vbsCon\\_pauseConvoy](#) (on the previous page), otherwise, the function does nothing.

### Syntax:

```
vehicle call fn_vbsCon_resumeConvoy
```

### Alternative Syntax:

```
convoyGroup call fn_vbsCon_resumeConvoy
```

### Parameters:

- vehicle: Object - Lead convoy vehicle.
- convoyGroup: Group - Convoy vehicle group.

**Return Values:** Nothing



### EXAMPLE

```
// Resumes convoy maneuver assigned to the
(group leadVehicle1) call fn_vbsCon_resumeConvoy

// The same as the previous example, but the group
leadVehicle1 call fn_vbsCon_resumeConvoy
```

## 10.11.5 Convoy Order

Assigns a convoy movement behavior to a group of vehicles. The convoy destination is the location of the (F3) Waypoints Editor Object.

For convoy uses cases, see [Convoy AI \(on page 482\)](#).

**Image-109: Convoy Order settings**



### Follow these steps:

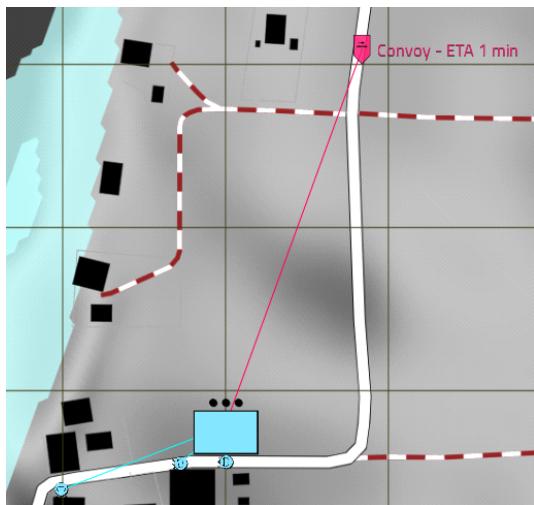
1. Select the **(F3) Waypoints** Editor Object from the Editor Objects List, and place it on the map.
2. In the **Behavior** list, select **Convoy**.
3. Set the [Convoy Settings \(on the next page\)](#).
4. Set the [Waypoint Completion Settings \(on page 497\)](#).
5. Click **OK** to confirm.
6. Once the Convoy Order is configured, you need to link it (see [Waypoints \(on page 421\)](#) for more information) to the lead convoy vehicle.

The Convoy Order behavior is set up.

While the convoy is moving, an ETA is displayed next to the Editor Object on the map for the current order. If the convoy stops (for instance during an engagement), the information about the stop is indicated instead of the ETA:

**NOTE**

Waypoint name types and any waypoint status information is only displayed, if the waypoint is selected.



## Convoy Settings

Setting	Description
<b>Vehicle Spacing (m)</b>	Desired spacing (in meters) between the vehicles in the convoy.
<b>Movement Speed (km/h)</b>	Suggested travel speed (in km/h) of the convoy (limited by the vehicle with the smallest maximal speed and / or the smallest acceleration).
<b>On Visual Contact</b>	Controls the reaction when spotting the enemy. <ul style="list-style-type: none"> <li><b>Continue, Hold Fire</b> (default) - Convoy continues moving towards the destination and gunners do not fire at the enemy.</li> <li><b>Continue, Open Fire</b> - Convoy continues moving towards the destination and gunners open fire at enemy entities.</li> </ul>
<b>On Taking Fire</b>	Controls the reaction to incoming enemy fire (defined by shots impacting or passing near the convoy at a short distance) - has a higher priority than <b>On Visual Contact</b> . <ul style="list-style-type: none"> <li><b>Continue, Hold Fire</b> - Convoy continues moving towards the destination and gunners do not fire at enemy entities.</li> <li><b>Continue, Open Fire</b> (default) - Convoy continues moving towards the destination and gunners open fire at enemy entities.</li> <li><b>Halt Until Clear, Open Fire</b> - Convoy stops while the gunners open fire at the enemy. The convoy automatically resumes its movement as the engagement is concluded.</li> </ul>

Setting	Description
<b>Road Usage</b>	<p>Controls whether the convoy should use roads for moving.</p> <ul style="list-style-type: none"> <li>• <b>Use Only Roads</b> - Drives in the middle of the road, without respecting road lanes or directions.</li> <li>• <b>Use Only Roads, Respect Lanes</b> - Drives on the road, respecting road lanes and directions.</li> <li>• <b>Ignore Roads</b> - Ignores roads and moves directly to the waypoint.</li> <li>• <b>Prefer Roads</b> - Prefers to move on the road, but can move off-road to bypass obstacles, take shortcuts, or when otherwise required.</li> </ul>
	<b>NOTE</b>
	<p>It is necessary to select <b>Use Only Roads, Respect Lanes</b>, if you want to use military convoys together with civilian vehicles (see Define Traffic Flows). Only convoys respecting lanes can encounter civilian vehicles on the same road, without the risk of collision.</p>
	<p>Off-road convoys cannot drive through areas with a high density of obstacles.</p>
	<b>TIP</b>
	<p>For multi-lane traffic, if <b>Use Only Roads, Respect Lanes</b> is used, you can either use the <b>AI Debug</b> option in VBS Geo (see VBS Geo User Interface in the VBS Geo Manual), or the <b>Show Roads</b> and <b>Generate Roads</b> options in the AI Debug Panel (see Control AI Visualization in the VBS Control AI Manual), to see how your road network is set up. Also, to configure road lanes, see <b>Lanes</b> in Placing and Editing Roads in the VBS Geo Manual.</p>
<b>Formation</b>	<p>Used to define the convoy formation.</p> <p>The available formations are:</p> <ul style="list-style-type: none"> <li>• <b>Convoy</b> (parallel to the direction of the convoy movement)</li> <li>• <b>Staggered Column</b></li> <li>• <b>Line</b> (perpendicular to the direction of the convoy movement)</li> <li>• <b>Wedge</b></li> <li>• <b>Vee</b></li> </ul>
<b>Variable Name</b>	In <b>Variable Name</b> , enter the Order waypoint name, which can be used in SQF scripts.

Setting	Description
<b>Advanced</b>	<p>The advanced settings are:</p> <ul style="list-style-type: none"><li>• <b>Burst</b> - Sets the number of rounds fired in each burst by the convoy gunners during an engagement.</li><li>• <b>Dispersion (degrees)</b> - Sets the dispersion of convoy weapons, allowing you to decrease / increase convoy weapon accuracy.</li><li>• <b>Visibility Range (m)</b> - Can override the default line-of-sight settings for each soldier, allowing you to increase / decrease visual contact reaction distance.</li></ul> <p>Click <b>OK</b> to confirm.</p>

## Waypoint Completion Settings

Set the Order waypoint completion settings:

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

## Aspects of Convoy Behavior

Behavior Aspect	Description
<b>Convoy Ordering</b>	The convoy vehicles are ordered automatically based on distance to destination. The vehicle closest to the destination is selected to drive on point, with the other vehicles being organized in a logical order.

Behavior Aspect	Description
Driving Towards Goal	<p>The convoy uses the following driving behavior:</p> <ul style="list-style-type: none"><li>• The lead vehicle uses the shortest path to the destination, while other vehicles follow, maintaining a distance based on <b>Vehicle Spacing (m)</b>.</li><li>• If the destination is not on the road and the convoy uses roads, the convoy drives to a point on the road that is closest to the actual destination. If the convoy ignores roads, it drives directly to the destination.</li><li>• If the destination is not on the road, the convoy drives to a point on the road that is closest to the actual destination.</li><li>• The convoy tries to reach the destination at all costs. This involves autonomous problem solving along the way (automatically dealing with disabled or destroyed vehicles). The behavior can be affected by setting reactions to contact.</li><li>• Spacing corrections - If the distance between vehicles is higher than the spacing, the vehicles in front may slow down or even stop to let the rest of the convoy catch up.</li><li>• Reaction to contact (based on the <b>On Visual Contact</b> and <b>On Taking Fire</b> settings).</li></ul>
ETA	<p>The ETA functionality is based on the following:</p> <ul style="list-style-type: none"><li>• Measured in minutes, next to the Editor Object in C2 / Editor (Execute Mode).</li><li>• ETA is paused if the convoy is paused using <a href="#">fn_vbsCon_pauseConvoy (on page 492)</a>.</li><li>• Disregards convoy stops for other reasons (for example, road blockage, vehicle losses).</li><li>• The ETA indicates an approximate time that may not be accurate if the convoy has problems driving through the terrain (due to slope or surface conditions).</li></ul>
Movement Interruption	<p>Convoy movement can be interrupted under the following conditions:</p> <ul style="list-style-type: none"><li>• A convoy vehicle becomes disabled. The vehicle crew attempts to mount the nearest vehicle that is not disabled and has free seats, and the disabled vehicle is removed from the simulation after 15 seconds. A vehicle is considered disabled when:<ul style="list-style-type: none"><li>◦ It is damaged to the point of being unable to drive further.</li><li>◦ It has no Control AI driver, who is alive.</li><li>◦ It has no fuel.</li><li>◦ It is overturned.</li></ul></li><li>• Any soldier who is a member of the convoy group is dismounted.</li><li>• There is an obstacle on the road or there is a risk of collision with a moving object.</li></ul>

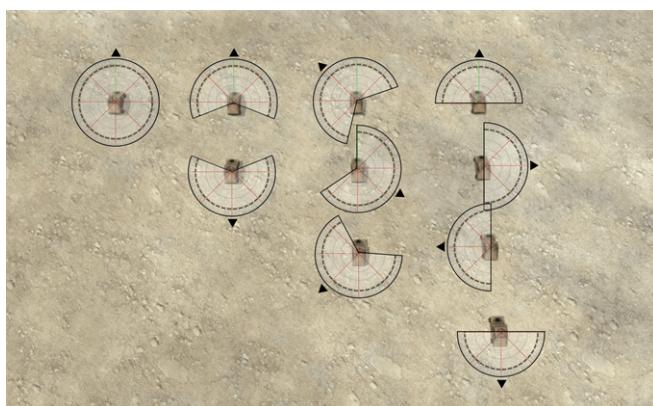
Behavior Aspect	Description
<b>Dismounted Soldier</b>	Any Control AI soldier in the convoy, who ends up dismounted for any reason (vehicle disabled, player occupying the position of the soldier, and so on), boards any other vehicle in the convoy automatically. If no vehicle has free seats, the Control AI soldier is deleted to allow the convoy to keep moving.

## Gunner Behavior

Gunner behavior applies to convoys that use the [Convoy Formation \(on page 496\)](#). In all other formations, gunners perform a 360-degree scan.

Gunner fire angles are defined according to the following convoy illustration:

**Image-110: Fire angles for convoys consisting of 1, 2, 3, and 4 vehicles**



Despite the preferred fire coverage shown in the preceding image, gunners are able to react to threats which get very close to the convoy and are in dead zones not covered by the illustrated firing angles. In such cases, fire coverage can be expanded up to 45 degrees in each direction for a short time, so that very close targets can be intercepted.

When the convoy is engaged and gunners have permission to fire (defined by the **On Visual Contact** and **On Taking Fire** settings), the gunners engage any targets in their arc of fire with bursts of fire from their turret weapon, up to their **Visibility Range (m)**. The length of the burst is determined by the **Burst** setting. When not engaging, the gunners scan their assigned arc of fire.

Gunners that control a turret with a large-caliber cannon (such as tank turrets or self-propelled artillery), or a turret only equipped with rocket or missile launchers (such as anti-air vehicles or anti-tank missile carriers) do not scan their arc of fire, but still turn the turret to engage targets.

**NOTE**

For more than 4 vehicles, vehicles (other than first or last) alternate in the right / left firing angle, the same way as for 4 vehicles.

## 10.11.5.1 Troubleshooting

### Vehicles connected to a Control AI - Convoy waypoint do not move.

Check the following:

- All vehicles are in the same group.
- All vehicles have Control AI drivers (have **Control AI** specified in their object properties).
- Convoy is not intentionally stopped.
- Any of the convoy cars is not blocked by some object on the road.
- Link orientation from the (F3) Waypoints Editor Object to the convoy group is correct.

## 10.11.5.2 Limitations

Vehicles do not stop before obstacles that have their object center positioned outside of the road (for example, houses close to the road are ignored). Some rectangle objects (such as **Chernarus - Fortification > Barrier**, **HESCO**, **5 Elements**, or **Scenery - Military > Concertina wire**) have their center at the object edge, so if they are placed across the road with the center outside, vehicles can crash into them.

## 10.12 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.

The bridge-laying convoy AI expands the [Convoy AI \(on page 482\)](#) use case.

For manual bridge-laying trainee operation, see Bridge Laying - HX45M in the VBS4 Trainee Manual.

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 \(on page 636\)](#).

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**

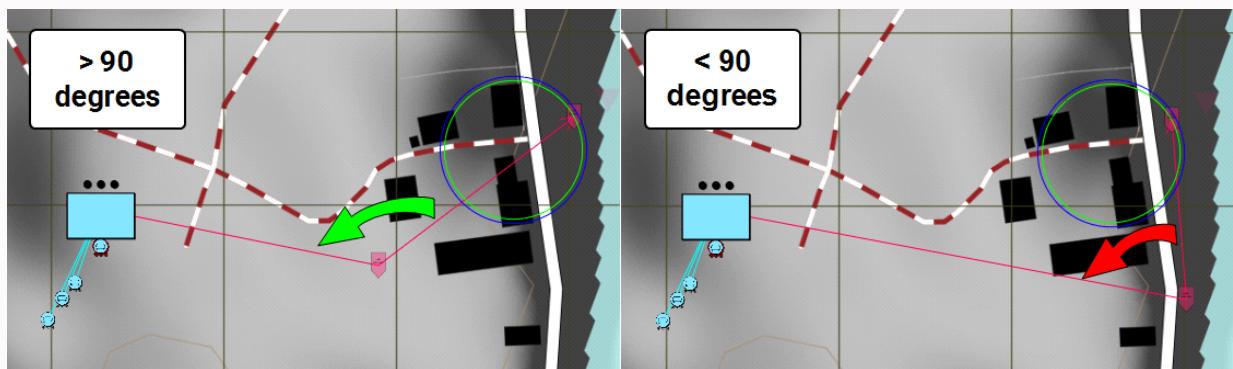
Vehicles with hitched trailers must not be group leaders.

4. Rotate and position the vehicles, as required.
5. (Optional) Create a convoy waypoint (see [Fully Autonomous Convoy \(on page 483\)](#)), 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 \(on page 421\)](#)) 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-111: Left to right: valid and invalid waypoint positioning**



- Set the bridge-laying properties (see [Deploy DSB Order \(on page 505\)](#)) and click **OK**.

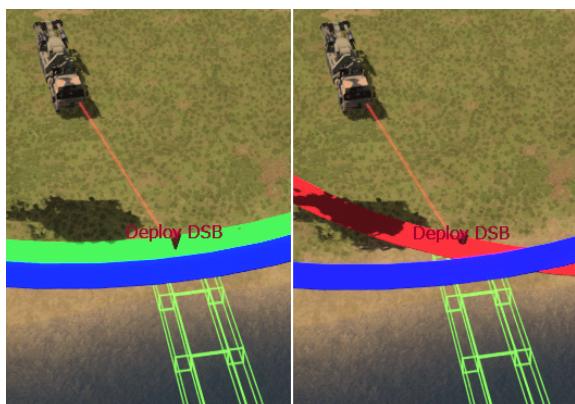
The Deploy DSB Order waypoint is created on the map.

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 \(on page 507\)](#)) 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.

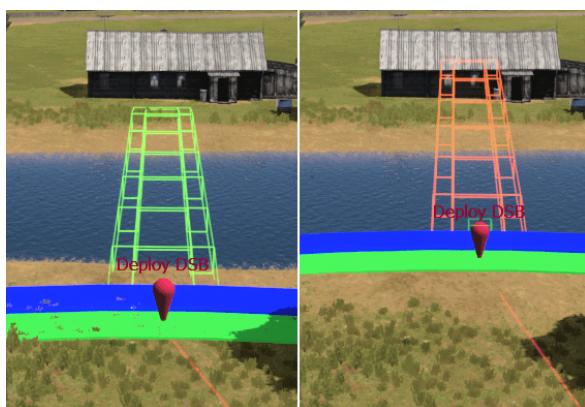


- Change the bridge deployment and construction waypoint position and / or its orientation, by rotating the waypoint.

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
<b>Missing HX45 Vehicle</b>	The HX45M bridge-builder vehicle, which operates the crane, is missing. Add the <b>HX45M DSB</b> vehicle to the mission.
<b>Missing HX77 Vehicle(s)</b>	There are not enough flatracks with cargo (modules), carried by the HX77 trucks and / or Haulmark trailers. Add more <b>HX77 ILHS - Loaded</b> and / or <b>Haulmark 3axle - Loaded</b> vehicles to the mission, until there are enough to <a href="#">Set the Bridge Length (in meters)</a> . <a href="#">(on the next page)</a>
<b>Invalid bridge placement</b>	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-112: Left to right: ongoing / complete bridge construction**



## 10.12.1 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 on the map.

For more information, see [Bridge Laying Convoy AI \(on page 501\)](#).

**Image-113: 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.

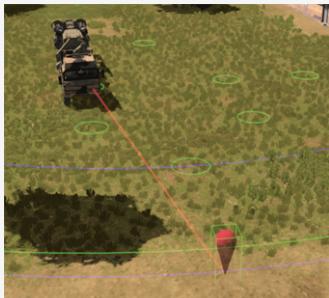
### 10.12.1.1 Waypoint Completion Settings

Set the Order waypoint completion settings:

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

### 10.12.1.2 Advanced Settings

The Deploy DSB Order has the following advanced settings:

Setting	Description
<b>Show Debug</b>	Visualize the vehicle (HX45M and HX77) parking positions in 3D. To enable / disable, set this setting to <code>true</code> / <code>false</code> . 
<b>Speed Up Animation</b>	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> .
<b>Skip Vehicle Parking</b>	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
<b>Harbor Position</b>	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
```

## 10.13 Aircraft AI

You can give Control AI rotary-wing and fixed-wing aircraft orders to follow fly to a specific location.

For land vehicles, also see the [Military AI \(on page 442\)](#), [Convoy AI \(on page 482\)](#), and [Bridge Laying Convoy AI \(on page 501\)](#).

The rotary-wing / fixed-wing aircraft order behavior is applied using the [\(F3\) Waypoints Editor Object \(on page 416\)](#). The orders create VBS4 waypoints (see [Waypoints \(on page 421\)](#)), and can use branching (see [Branching Waypoints \(on page 423\)](#)).

The following topics are discussed:

- [Aircraft Tutorial \(on the next page\)](#) - A tutorial that demonstrates the Control AI behaviors for rotary-wing UAVs.
- [Aircraft AI Orders and Behaviors \(on page 512\)](#) - A list of rotary-wing AI order behaviors.

## 10.13.1 Aircraft Tutorial

This tutorial demonstrates the use of Control AI behaviors for rotary-wing UAVs.

The workflow of the tutorial is as follows:

1. In Prepare mode, add a player unit and a DJI Spark UAV - see [Creating the Entities \(below\)](#).
2. Give the UAV several Fly Order waypoints (see [Fly Order \(on page 513\)](#)) to fly to - see [Creating the Flight Path \(on the next page\)](#).

### 10.13.1.1 Creating the Entities

First, create the entities - the player unit (to be able to run the scenario) and the DJI Spark UAV.

**Follow these steps:**

1. In the VBS Editor, select **(F1) Unit** in the Editor Objects List.
2. Double-click a location on the map to place the unit.  
The Object Properties dialog opens.
3. Select any unit, and make sure to select **Player** in the **AI Parameters** drop-down.
4. Click **OK**.

The player unit is placed on the map.

5. In the VBS Editor, select **(F4) Vehicle** in the Editor Objects List.
6. Double-click a location on the map to place the UAV.  
The Object Properties dialog opens.

7. In **Filters**, type **DJI Spark** and select the DJI Spark UAV.
8. Make sure that the **Special** drop-down is not set to **Flying**.

This ensures that the UAV is placed on a surface (such as the ground).

9. Click **OK**.  
The DJI Spark UAV is placed on the map.

The entities are placed in the scenario.

### 10.13.1.2 Creating the Flight Path

Add Fly Order waypoints to create the UAV flight path.

#### Follow these steps:

1. Right-click the UAV and select **Orders > Assign New Waypoint**.
2. Click the first location where you want your UAV to fly to, designated by the first Fly Order waypoint.

The Object Properties dialog opens.

3. In the **Behavior** list, select **Fly**.
4. Set **Destination Altitude (m)** to 10 meters.
5. Leave **Altitude Mode** set to AGL (Above Ground Level).
6. Leave **Maximum Speed (km/h)** at 5 meters per second.
7. Click **OK**.

The first Fly Order waypoint is created for the UAV.

8. Right-click the Fly Order waypoint and select **Assign Next Waypoint**.
9. Click the location of the next Fly Order waypoint.

The Object Properties dialog opens.

10. In the **Behavior** list, select **Fly**.
11. Set **Destination Altitude (m)** to 25 meters, leave **Altitude Mode** and **Maximum Speed (km/h)** set to their previous values, and click **OK**.

The second Fly Order waypoint is created for the UAV.

12. Repeat steps 8 - 11 for the second Fly Order waypoint, but set **Destination Altitude (m)** to 10 meters.

The third Fly Order waypoint is created.

The UAV flight path is created.

13. Click **Preview** to preview the scenario.

The UAV first ascends to 10 meters at the first waypoint, then to 25 meters at the second waypoint, and then descends back to 10 meters at the third waypoint, above which it stays hovering.

**Image-114: Fly Order waypoints in the 2D View****Image-115: Fly Order waypoints in the 3D View at different altitudes**

A yellow altitude line indicator appears in the 3D View at the Fly Order waypoint position.



## 10.13.2 Aircraft AI Orders and Behaviors

Rotary-wing and fixed-wing aircraft AI uses the [\(F3\) Waypoints Editor Object \(on page 416\)](#) and consists of the following orders / behaviors:

Order / Behavior Type	Description
Fly Order (on the next page)	The single fixed-wing or rotary-wing aircraft flies to the given position (the location of the <a href="#">(F3) Waypoints Editor Object (on page 416)</a> on the map).
Land Order (on page 516)	The single rotary-wing aircraft lands at the given position (the location of the <a href="#">(F3) Waypoints Editor Object (on page 416)</a> on the map).
Loiter Order (on page 518)	The single fixed-wing aircraft loiters around the given position (the location of the <a href="#">(F3) Waypoints Editor Object (on page 416)</a> on the map).

In addition, aircraft AI uses the following [Military AI \(on page 442\)](#) orders / behaviors:

 **NOTE**

These orders / behaviors can only be used for rotary-wing aircraft.

Order / Behavior Type	Description
Mount Order (on page 471)	The infantry team moves to the given position (the location of the <a href="#">(F3) Waypoints Editor Object (on page 416)</a> on the map), and mounts the nearest vehicle at the selected vehicle positions (crew, cargo, or both).
Dismount Order (on page 475)	The infantry teams dismounts the vehicle from the selected vehicle positions (crew, cargo, or both).

 **NOTE**

VBS Plan (see VBS Plan Overview in the VBS Plan Manual) relies on the rotary-wing and fixed-wing aircraft AI behaviors. For more information on how to use them, see Order Tactical Tools in Tactical Objects in the VBS Plan Manual.

### 10.13.2.1 Fly Order

The single fixed-wing or rotary-wing aircraft flies to the given position (the location of the [\(F3\) Waypoints Editor Object \(on page 416\)](#) on the map).

To order the aircraft to loiter around a given position or land at it, see the [Loiter Order \(on page 518\)](#) and [Land Order \(on page 516\)](#).

#### NOTE

The following considerations apply:

- The Fly Order cannot be used with omnicopters.
- The Fly Order can only be used with single aircraft, not aircraft groups.
- The **Weapon Control Status** is ignored for fixed-wing aircraft.

**Image-116: Fly Order settings**



#### Follow these steps:

1. Select the [\(F3\) Waypoints Editor Object](#) from the Editor Objects List, and place it on the map.
2. In the **Behavior** list, select **Fly**.

3. In the **Weapon Control Status** drop-down, select the behavior for engaging enemy forces, when they are encountered:

Option	Description
No Change	No change in the behavior upon encountering enemy forces.
Weapons Free	Fire at enemy forces, when they are encountered.
Hold Fire	Do not fire at enemy forces, when they are encountered.

 **NOTE**

The Weapon Control Status is related to the following SQF commands:

- [combatMode](https://sqf.bisimulations.com/display/SQF/combatMode) (<https://sqf.bisimulations.com/display/SQF/combatMode>)
- [setCombatMode](https://sqf.bisimulations.com/display/SQF/setCombatMode) (<https://sqf.bisimulations.com/display/SQF/setCombatMode>)
- [unitCombatMode](https://sqf.bisimulations.com/display/SQF/unitCombatMode) (<https://sqf.bisimulations.com/display/SQF/unitCombatMode>)
- [setUnitCombatMode](https://sqf.bisimulations.com/display/SQF/setUnitCombatMode)  
(<https://sqf.bisimulations.com/display/SQF/setUnitCombatMode>)

4. In **Destination Altitude (m)**, set the altitude (in meters) at which the aircraft should hover above the destination position, after reaching it.

 **WARNING**

The VBS Editor Undo and Redo operations do not take into account altitude changes in Fly Order waypoints.

 **NOTE**

Wind (see [Weather Settings \(on page 285\)](#)) does not affect aircraft, piloted by Control AI.

5. In the **Altitude Mode** drop-down, select between AGL (Above Ground Level) and ASL (Above Sea Level) altitude modes for **Destination Altitude (m)**.
6. In **Maximum Speed (km/h)**, set the maximum speed (in km/h) at which the aircraft should fly to the destination position.
7. In **Variable Name**, enter the Order waypoint name, which can be used in SQF scripts.

8. Set the Order waypoint completion settings:

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

9. Click **OK**.

The Fly Order behavior is set up.

 **WARNING**

Bohemia Interactive Simulations advises scenario Administrators not to change the **Advanced** settings for the behavior to work correctly.

A yellow altitude line indicator appears in the 3D View at the Fly Order waypoint position.



### 10.13.2.2 Land Order

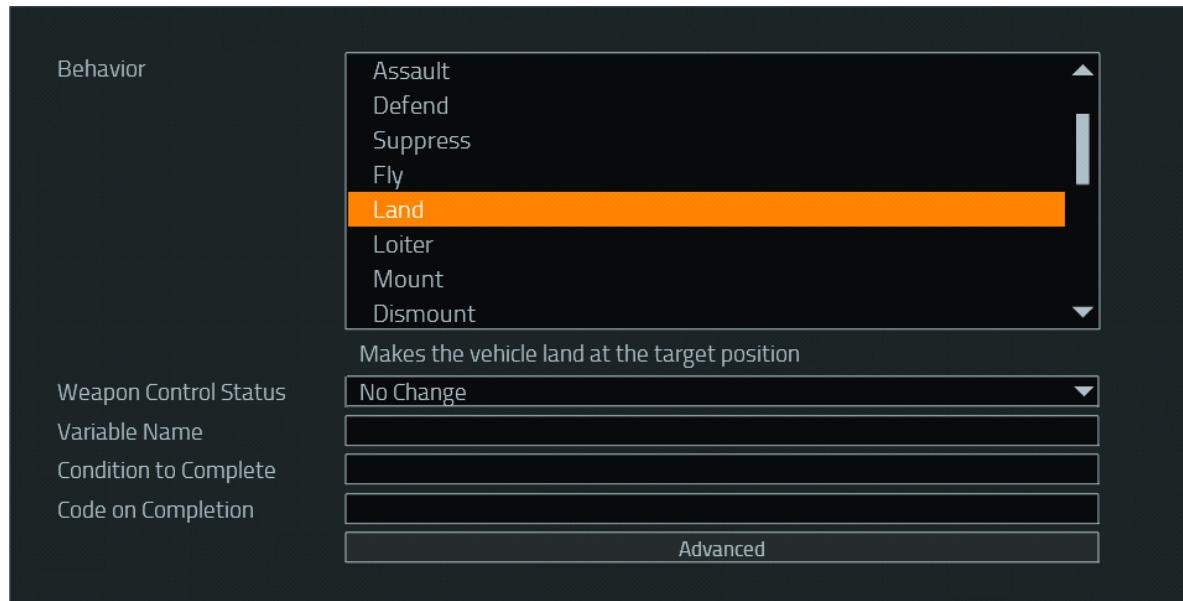
The single rotary-wing aircraft lands at the given position (the location of the [\(F3\) Waypoints Editor Object](#) (on page 416) on the map).

#### NOTE

The following considerations apply:

- The Land Order can only be used with rotary-wing aircraft.
- The Land Order can only be used with single aircraft, not aircraft groups.
- For more realistic behavior, it is recommended to assign a [Fly Order](#) (on page 513) to the aircraft, before assigning it a Land Order.

**Image-117: Land Order settings**



#### Follow these steps:

1. Select the [\(F3\) Waypoints Editor Object](#) from the Editor Objects List, and place it on the map.
2. In the **Behavior** list, select **Land**.

3. In the **Weapon Control Status** drop-down, select the behavior for engaging enemy forces, when they are encountered:

Option	Description
No Change	No change in the behavior upon encountering enemy forces.
Weapons Free	Fire at enemy forces, when they are encountered.
Hold Fire	Do not fire at enemy forces, when they are encountered.

 **NOTE**

The Weapon Control Status is related to the following SQF commands:

- [combatMode](https://sqf.bisimulations.com/display/SQF/combatMode) (<https://sqf.bisimulations.com/display/SQF/combatMode>)
- [setCombatMode](https://sqf.bisimulations.com/display/SQF/setCombatMode) (<https://sqf.bisimulations.com/display/SQF/setCombatMode>)
- [unitCombatMode](https://sqf.bisimulations.com/display/SQF/unitCombatMode) (<https://sqf.bisimulations.com/display/SQF/unitCombatMode>)
- [setUnitCombatMode](https://sqf.bisimulations.com/display/SQF/setUnitCombatMode)  
(<https://sqf.bisimulations.com/display/SQF/setUnitCombatMode>)

4. In **Variable Name**, enter the Order waypoint name, which can be used in SQF scripts.

5. 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.

6. Click **OK**.

The Land Order behavior is set up.

 **WARNING**

Bohemia Interactive Simulations advises scenario Administrators not to change the **Advanced** settings for the behavior to work correctly.

### 10.13.2.3 Loiter Order

The single fixed-wing aircraft loiters around the given position (the location of the [\(F3\) Waypoints Editor Object \(on page 416\)](#) on the map).

To land an aircraft, see the [Land Order \(on page 516\)](#).

#### NOTE

The following considerations apply:

- The Loiter Order can only be used with fixed-wing aircraft.
- The Loiter Order can only be used with single aircraft, not aircraft groups.
- The **Weapon Control Status** is ignored for fixed-wing aircraft.
- Setting the **Special** drop-down to **Flying** (see [Adding Vehicles \(on page 599\)](#)) creates a Loiter Order at the aircraft position, with a 5 km radius.

**Image-118: Loiter Order settings**



#### Follow these steps:

1. Select the **(F3) Waypoints** Editor Object from the Editor Objects List, and place it on the map.
2. In the **Behavior** list, select **Loiter**.

3. In the **Weapon Control Status** drop-down, select the behavior for engaging enemy forces, when they are encountered:

Option	Description
No Change	No change in the behavior upon encountering enemy forces.
Weapons Free	Fire at enemy forces, when they are encountered.
Hold Fire	Do not fire at enemy forces, when they are encountered.

 **NOTE**

The Weapon Control Status is related to the following SQF commands:

- [combatMode](https://sqf.bisimulations.com/display/SQF/combatMode) (<https://sqf.bisimulations.com/display/SQF/combatMode>)
- [setCombatMode](https://sqf.bisimulations.com/display/SQF/setCombatMode) (<https://sqf.bisimulations.com/display/SQF/setCombatMode>)
- [unitCombatMode](https://sqf.bisimulations.com/display/SQF/unitCombatMode) (<https://sqf.bisimulations.com/display/SQF/unitCombatMode>)
- [setUnitCombatMode](https://sqf.bisimulations.com/display/SQF/setUnitCombatMode)  
(<https://sqf.bisimulations.com/display/SQF/setUnitCombatMode>)

4. In **Destination Altitude (m)**, set the altitude (in meters) at which the aircraft should loiter above the destination position, after reaching it.

 **WARNING**

The VBS Editor Undo and Redo operations do not take into account altitude changes in Loiter Order waypoints.

 **NOTE**

Wind (see [Weather Settings \(on page 285\)](#)) does not affect aircraft, piloted by Control AI.

5. In the **Altitude Mode** drop-down, select between AGL (Above Ground Level) and ASL (Above Sea Level) altitude modes for **Destination Altitude (m)**.
6. In **Maximum Speed (km/h)**, set the maximum speed (in km/h) at which the aircraft should loiter around the destination position.
7. In **Loiter Radius** (meters), set the loiter radius around the destination position.
8. In the **Direction** drop-down, select the loitering direction (clockwise or counterclockwise).
9. In **Variable Name**, enter the Order waypoint name, which can be used in SQF scripts.

10. Set the Order waypoint completion settings:

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

11. Click **OK**.

The Loiter Order behavior is set up.

 **WARNING**

Bohemia Interactive Simulations advises scenario Administrators not to change the **Advanced** settings for the behavior to work correctly.

## 10.14 Civilian AI

Control AI allows you to create a civilian pattern of life, using pedestrians and car traffic, where civilians engage in various activities in the given area and respond to various events in various ways.

The general workflow for defining a civilian pattern of life is as follows:

1. Define the population (pedestrians and car traffic).

For more information, see [Define Populations \(on the next page\)](#).

2. Define the civilian pedestrian flow that consists of idle activities, performed in parallel by civilian entity groups, and mandatory activities, performed in a sequence by each civilian entity as part of their simulation lifecycle.

For more information, see [Define Pedestrian Flows \(on page 530\)](#).

3. Define the car traffic flow, using traffic lights and areas.

For more information, see [Define Traffic Flows \(on page 540\)](#).

4. Define responsive behavior, when an event happens, causing a temporary or permanent disruption in idle and mandatory-sequence activities.

For more information, see [Defining Responsive Behavior \(on page 552\)](#).

5. To troubleshoot your civilian population behavior, use the civilian Control AI visualization options.

For more information, see Debug Visualization in the VBS4 Instructor Manual.

In addition, a train-station example scenario, which demonstrates pedestrian, traffic, and responsive civilian behaviors, is available: [Basic Example Scenario \(on page 557\)](#).

For additional civilian AI demo scenarios, see [Example Content \(on page 590\)](#).

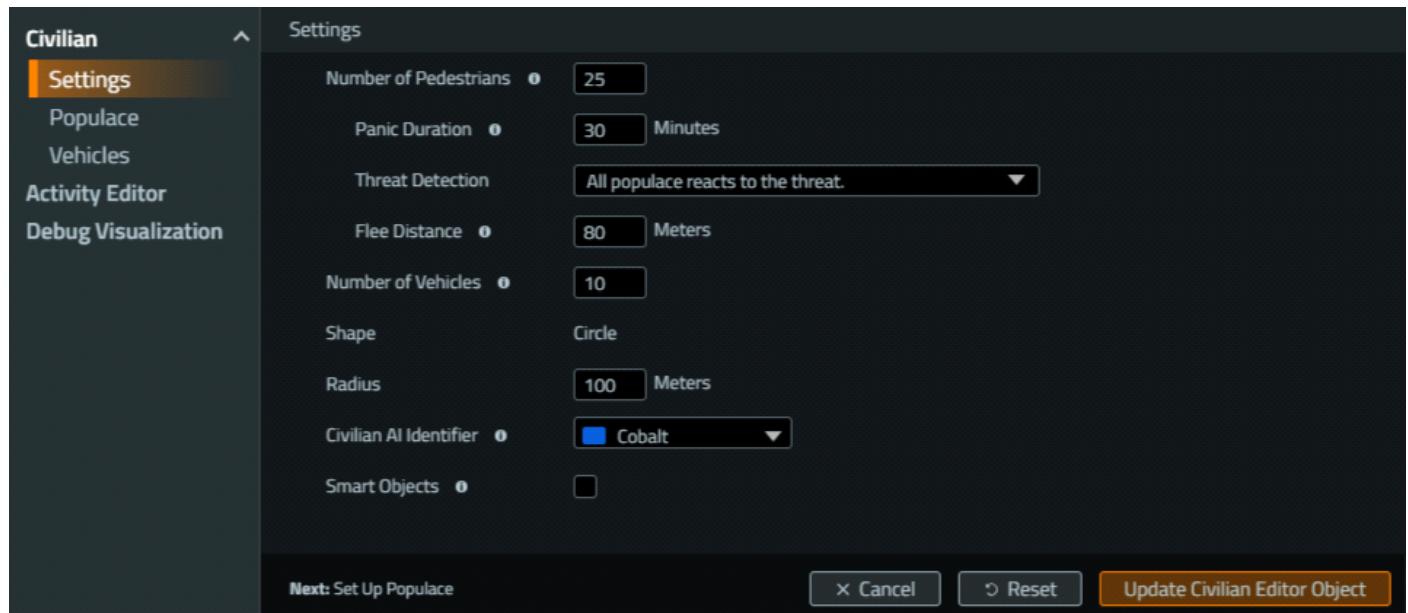
For a full list of civilian Editor Objects used by the civilian AI, see [Civilian AI Editor Objects \(on page 573\)](#).

## 10.14.1 Define Populations

To create a pattern of life, first define a population, consisting of pedestrians and / or car traffic.

In the VBS Editor Objects List, select the **Control AI - Civilian** Editor Object and place it on the map, where you want to simulate the civilian pattern of life.

The Civilian AI dialog opens.



**Follow this process:**

1. [Specify Civilian Settings \(on the next page\)](#)
2. [Specify Civilian Populace \(on page 525\)](#)
3. [Specify Vehicle Traffic \(on page 527\)](#)
4. Click **Place Civilian Editor Object** to place the population on the map.

The [Population Editor Object \(on page 574\)](#) is created and placed on the map, and you can define activities for your population.

For more information on defining activities, see [Define Pedestrian Flows \(on page 530\)](#) and [Define Traffic Flows \(on page 540\)](#).

If you want to edit an existing population, see [Edit Populations \(on page 529\)](#).

 **TIP**

Before you define the population, you can place Smart Objects, which are special Editor Objects for the population to interact with, using automatically-defined population activities. If you decide to do so, check the [Smart Objects \(on the next page\)](#) setting in step 3 of this procedure.

Alternatively, define the population first, and add Smart Objects later. However, you must manually define the activities for these Editor Objects. For more information, see [Define Pedestrian Flows \(on page 530\)](#).

**EXAMPLE**

The [Ticket Machine \(on page 586\)](#) is a Smart Object that requires a relevant activity for civilians (**Buy Item (Vending Machine)**), see [Define Pedestrian Flows \(on page 530\)](#)).

### 10.14.1.1 Specify Civilian Settings

In the Civilian AI dialog, expand the **Civilian** menu and select **Settings**.

Setting	Description
<b>Number of Pedestrians</b>	Number of pedestrians in the population.
<b>Panic Duration</b>	Panic duration (if panic ensues, due to a threat) (in minutes).   <b>NOTE</b> If Panic Duration is less than the amount of time it takes civilians to get to a Safe Zone (see <a href="#">Define Pedestrian Flows (on page 530)</a> ), the civilians stop panicking before reaching the Safe Zone.
<b>Threat Detection</b>	Defines how panic starts, based on the detected threat. Has the following options: <ul style="list-style-type: none"><li>• <b>All populace reacts to the threat</b></li><li>• <b>Only populace within hearing range reacts to threats</b></li><li>• <b>Only populace within hearing range or line of sight reacts to threats</b></li></ul>
<b>Flee Distance</b>	Defines the distance (in meters) from the threat to which pedestrians flee in panic.   <b>NOTE</b> If Flee Distance is smaller than the distance to a Safe Zone (see <a href="#">Define Pedestrian Flows (on page 530)</a> ), some civilians hide in the Safe Zone, while others only rely on Flee Distance.

Setting	Description
<b>Number of Vehicles</b>	<p>Number of vehicles in the population.</p> <div style="border: 2px solid red; padding: 10px;"><p><b>⚠️ WARNING</b></p><p>If you add vehicles to your civilian population (<b>Number of Vehicles</b> is greater than 0), you must define <b>Vehicle Spawn</b> and <b>Vehicle Despawn</b> activities. Also, <b>Vehicle Spawn</b> and <b>Vehicle Despawn</b> activities must be placed on roads. Placing them elsewhere does not create vehicle traffic. For more information, see <a href="#">Spawn / Despawn (on page 580)</a>.</p></div>
<b>Shape</b>	<p>Population area shape on the map. Only <b>Circle</b> is available.</p>
<b>Radius</b>	Radius of the population area (in meters).
<b>Civilian AI Identifier</b>	<p>Population color identifier. Different populations can have different roles, and color identifiers are used to distinguish between these roles.</p> <div style="border: 2px solid green; padding: 10px;"><p><b>✓ TIP</b></p><p>Click the <b>Information</b> icon to see how populations only perform activities defined using the same color identifier (see <a href="#">Define Pedestrian Flows (on page 530)</a>).</p></div>
<b>Smart Objects</b>	<p>Check this to automatically create relevant population activities for any Smart Objects placed on the map. For a full list of Smart Objects, see <a href="#">Smart Objects (on page 585)</a>.</p> <div style="border: 2px solid red; padding: 10px;"><p><b>⚠️ WARNING</b></p><p>To automatically create relevant population activities for your Smart Objects, make sure to place them first, before creating the population.</p></div>

## 10.14.1.2 Specify Civilian Populace

In the Civilian menu, select **Populace**, to set up the pedestrian entities:



Click the **Add Model** icon to add a model, which is used to generate the pedestrian population.



### TIP

The more pedestrian models you add, the more realistic the population looks.

**Image-119: Add Pedestrian Models dialog**



### WARNING

Child entity models do not perform any pedestrian activities, apart from the **Start Panic** activity. For more information on pedestrian activities, see [Define Pedestrian Flows \(on page 530\)](#).

## Follow these steps:

1. Use the **Filter** and **Search** fields to find a specific pedestrian model you want to insert.

 **NOTE**

The search results are based on the selected filter.

2. In the **Library** list, select the models you want to insert, and click the **Right Arrow** icon.

 **TIP**

The **Preview** box illustrates how the selected pedestrian model looks.



The model is added to the **My Populace** list.

To remove a model from the My Populace list, select the model and click the **Left Arrow** icon.



3. To confirm the added models, select **Apply Populace Changes**.

Alternatively, click **Reset** to revert the pedestrian model changes.

To delete a model, select the model row and click the **Trash** icon.

 **TIP**

To delete multiple models, use the **Type** column checkbox.



Use the sliders in the **Ratio** column to control the model ratio in the pedestrian population (how many pedestrians are generated, using the model, as a percentage of the pedestrian population).

Click the **Lock** icon to lock / unlock the ratio (if locked, the ratio slider cannot be modified).

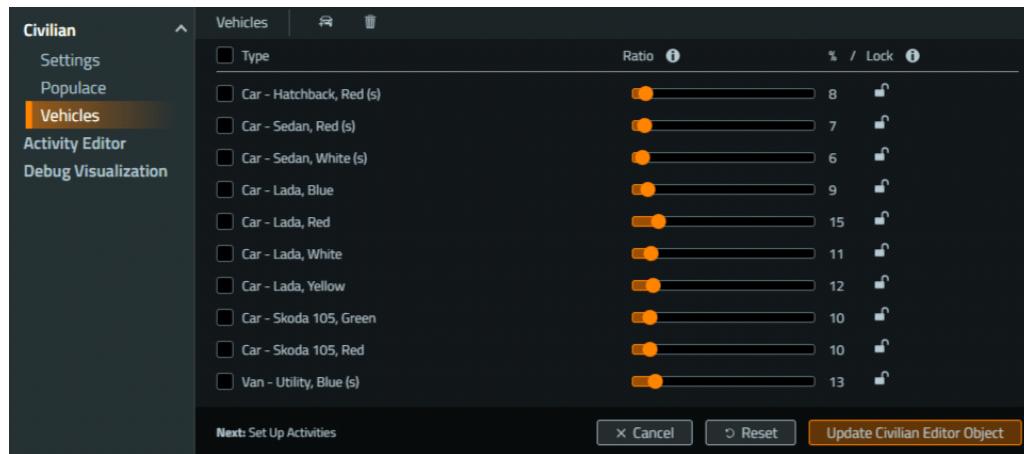


### 10.14.1.3 Specify Vehicle Traffic

In the Civilian menu, select **Vehicles**, to set up the vehicle entities:

#### WARNING

Unlike pedestrians, vehicles require at least one **Vehicle Spawn** activity and one **Vehicle Despawn** activity to appear in the scenario. For more information on how to add activities, see [Create Activities \(on page 531\)](#).



Click the **Add Vehicle** icon to add a model, which is used to generate the vehicle population.



#### TIP

The more vehicle models you add, the more realistic the population looks.

**Image-120: Add Vehicle Models dialog**



## Follow these steps:

1. Use the **Filter** and **Search** fields to find a specific vehicle model you want to insert.

 **NOTE**

The search results are based on the selected filter.

2. In the **Library** list, select the models you want to insert, and click the **Right Arrow** icon.

 **TIP**

The **Preview** box illustrates the selected vehicle model.



The model is added to the **My Vehicles** list.

To remove a model from the My Vehicles list, select the model and click the **Left Arrow** icon.



3. To confirm the added models, select **Apply Vehicles Changes**.

Alternatively, click **Reset** to revert the vehicle model changes.

To delete a model, select the model row and click the **Trash** icon.

 **TIP**

To delete multiple models, use the **Type** column checkbox.



Use the sliders in the **Ratio** column to control the model ratio in the vehicle population (how many vehicles are generated, using the model, as a percentage of the vehicle population).

Click the **Lock** icon to lock / unlock the ratio (if locked, the ratio slider cannot be modified).



#### 10.14.1.4 Edit Populations

You can edit an existing population.

**Follow these steps:**

1. Double-click the [Population Editor Object \(on page 574\)](#) on the map.

The Civilian AI dialog opens.

2. Follow the previous procedures, to make the required modifications:

- [Specify Civilian Settings \(on page 523\)](#)
- [Specify Civilian Populace \(on page 525\)](#)
- [Specify Vehicle Traffic \(on page 527\)](#)

3. Click **Update Control AI - Civilian Editor Object** to save the population changes.

The population is modified.

## 10.14.2 Define Pedestrian Flows

Once the civilian population is defined (see [Define Populations \(on page 522\)](#)), you can define the pedestrian activity flow.

The process to create a pedestrian flow is as follows:

1. Make sure that the [Number of Pedestrians \(on page 523\)](#) to generate is defined (bigger than 0), as well as the pedestrian models (see step 4 of [Define Populations \(on page 522\)](#)).
2. Create activities and areas for your pedestrian crowd.

### NOTE

If the activities are area-specific, you can create areas for them. For some activity types, area linking is mandatory (this is done automatically - see [Create Area \(on page 579\)](#)), while for other types it is not (activities that have no areas defined occur at the activity position, or as close to the position as possible, on the map).

For more information, see:

- [Create Activities \(on the next page\)](#)
- [Create Areas \(on page 533\)](#)

For more information on how to define responsive behavior for various events, see [Defining Responsive Behavior \(on page 552\)](#).

3. If you want to modify existing activities and / or areas, you can edit them. See:

- [Edit Activities \(on page 535\)](#)
- [Edit Areas \(on page 536\)](#)

In addition, you can define riot behavior for civilian groups. See [Define Civilian Riot \(on page 537\)](#).

For how to define the traffic flow, see [Define Traffic Flows \(on page 540\)](#).

## 10.14.2.1 Create Activities

You can create an activity for your population.

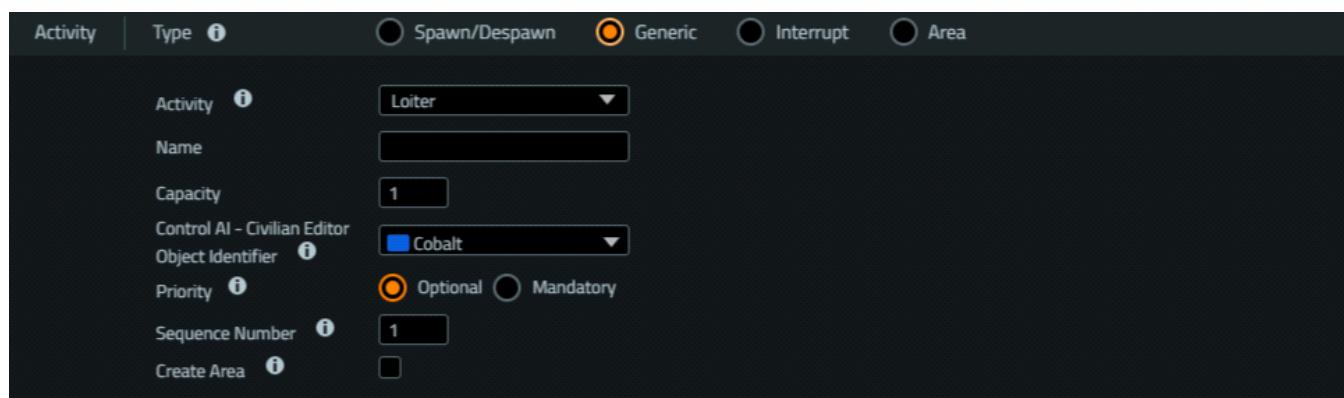
### Follow these steps:

1. In the Editor Objects List, select **Control AI - Activity** and double-click a location on the map, where you want to place the activity.

#### **WARNING**

If you place the activity outside the population radius (see [Radius \(on page 524\)](#)), it is not functional. It only becomes functional, if you move it within the population radius.

The Activity Creator opens.



2. In the **Activity Creator**, set the activity **Name**.

#### **NOTE**

The activity **Name** setting cannot be used as an Editor Object variable name.

3. Set the [Activity Types \(on page 579\)](#) settings.
4. Set the remaining [Activity Settings \(on page 577\)](#).
5. Check **Create Area** to create an area, where the activity takes place.

#### **NOTE**

For activities that require the presence of an area, this option is automatically checked.

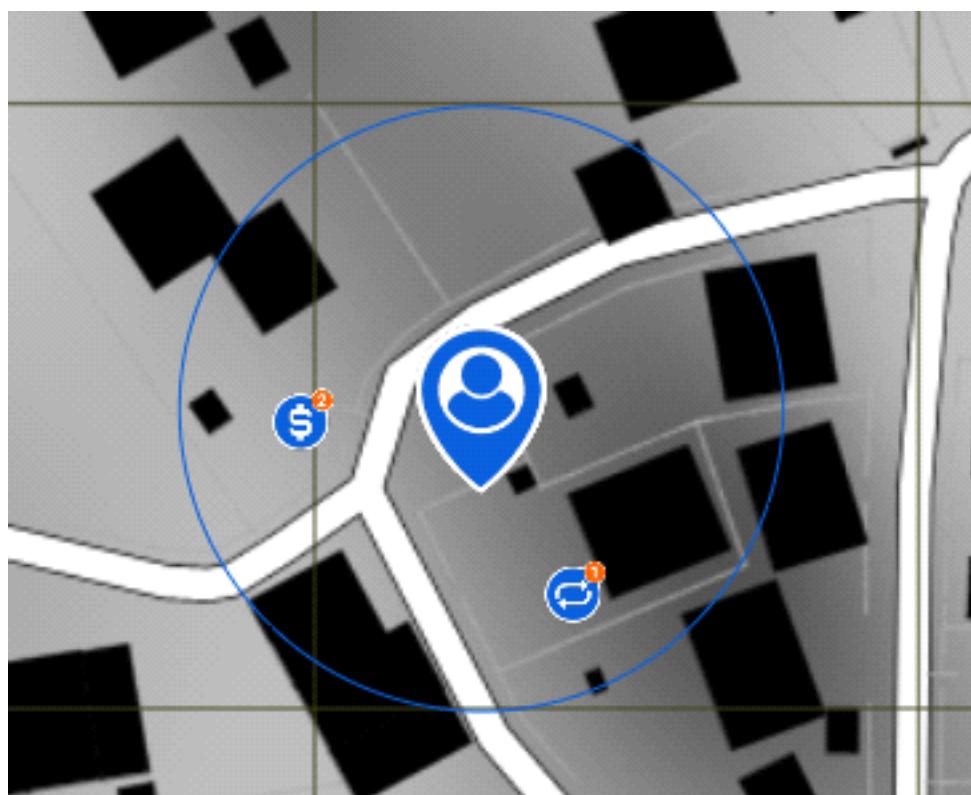
This creates an area ([Area Editor Object \(on page 584\)](#)) with the default size of 25 meters x 25 meters (to change the area size, see [Edit Areas \(on page 536\)](#)), linked to the [Activity Editor Object \(on page 577\)](#).

Alternatively, you can create the activity and the area separately, and then link the former to the latter. For more information, see [Create Areas \(on page 533\)](#).

6. Click **Place Activity**.
7. (Optional) Add additional interactive objects for your pedestrians. For more information, see [Smart Objects \(on page 585\)](#).

The [Activity Editor Object \(on page 577\)](#) is created and placed on the map.

**Image-121: Population with two activities**



You can create more activities in the same way, or edit existing ones (see [Edit Activities \(on page 535\)](#)).

## 10.14.2.2 Create Areas

You can create an area, within the civilian pattern of life area.

### **i** NOTE

If you create an area without an activity, the created area is an abstract area, represented by the [Area Editor Object \(on page 584\)](#), and has no purpose, until an [Activity Editor Object \(on page 577\)](#) is linked to it, which gives the area its purpose.

**Follow these steps:**

1. In the Editor Objects List, select **Control AI - Area** and double-click a location on the map, where you want to place the area.



### **WARNING**

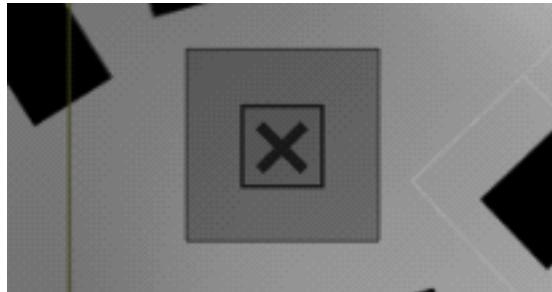
If you place the area outside the population radius (see [Radius \(on page 524\)](#)), it is not functional. It only becomes functional, if you move it within the population radius.

2. In the **Object Properties** dialog, set the following:

Area Setting	Description
<b>Size (Left-Right)</b>	Area width (in meters).
<b>Size (Up-Down)</b>	Area height (in meters).

3. Click **OK**.

The [Area Editor Object \(on page 584\)](#) is created and placed on the map.



#### 4. Linking an activity to an area, or attaching an area to an entity:

- To link an activity to an area (for example, for an activity to be performed in a certain area), right-click an [Activity Editor Object \(on page 577\)](#), select **Link to Area** in the context menu, and click the [Area Editor Object \(on page 584\)](#).

The area changes color and shows the linked activity icon.

To unlink the activity from the area, repeat this step.



##### **WARNING**

You can only link one activity to an area.

- You can attach the area to an entity, such as a human or a vehicle. To do that, right-click the [Area Editor Object \(on page 584\)](#), select **Attach to Unit or Vehicle** in the context menu, and click the entity.



##### **WARNING**

Trying to attach **Restrict Access (Pedestrians)** and **Restrict Access (Vehicles)** areas to moving entities may result in unexpected behavior, as areas of these types cannot move with the entity.

The area is attached to the entity.



##### **NOTE**

You can attach multiple areas to an entity.

To detach the area from the entity, repeat this step.

To edit an existing area, see [Edit Areas \(on page 536\)](#).

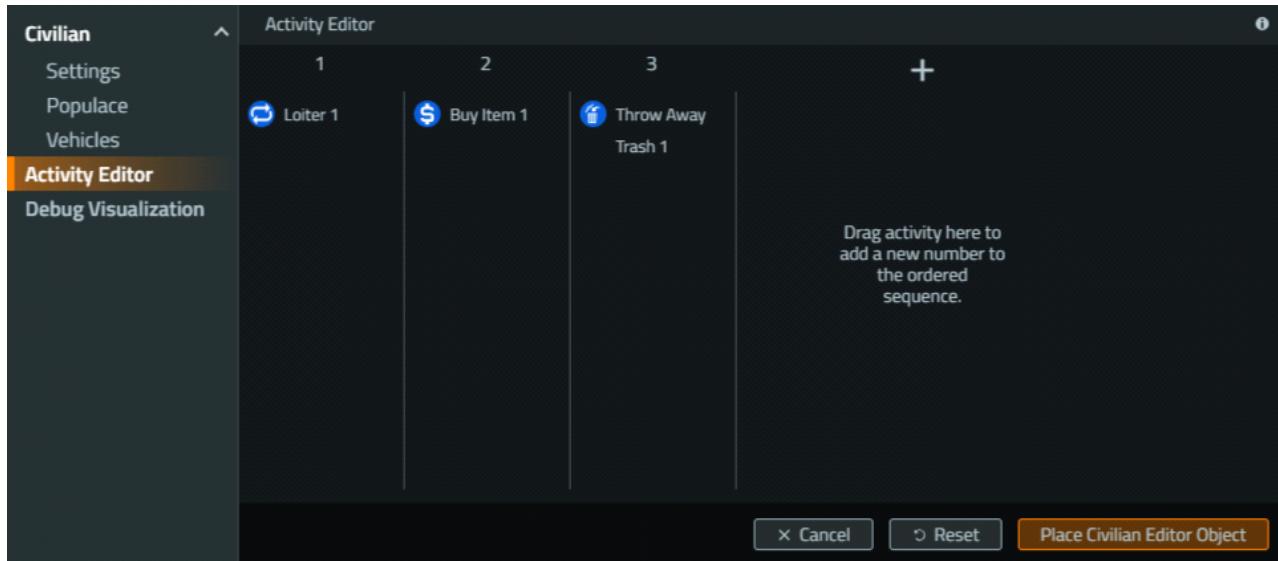
### 10.14.2.3 Edit Activities

You can edit existing population activities.

#### Follow these steps:

Do any of the following:

- To edit the activity settings:
  1. Double-click the [Activity Editor Object \(on page 577\)](#).  
The Activity Creator opens.
  2. In the **Activity Creator**, set the activity settings, as described in steps 3 and 4 of [Create Activities \(on page 531\)](#).
  3. Click **Place Activity**.
- To move the activity to a different position on the map, click the [Activity Editor Object \(on page 577\)](#), and drag it.
- To change the [Sequence Number \(on page 577\)](#) of an activity, using the Activity Editor:
  1. Click the [Population Editor Object \(on page 574\)](#) and select **Activity Editor**.  
A table with population activities appears, where the activities are ordered into columns based on their sequence number.



2. Drag any activity to a column with a different sequence number.
3. Click **Place Civilian Editor Object**.

The activity is modified.

## 10.14.2.4 Edit Areas

You can edit existing areas.

### Follow these steps:

Do any of the following:

- To edit the area settings:
  1. Double-click the [Area Editor Object \(on page 584\)](#).
  2. Update the area settings, as described in steps 2 - 3 of [Create Areas \(on page 533\)](#).
  3. Click **OK**.
- To move the area to a different position on the map, click the [Area Editor Object \(on page 584\)](#), and drag it.
- To link an activity to an area (for example, for an activity to be performed in a certain area), right-click an [Activity Editor Object \(on page 577\)](#), select **Link to Area** in the context menu, and click the [Area Editor Object \(on page 584\)](#).

The area changes color and shows the linked activity icon.

To unlink the activity from the area, repeat this step.

#### **WARNING**

You can only link one activity to an area.

- You can attach the area to an entity, such as a human or a vehicle. To do that, right-click the [Area Editor Object \(on page 584\)](#), select **Attach to Unit or Vehicle** in the context menu, and click the entity.

#### **WARNING**

Trying to attach **Restrict Access (Pedestrians)** and **Restrict Access (Vehicles)** areas to moving entities may result in unexpected behavior, as areas of these types cannot move with the entity.

The area is attached to the entity.

#### **NOTE**

You can attach multiple areas to an entity.

To detach the area from the entity, repeat this step.

The area is modified.

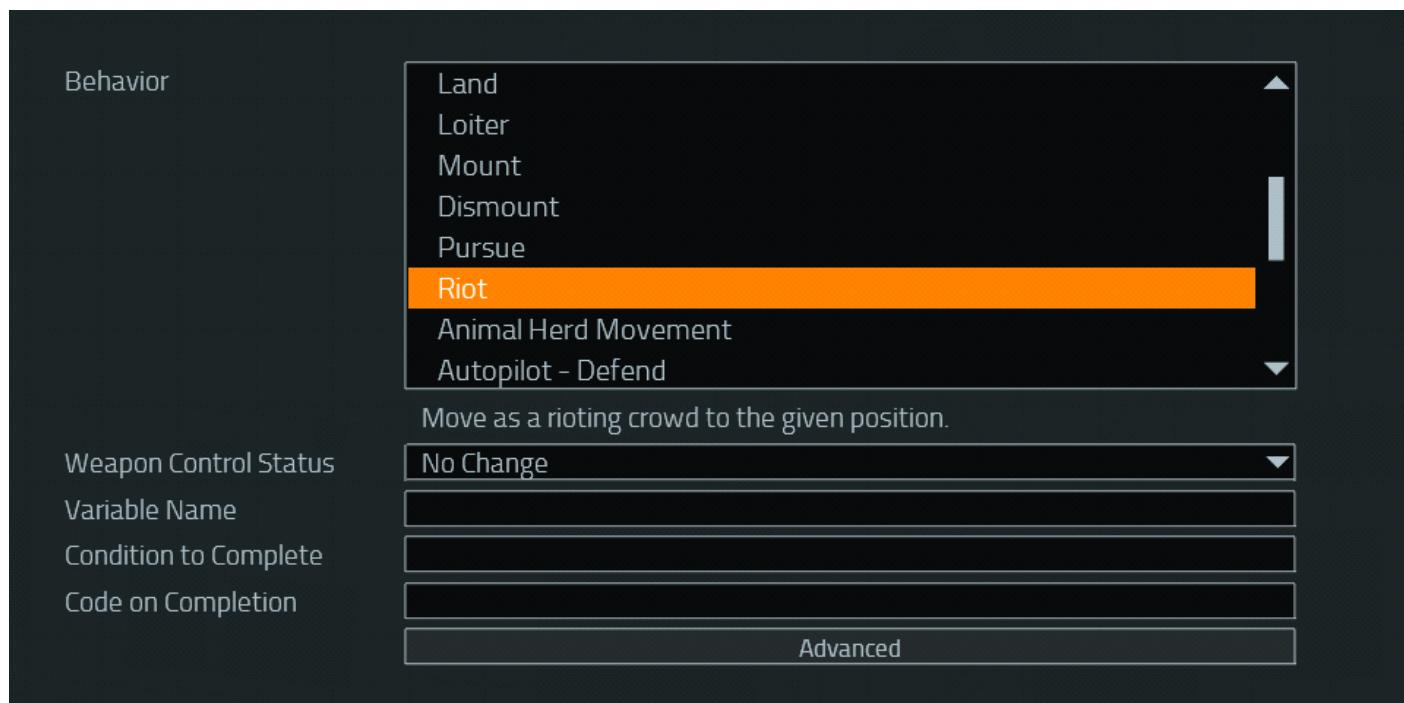
### 10.14.3 Define Civilian Riot

You can add riot behavior to civilian groups to simulate protest marches and on-site demonstrations.

#### NOTE

Riot behavior is not defined using the [Control AI - Civilian Editor Object \(on page 418\)](#), but the [\(F3\) Waypoints Editor Object \(on page 416\)](#).

**Image-122: Riot behavior settings**



#### Follow these steps:

1. In the Editor (Prepare Mode), select **(F1) Unit** in the Editor Objects List, and double-click a location on the map, where you want to place your group of rioting civilians.

The Object Properties dialog opens.

2. In **Filters**, select Civilian in the following drop-down:



The Object Properties dialog displays a list of all the available civilians in VBS4.

3. Select a civilian you want to place on the map.
4. Make sure **Control AI** is selected (see [Waypoints \(on page 421\)](#)).
5. Click **OK**.

6. If you want to place more civilians of the same type, press **LCtrl + C** and then **LCtrl + V** to copy and paste the civilian entity. Otherwise, if you want to place civilians of different types, repeat steps 3 - 5.

The civilians are placed on the map.

7. Select all the civilians you placed, click the **RMB**, and select **Orders > Group Selected**.

The civilians are grouped.

8. To assign a riot destination to the civilian group, create a Riot waypoint (see [Waypoints \(on page 421\)](#)) by right-clicking the civilian group marker, selecting **Orders > Assign New Waypoint**, and clicking a position on the map, where the civilian group needs to riot.

**NOTE**

The civilian group marches in riot along the way to the riot destination.

9. In the **Behavior** list, select **Riot**.

10. In the **Weapon Control Status** drop-down, select the behavior for engaging enemy forces, when they are encountered:

Option	Description
<b>No Change</b>	No change in the behavior upon encountering enemy forces.
<b>Weapons Free</b>	Fire at enemy forces, when they are encountered.
<b>Hold Fire</b>	Do not fire at enemy forces, when they are encountered.

**NOTE**

The Weapon Control Status is related to the following SQF commands:

- [combatMode](#) (<https://sqf.bisimulations.com/display/SQF/combatMode>)
- [setCombatMode](#) (<https://sqf.bisimulations.com/display/SQF/setCombatMode>)
- [unitCombatMode](#) (<https://sqf.bisimulations.com/display/SQF/unitCombatMode>)
- [setUnitCombatMode](#)  
(<https://sqf.bisimulations.com/display/SQF/setUnitCombatMode>)

**NOTE**

This controls how the civilians use whatever qualifies as weapons assigned to them in their loadout. For more information, see [Edit Equipment Loadout \(on page 662\)](#).

11. In **Variable Name**, enter the Order waypoint name, which can be used in SQF scripts.

12. Set the Order waypoint completion settings:

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

13. Click **OK**.

14. Preview the mission.

The civilian group starts a riot march, and continues rioting at the riot destination.

 **WARNING**

Bohemia Interactive Simulations advises scenario Administrators not to change the **Advanced** settings for the behavior to work correctly.

 **NOTE**

After reaching the destination, the riot behavior continues indefinitely.



## 10.14.4 Define Traffic Flows

Besides defining the pedestrian flow (see [Define Pedestrian Flows \(on page 530\)](#)), you can define a civilian car traffic flow.

The process to create a pedestrian flow is as follows:

### Follow these steps:

1. Make sure that the [Number of Vehicles \(on page 524\)](#) to generate is defined (bigger than 0), as well as the vehicle models (see step 5 of [Define Populations \(on page 522\)](#)).
2. Create traffic spawn and despawn points, areas where vehicles can / cannot go, and traffic signs and lights to regulate the traffic. Once this is done, you can also debug the traffic rules using 3D visualization.

For more information, see:

- [Create Traffic Spawn / Despawn Points \(on the next page\)](#)
- [Create Traffic Areas \(on page 542\)](#)
- [Traffic Signs and Lights \(on page 543\)](#)
- [Traffic Debug Visualization \(on page 548\)](#)

Unlike pedestrians, vehicles can only respond to panic activity. For more information, see [Defining Responsive Behavior \(on page 552\)](#).

3. If you want to modify existing vehicle activities and / or areas, you can edit them. See:
  - [Edit Activities \(on page 535\)](#) (to modify spawn / despawn points)
  - [Edit Areas \(on page 536\)](#) (to modify where vehicles can / cannot go)

### 10.14.4.1 Create Traffic Spawn / Despawn Points

To create a traffic flow, you need to place spawn and despawn points (activities), where vehicles originate and disappear, respectively.

#### Follow these steps:

1. In the Editor Objects List, select **Control AI - Activity** and double-click a location on the map, where you want to place the traffic spawn / despawn activity.

#### **WARNING**

If you place the activity outside the population radius (see [Radius \(on page 524\)](#)), it is not functional. It only becomes functional, if you move it within the population radius.

The Activity Creator opens.



2. In the **Activity Creator**, select any of the vehicle-related spawn / despawn activity types and sub-types (see step 2 in [Create Activities \(on page 531\)](#)):

- **Type** - Select **Spawn / Despawn**.
- **Activity** - Select any of the following:
  - **Vehicle Spawn**
  - **Vehicle Despawn**

#### **WARNING**

Any **Vehicle Spawn** activity requires the presence of a **Vehicle Despawn** activity. Also, **Vehicle Spawn** and **Vehicle Despawn** activities must be placed on roads. Placing them elsewhere does not create vehicle traffic.

3. Set the other activity settings, as needed, in the **Activity Setup**, as described in step 3 of [Create Activities \(on page 531\)](#).
4. Click **OK**.

The spawn / despawn point ([Activity Editor Object \(on page 577\)](#)) is placed on the map.

You can create more spawn / despawn points in the same way. If you want to edit the points, see [Edit Activities \(on page 535\)](#).

## 10.14.4.2 Create Traffic Areas

You can define areas, where vehicles can / cannot go.

**Follow these steps:**

1. Create an area-based activity, as described in the [Create Activities \(on page 531\)](#) procedure, and in step 3 of the procedure, select:
  - **Type** - Select **Area**.
  - **Activity** - Select **Restrict Access (Vehicles)** in the drop-down.

**NOTE**

This activity requires the presence of an area, which is why **Create Area** is automatically checked, to create the linked area.

2. Set the other activity settings, as needed, in the **Activity Creator**, as described in step 3 of [Create Activities \(on page 531\)](#), and click **OK**.

The area-based [Activity Editor Object \(on page 577\)](#) and [Area Editor Object \(on page 584\)](#) are created.

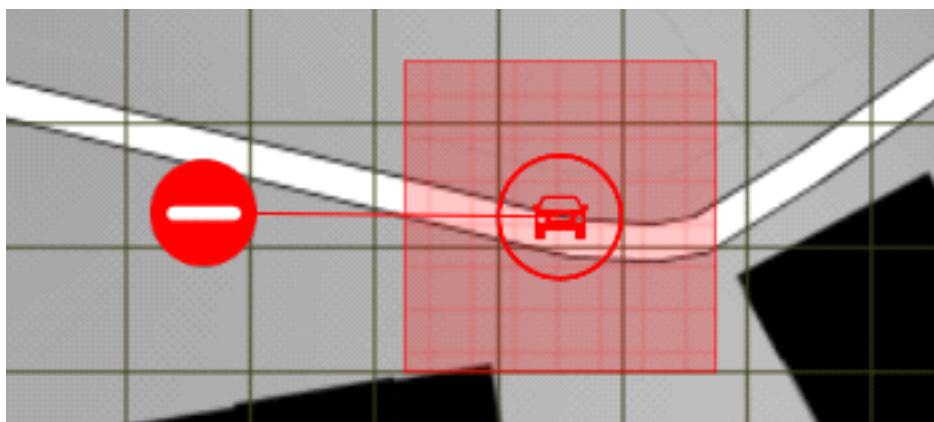
3. Modify the area settings for the [Area Editor Object \(on page 584\)](#), as described in [Edit Areas \(on page 536\)](#).

The [Area Editor Object \(on page 584\)](#) is modified.

The restricted [Area Editor Object \(on page 584\)](#) is set up.

You can create more restricted areas in the same way.

**Image-123: Road segment with a Restricted Access area**



### 10.14.4.3 Traffic Signs and Lights

The vehicle traffic flow can be regulated by placing traffic signs and lights near junctions or crosswalks, which is a good way to avoid congestion in dense traffic patterns.

#### To use signs / traffic lights, follow these steps:

1. Make sure you have added a [Population Editor Object \(on page 574\)](#), as described in [Define Populations \(on page 522\)](#).
2. In the Editor Objects List, select **(F8) Objects**.
3. Right-click a placement position near a junction and select **New Object**.
4. In the **Object Properties** dialog, select the desired [Traffic Signs and Lights Models \(on page 546\)](#).

 **NOTE**

You can switch non-pedestrian traffic lights to red. For more information, see [Changing Lights \(on page 547\)](#).

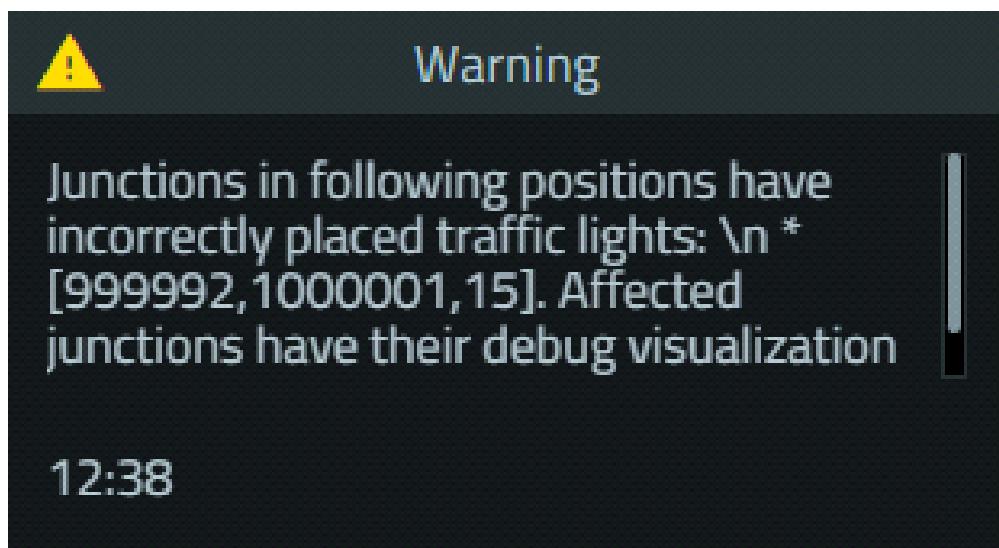
5. Click **OK**.
6. Rotate the traffic light / sign object in the correct direction.
7. Repeat steps 3-6 for each road in the junction.

Preview the mission to view the vehicle traffic at the junction being controlled by the traffic signs / lights.

 **NOTE**

Unlike the preview mode, in large multiplayer scenarios, to reduce network traffic, traffic signals (signs and lights) pre-placed on the terrain are imported at a limited rate. Because of this, it may take a few minutes to prepare traffic signals, and spawn the civilian population and traffic.

After previewing the mission, a message may appear, noting that some of the junctions have their traffic lights configured incorrectly. A list of positions of the affected junctions is included, and the traffic debug visualization is enabled for those junctions. You can use the debug visualization (see [Traffic Debug Visualization \(on page 548\)](#)) to determine which traffic lights are missing, or need to be adjusted.

**Image-124: Message listing junctions with incorrectly placed traffic lights****Image-125: Affected junction with debug visualization enabled**

In this illustration, the traffic light on the right is placed correctly, the rest are not:

- The bottom traffic light is aligned incorrectly.
- The left traffic light is placed outside the expected area.
- The top traffic light is missing entirely.

**NOTE**

Some traffic light objects have more than one traffic light. For example, the **Traffic Light 01, DE Pedestrian (Left)** object has one light for vehicles, and one light for pedestrians at a 90 degree angle.

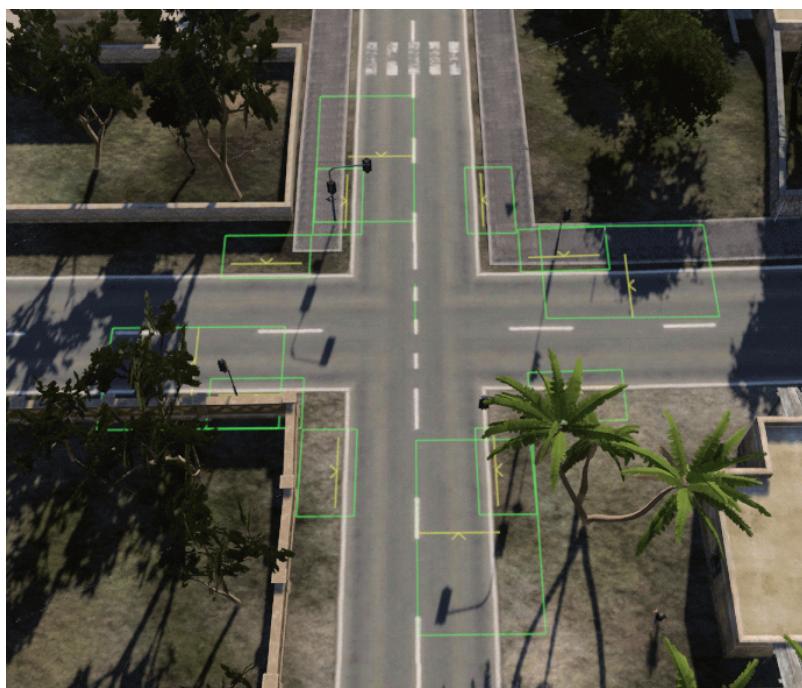
A traffic light is considered to be placed correctly, if it is:

- Aligned with the road.
- Placed within the expected area, as shown in the traffic debug visualization.
- Of the correct type (for example, a pedestrian light is disregarded, when determining the traffic light for a road intended for vehicles).

Each road in a junction needs to have a correctly placed traffic light, in order to be controlled by traffic lights. If only some of the roads have correctly placed traffic lights, the message listing junctions with incorrectly placed traffic lights appears, and the junction traffic lights are ignored.

You can use the "`trafficLightAreas`" option of the Traffic Debug Visualization to see where each road expects its traffic light to be placed. This rectangle turns red, if a problem is encountered on that road. If a traffic light is placed correctly, it is connected to the road by a cyan line, when the "`trafficLightAssignment`" option is enabled.

**Image-126: Debug visualization of a road with all traffic lights placed correctly**



### 10.14.4.3.1 Traffic Signs and Lights Models

The traffic lights / signs are located in the **Scenery - European Traffic Signs** category.

#### Traffic Signs:

Object Display Name	Object Class
Stop	<code>land_eu_trafficsign_stop_01</code>
Yield	<code>land_eu_trafficsign_yield_01</code>

#### Traffic Lights:

Object Display Name	Object Class
Traffic Light 00, DE Pedestrian (Left)	<code>land_eu_trafficlight_00_011_de</code>
Traffic Light 00, FR Pedestrian (Left)	<code>land_eu_trafficlight_00_011_fr</code>
Traffic Light 01	<code>land_eu_trafficlight_01</code>
Traffic Light 01, DE Pedestrian (Left)	<code>land_eu_trafficlight_01_011_de</code>
Traffic Light 01, DE Pedestrian (Right)	<code>land_eu_trafficlight_01_01r_de</code>
Traffic Light 01, FR Pedestrian (Left)	<code>land_eu_trafficlight_01_011_fr</code>
Traffic Light 01, FR Pedestrian (Right)	<code>land_eu_trafficlight_01_01r_fr</code>
Traffic Light 02	<code>land_eu_trafficlight_02</code>
Traffic Light 02, DE Pedestrian (Left)	<code>land_eu_trafficlight_02_011_de</code>
Traffic Light 02, FR Pedestrian (Left)	<code>land_eu_trafficlight_02_011_fr</code>
Traffic Light 02, Turn Lane	<code>land_eu_trafficlight_02_01tlr</code>
Traffic Light 02, Turn Lane, DE Pedestrian (Left)	<code>land_eu_trafficlight_02_01tlr_011_de</code>
Traffic Light 02, Turn Lane, FR Pedestrian (Left)	<code>land_eu_trafficlight_02_01tlr_011_fr</code>
Traffic Light 03	<code>land_eu_trafficlight_03</code>
Traffic Light 03, DE Pedestrian (Left)	<code>land_eu_trafficlight_03_011_de</code>
Traffic Light 03, FR Pedestrian (Left)	<code>land_eu_trafficlight_03_011_fr</code>
Traffic Light 03, Turn Lane	<code>land_eu_trafficlight_03_01tlr</code>
Traffic Light 03, Turn Lane, DE Pedestrian (Left)	<code>land_eu_trafficlight_03_01tlr_011_de</code>
Traffic Light 03, Turn Lane, FR Pedestrian (Left)	<code>land_eu_trafficlight_03_01tlr_011_fr</code>

#### 10.14.4.3.2 Changing Lights

Non-pedestrian traffic lights can be switched to red in the Editor (Execute Mode).

##### Follow these steps:

1. Right-click the traffic light and select **Force traffic light to red**.

The traffic light switches to red, and all the traffic lights that belong to the same traffic direction switch to red as well. Traffic lights pointing in other traffic directions are unaffected.

2. To resume the traffic light cycle, right-click the traffic light and select **Resume traffic light cycle**.

#### 10.14.4.4 Traffic Debug Visualization

Visualize traffic rules by enabling the traffic debug visualization to gain insight into AI driver intent.

Enable traffic debug visualization using the [fn\\_vbsCon\\_civ\\_setTrafficDebug](https://sqf.bisimulations.com/display/SQF/fn_vbsCon_civ_setTrafficDebug) (https://sqf.bisimulations.com/display/SQF/fn\_vbsCon\_civ\_setTrafficDebug) SQF function.

##### TIP

Additional traffic debug visualization can be activated, using the following **Civilian Debug Visualization** UI options (see Debug Visualization in the VBS Control AI Manual):

- **Display Narrow Roads**
- **Display Problematic Turns**
- **Display Problematic Intersections**
- **Display Objects Interfering with Road Traffic**
- **Display Junctions for Crosswalks and Crossroads**

For multi-lane traffic, you can either use the **AI Debug** option in VBS Geo (see VBS Geo User Interface in the VBS Geo Manual), or the **Show Roads** and **Generate Roads** options in the AI Debug Panel (see Control AI Visualization in the VBS Control AI Manual), to see how your road network is set up. Also, to configure road lanes, see **Lanes** in Placing and Editing Roads in the VBS Geo Manual.

#### fn\_vbsCon\_civ\_setTrafficDebug

An SQF function that enables / disables traffic debug visualization.

##### NOTE

This SQF function only works with civilian vehicles created using the Population Editor Object (see [Population Editor Object \(on page 574\)](#)).

The traffic debug visualization consists of the following, which can be enabled separately:

- `"shape"` - Displays the collision shape of the junction.
- `"entities"` - Displays the intent of vehicles or pedestrians interacting with junctions.
- `"trafficLightAreas"` - Displays the areas where traffic lights are expected.
- `"trafficLightAssignment"` - Displays traffic light assignment to roads or crosswalks.
- `"connections"` - Displays valid paths through the junction, and whether they are free, in use, or blocked.

#### Syntax:

```
options call fn_vbsCon_civ_setTrafficDebug
```

**Parameters:**

- **options**: Array of Strings - Contains the visualization options to enable. To enable all the options, use "**"all"**"; or "**"none"**", to disable all of them.

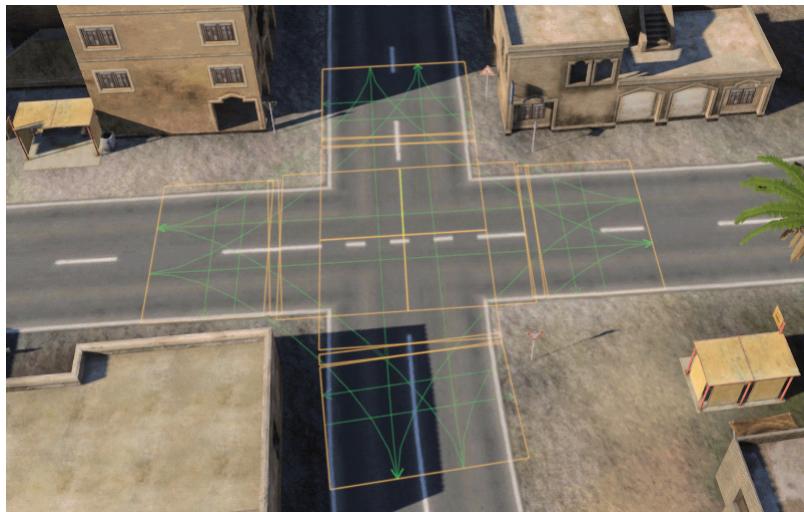
**Return Values:** Nothing**EXAMPLE**

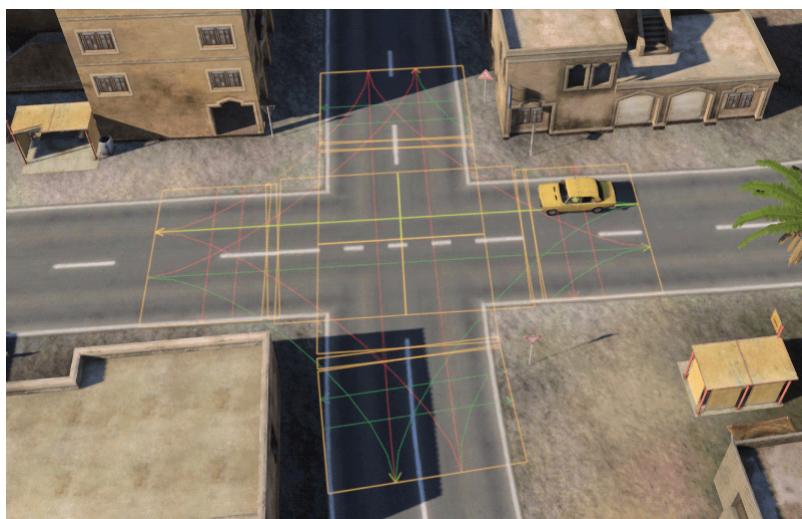
```
["connections", "entities"] call fn_vbsCon_civ_setTrafficDebug  
["all"] call fn_vbsCon_civ_setTrafficDebug  
["none"] call fn_vbsCon_civ_setTrafficDebug
```

With the visualization enabled, all junctions in civilian areas of all instances of the Population Editor Object (see Population Editor Object) display a representation of their current state. The visualization consists of the following elements:

- Orange boxes, enabled by the "**shape**" option, represent the area considered part of the junction.
- Arrows through the junction, enabled by the "**connections**" option, represent the directions possible to pass through the junction.

**Image-127: Junction visualization with no vehicles present**



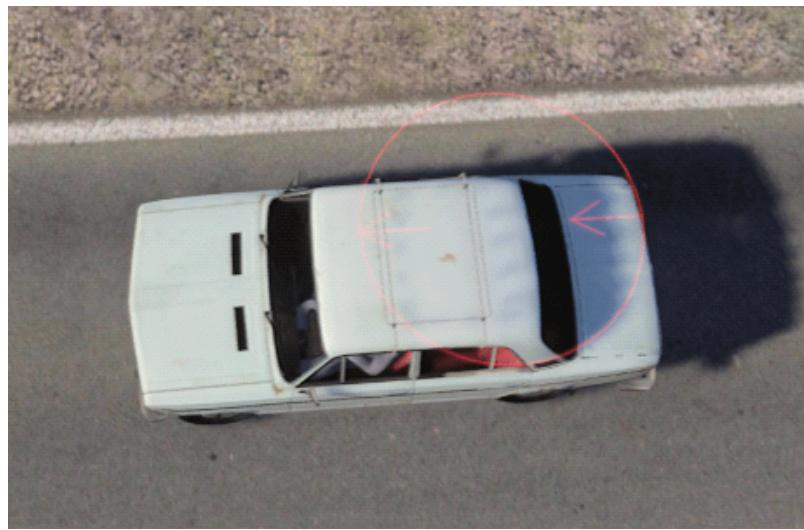
**Image-128: Junction visualization with a vehicle passing through, blocking the intersecting road**

The "entities" option enables a visual representation of intent that civilian entities have when approaching a junction. This visualization has the following elements:

- The arrows represent the direction that the entity takes, when entering and leaving the junction.
- The visualization is green when the entity is free to pass through, and turns red when the entity does not have priority or the direction is blocked.

**Image-129: Entity intent visualization for an entity passing from left to right**

**Image-130: Entity intent visualization for the same entity, when it does not have priority**



## 10.14.5 Defining Responsive Behavior

With the standard pedestrian and vehicle flows defined (see [Define Pedestrian Flows \(on page 530\)](#) and [Define Traffic Flows \(on page 540\)](#)), you can proceed to define responsive behavior, which occurs when an event happens, causing a temporary or permanent disruption in pedestrian idle and mandatory-sequence activities, as well as vehicle traffic.

### Follow these steps:

1. Define a responsive behavior, based on the **Interrupt** activity sub-type (see [Create Activities \(on page 531\)](#)). See [Interrupt Activity Sub-Types \(below\)](#).
2. In addition to responsive-behavior activities, as a scenario administrator, you can manually trigger events in the VBS Editor (Execute Mode), see:
  - [Resetting Panic \(on the next page\)](#)
  - [Enabling / Disabling the Population \(on page 554\)](#)
  - [Initiating Activities \(on page 555\)](#)

### 10.14.5.1 Interrupt Activity Sub-Types

The available **Interrupt** activity sub-types are:

Interrupt Activity Sub-Type	Description
<b>Start Panic</b>	Makes civilians run in panic (for example, when a shooting or an explosion occurs). <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"><p><b>NOTE</b></p><p>The following considerations apply:</p><ul style="list-style-type: none"><li>• When panic is active, pedestrians flee, while vehicles stop.</li><li>• Panic is automatically activated as a result of a shooting or an explosion.</li></ul></div> <p>For more information, see the following population settings for panic: <a href="#">Panic Duration (on page 523)</a>, <a href="#">Threat Detection (on page 523)</a>, <a href="#">Flee Distance (on page 523)</a>.</p>

Interrupt Activity Sub-Type	Description
Gather Crowd	Causes the civilian entities to stop whatever they are doing, and look at a location. <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><b><span style="color: #0070C0;">i</span> NOTE</b><p>The following considerations apply:</p><ul style="list-style-type: none"><li>• To look at the specified location, the civilian entities first need to be in an area, linked to the activity (see <a href="#">Create Areas (on page 533)</a>). To force the civilian entities to move to the area, use either the <b>Walk To</b> or <b>Run To</b> activities.</li><li>• Once the civilian entities are in the area, they assume a random position in it, and look at the specified location.</li><li>• The crowd continues to look at the location, until the <b>Gather Crowd</b> activity is removed or disabled with a trigger (see <a href="#">Initiating Activities (on page 555)</a>).</li><li>• Civilians cannot gather on roads.</li></ul></div>
Walk To	Causes the crowd to stop whatever they are doing, and walk to a certain location. <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><b><span style="color: #0070C0;">i</span> NOTE</b><p>Once the civilians arrive to the location, they resume their other activities.</p></div>
Run To	Causes the crowd to stop whatever they are doing, and run to a certain location. <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><b><span style="color: #0070C0;">i</span> NOTE</b><p>Once the civilians arrive to the location, they resume their other activities.</p></div>

## 10.14.5.2 Resetting Panic

As a scenario administrator, you can reset (stop) panic behavior manually, when the behavior is running.

### Follow these steps:

1. Open the Editor (Execute Mode).
2. Right-click the [Population Editor Object \(on page 574\)](#) that generates a population, and select one of the following options:
  - **Reset Panic** - Resets the selected population panic behavior.

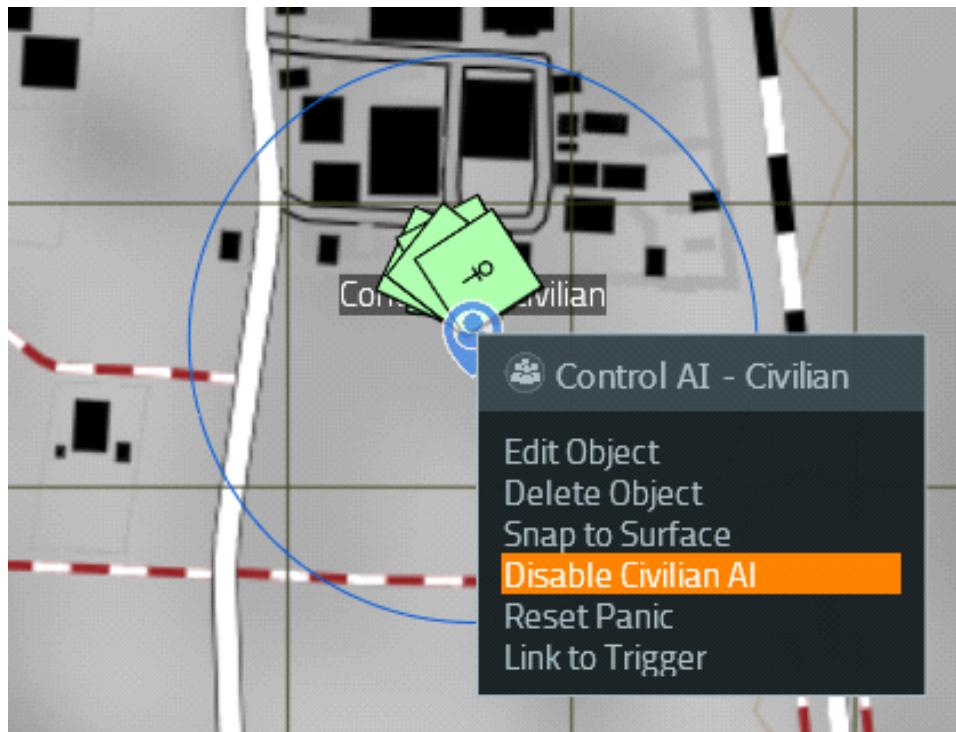
The panic behavior is reset and stopped.

### 10.14.5.3 Enabling / Disabling the Population

As a scenario administrator, you can enable / disable an entire population using Population Editor Object or by using a Trigger. A disabled population disappears from the simulation, and re-enabling it makes it reappear.

In the Editor (Execute Mode), right-click the [Population Editor Object \(on page 574\)](#) that generates a population, and select one of the following options:

- **Enable Civilian AI** - The selected population appears and starts the civilian pattern of life simulation.
- **Disable Civilian AI** - The selected population disappears and stops the civilian pattern of life simulation.



#### Use a Trigger Editor Object:

1. Open the Editor (Prepare Mode).
2. Select (**F7**) **Trigger** in the Editor Objects List, and place a Trigger Editor Object on the map.

- Fill the Trigger Editor Object settings, as required (for more information, see Triggers in the VBS4 Editor Manual), and click **OK**.

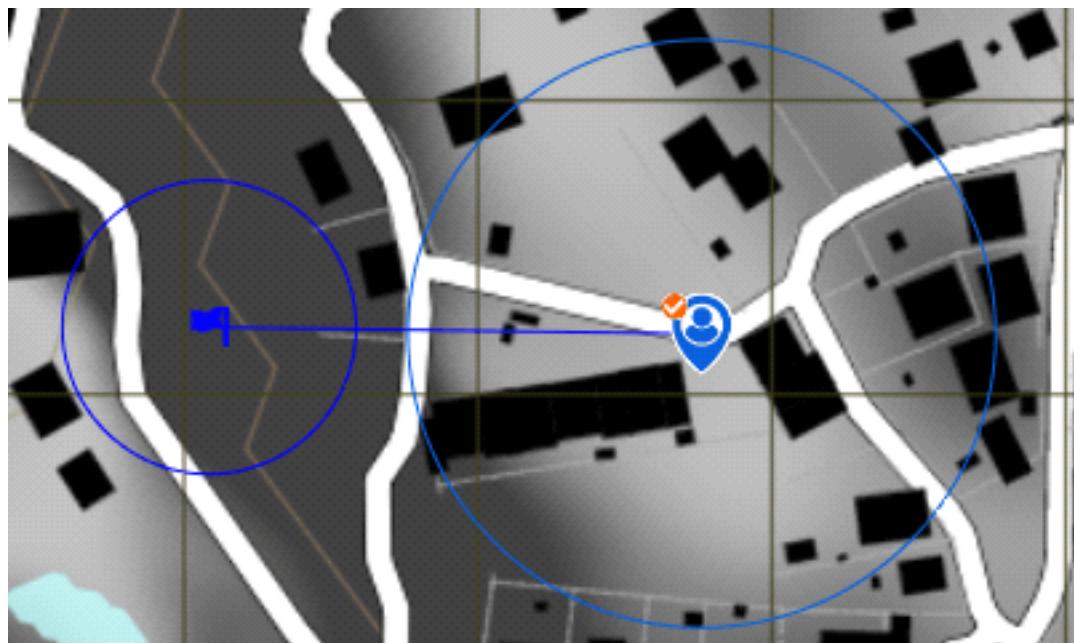
**NOTE**

It is recommended to set the **Repeatedly** setting to **false** to allow repeated activation / deactivation of the trigger, to start / stop the population activity.

The Trigger Editor Object is created.

- Link the Trigger Editor Object to an [Population Editor Object \(on page 574\)](#) by right-clicking the Population Editor Object, selecting **Link to Trigger** in the context menu, and clicking the Trigger Editor Object.
- In the Editor (Execute Mode), right-click the Trigger Editor Object, and select **Activate Trigger / Deactivate Trigger** to activate / deactivate the Trigger Editor Object.

**Image-131: Trigger Editor Object linked to a Population Editor Object**



The civilian pattern of life simulation appears / disappears for the selected population.

#### 10.14.5.4 Initiating Activities

As a scenario administrator, you can use triggers to start / stop (or lock / unlock) various population activities in areas.

**Follow these steps:**

- Open the Editor (Prepare Mode).
- Select (**F7**) **Trigger** in the Editor Objects List, and place a Trigger Editor Object on the map.

- Fill the Trigger Editor Object settings, as required (for more information, see Triggers in the VBS4 Editor Manual), and click **OK**.

**i** **NOTE**

It is recommended to set the **Repeatedly** setting to **false** to allow repeated activation / deactivation of the trigger, to start / stop the population activity.

The Trigger Editor Object is created.

- Link the Trigger Editor Object to an [Activity Editor Object \(on page 577\)](#), which generates a certain population activity, by right-clicking the Activity Editor Object, selecting **Link to Trigger** in the context menu, and clicking the Trigger Editor Object.

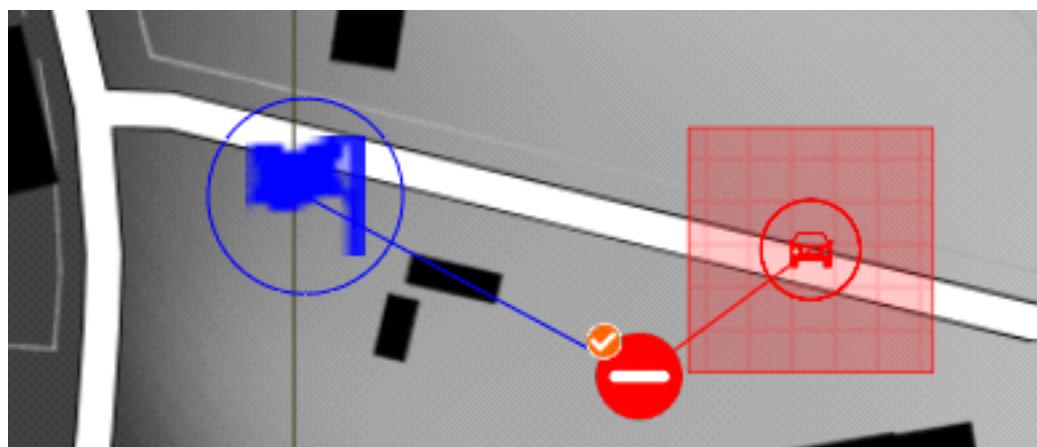
**!** **WARNING**

Since the activity is activated / deactivated in a certain area, make sure there is also an [Area Editor Object \(on page 584\)](#) linked to the Activity Editor Object (see step 4 of [Create Areas \(on page 533\)](#)).

- In the Editor (Execute Mode), right-click the Trigger Editor Object, and select **Activate Trigger** / **Deactivate Trigger** to activate / deactivate the Trigger Editor Object.

Activating / deactivating the trigger starts / stops the linked activity in the given area.

**Image-132: Trigger Editor Object linked to an Activity Editor Object**



## 10.14.6 Basic Example Scenario

This topic demonstrates the main features of the Civilian AI functionality, discussed in the previous [Civilian AI \(on page 521\)](#) topics, and how to use them to design an example train station scenario.

### Scenario Definition

The example scenario is the simulation of civilians at a train station.

The example uses three populations:

- **Departing Passengers** - A pedestrian population that spawns at the train station entrance, enters the station, buys items at the train station shops and / or vending machines, gets tickets, and despawns at the train platform (simulating boarding the train).
- **Arriving Passengers** - A pedestrian population that spawns at the trains (simulating getting off the train), buys items at the station shops and / or vending machines, leaves the station, and despawns.
- **City Population** - A general (pedestrian and vehicle traffic) ambient population that serves as the city population, where the train station is located.

The scenario also defines a train-station attacker threat, which is a moving hostile entity that causes panic within a predefined distance / area from civilians, and a safe zone, where departing and arriving passengers flee from the threat.

In addition, the train station also has a restricted area, which can be restricted / allowed in-game by the scenario administrator, using a Trigger Editor Object (see [Triggers in the VBS4 Editor Manual](#)). This can be used to simulate a train-station area, where passengers are not allowed.

For more information, see:

- [Define Smart Objects \(on the next page\)](#)
- [Define Departing Passengers \(on page 560\)](#)
- [Define Arriving Passengers \(on page 564\)](#)
- [Define the City Population \(on page 564\)](#)
- [Define the Threat \(on page 566\)](#)
- [Define the Safe Zone \(on page 569\)](#)
- [Define the Restricted Area \(on page 571\)](#)
- [Run the Scenario as Administrator \(on page 572\)](#)

## 10.14.6.1 Define Smart Objects

Place [Smart Objects \(on page 585\)](#) for the **Departing Passengers** and **Arriving Passengers** populations to interact with on the train-station premises (the Smart Objects are used to automatically create civilian interaction activities - for more information, see [Define Pedestrian Flows \(on page 530\)](#)).

### ★ FEATURE NOTICE

This feature is part of French VBS4, a licensed product. For more information, contact [sales@bisimulations.com](mailto:sales@bisimulations.com).

#### Follow these steps:

1. Place ticket machines, where civilians can buy train tickets: in the Editor Objects List, select the **(F8) Objects > FR Structures > Ticket Machine**, and place it on the map.



2. Place trash bins, where civilians can dispose trash: in the Editor Objects List, select the **(F8) Objects > FR Structures > Trashbin**, and place it on the map.



3. Place benches for civilians to sit on: in the Editor Objects List, select **(F8) Objects > FR Structures > Bench**, and place it on the map.

**Image-133: Civilians sitting on a bench**



4. Place timetable displays for civilians to use: in the Editor Objects List, select **(F8) Objects > FR Structures > Info Screen**, and place it on the map.

**Image-134: Civilians checking a timetable display**



5. Repeat any of the preceding procedure steps to place more Smart Objects.

Once the Smart Objects are placed, the relevant activities can be created automatically in:

- [Define Departing Passengers \(on the next page\)](#)
- [Define Arriving Passengers \(on page 564\)](#)

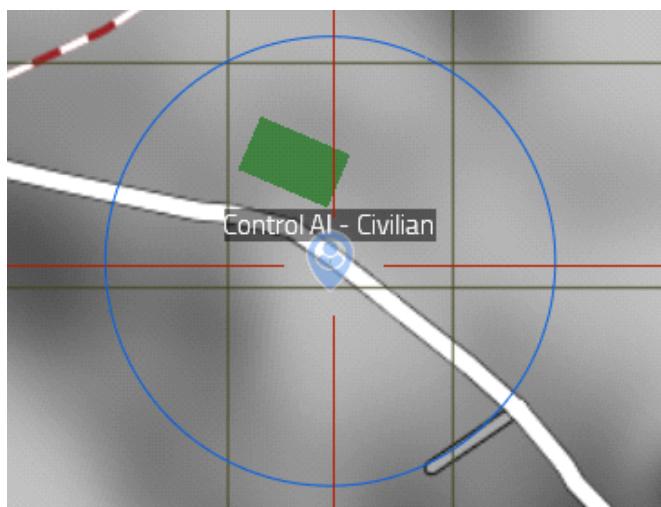
## 10.14.6.2 Define Departing Passengers

The departing passengers population is a pedestrian-only (no vehicles defined) population that spawns at the station entrance, enters, buys items at the train station shops and / or vending machines, gets tickets, and despawns at the train platform (simulating boarding the train).

### Follow these steps:

1. In the Editor Objects List, select the **Control AI - Civilian** Editor Object, and place it in such a way on the map, so that it covers the train station area.
2. In **Civilian > Settings**, set:
  - **Number of Pedestrians** - The number of departing passengers you want.
  - Set the following panic-related settings (the panic behavior is expanded on in [Define the Threat \(on page 566\)](#) and [Define the Safe Zone \(on page 569\)](#)):
    - **Panic Duration** - Set the panic duration (in minutes) for the departing passengers.
    - **Threat Detection** - Set the departing-passengers threat detection to **Only populace within hearing range or line of sight reacts to threats**.
    - **Flee Distance** - Set the departing-passengers flee distance from the threats (in meters). Choose any value.
  - **Number of Vehicles** - Set to 0 as this is only a departing-passengers population.
  - **Radius** - Make the population radius big enough to cover the train station area.

**Image-135: Control AI - Civilian Editor Object covering the train station**



- **Civilian AI Identifier** - Select **Cobalt** in the drop-down.
- **Smart Objects** - Check this to automatically create relevant activities for the Smart Objects you defined in [Define Smart Objects \(on page 558\)](#).

3. **Optional:** In **Civilian > Populace**, you change the default pedestrian models. For more information, see [Specify Civilian Populace \(on page 525\)](#).

**i** **NOTE**

Since the departing-passengers population has no vehicles, **Civilian > Vehicles** should be left as is. By setting **Number of Vehicles** to 0, no vehicles are generated.

4. Click **Place Civilian Editor Object** to place the population on the map.

The departing-passengers population is placed on the map, along with Smart Object activities for departing passengers.

Now, you can add spawn points at the train station entrance, to simulate departing passengers entering the station.

5. In the Editor Objects List, select **Control AI - Activity** and place it next to the station entrance.

6. In the **Activity Creator**, set:

- **Name** - The name of your spawn point (for example, "Enter Station").
- **Type** - Select **Spawn / Despawn** in the drop-down.
- **Activity** - Select **Spawn** in the drop-down.
- **Civilian AI Identifier** - Select **Cobalt** in the drop-down, to match the departing-passengers population **Civilian AI Identifier**.

7. Click **Place Activity**.

The spawn point is placed by the train station entrance.

Repeat steps 5 - 7 to create additional spawn points by the station entrance, if needed.

8. In the Editor Objects List, select **Control AI - Activity** and place it as a loitering activity anywhere in the train station area.

**Image-136: Loitering civilians**



## 9. In the **Activity Creator**, set:

- **Name** - The name of your loitering activity (for example, "Walk Around").
- **Type** - Select **Generic** in the drop-down.
- **Activity** - Select **Loiter** in the drop-down.
- **Civilian AI Identifier** - Select **Cobalt** in the drop-down, to match the departing-passengers population **Civilian AI Identifier**.
- **Sequence Number** - To make loitering follow ticket-purchasing, this should be set to 2.
- **Capacity** - Specify how many departing passengers you want to loiter at the loitering activity location.

### NOTE

If there is no free capacity left at the activities with a relevant **Mandatory** sequence (see step 9 and the **Buy Item (Vending Machine)** activity), the civilian entities loiter around the place. It is not necessary to explicitly specify a loitering area / activity. However, if loitering has to happen at a specific location, this can be achieved by specifying an activity or an area for it.

- **Priority** - To make loitering optional, select **Optional**.
- **Create Area** - Check this option to create a loitering area.

## 10. Click **Place Activity**.

The loitering activity and area are placed on the map. If you want to change the loitering area size, see [Edit Areas \(on page 536\)](#).

11. In the Editor Objects List, select **Control AI - Activity** and place it on the train-station platform, next to the train.

**TIP**

The (**F8**) **Objects > FR Structures > Train Wagon** is specifically intended for the despawn train-boarding activity.

**FEATURE NOTICE**

This feature is customer exclusive. For more information, contact [sales@bisimulations.com](mailto:sales@bisimulations.com).

**Image-137: Civilians boarding the train**



12. In the **Activity Creator**, set:

- **Name** - The name of your despawn point (for example, "Board Train").
- **Type** - Select **Spawn / Despawn** in the drop-down.
- **Activity** - Select **Despawn** in the drop-down.
- **Civilian AI Identifier** - Select **Cobalt** in the drop-down, to match the departing-passengers population **Civilian AI Identifier**.

13. Click **Place Activity**.

The despawn point is placed by the train.

Create additional despawn points along other train sections, if needed.

The departing-passengers population definition is complete.

### 10.14.6.3 Define Arriving Passengers

The arriving passengers population is a pedestrian-only (no vehicles defined) population that spawns at the trains (simulating getting off the train), buys items at the station shops and / or vending machines, leaves the station, and despawns.

#### Follow these steps:

1. Repeat steps 1 - 4 of [Define Departing Passengers \(on page 560\)](#) to create the population. Select **Sky** as the **Civilian AI Identifier**, to distinguish from departing passengers.  
The arriving population is placed, along with Smart Object activities for departing passengers.  
Now, add spawn points at the platform, next to the train, to simulate passengers getting off the train.
2. Repeat steps 5 - 7 of [Define Departing Passengers \(on page 560\)](#) to create spawn points. Select **Sky** as the **Civilian AI Identifier**, to match the arriving population **Civilian AI Identifier**.
3. Repeat steps 8 - 10 of [Define Departing Passengers \(on page 560\)](#) to create the loitering activity. Select **Sky** as the **Civilian AI Identifier**, to match the arriving population **Civilian AI Identifier**:  
Now, add despawn points at the station exit, to simulate passengers leaving the station.
4. Repeat steps 11 - 13 of [Define Departing Passengers \(on page 560\)](#) to create despawn points. Select **Sky** as the **Civilian AI Identifier**, to match the arriving population **Civilian AI Identifier**.

The arriving passengers population definition is complete.

### 10.14.6.4 Define the City Population

The city population is a general ambient population, surrounding the train station.

#### Follow these steps:

1. In the Editor Objects List, select the **Control AI - Civilian** Editor Object, and place it in such a way on the map, so that it covers the city area, where the train station is located.
2. In **Civilian > Settings**, set:
  - **Number of Pedestrians** - The number of city pedestrians you want.
  - **Number of Vehicles** - The number of city vehicles you want.
  - **Radius** - Make the city population radius big enough to cover the city area.
  - **Civilian AI Identifier** - Select **Shamrock** to distinguish from the departing and arriving populations.
3. **Optional:** In **Civilian > Populace** and **Civilian > Vehicles**, you change the default pedestrian and vehicle models. For more information, see [Specify Civilian Populace \(on page 525\)](#) and [Specify Vehicle Traffic \(on page 527\)](#).

4. To create a vehicle spawn point, in the Editor Objects List, select **Control AI - Activity** and place it on one of the city roads.
5. In the **Activity Creator**, set:
  - **Name** - The name of your spawn point (for example, "Vehicles Entering City").
  - **Type** - Select **Spawn / Despawn** in the drop-down.
  - **Activity** - Select **Vehicle Spawn** in the drop-down.
  - **Civilian AI Identifier** - Select **Shamrock** in the drop-down, to match the city population **Civilian AI Identifier**.
6. Click **Place Activity**.

The vehicle spawn point is placed on the city road.  
Create additional vehicle spawn points on other city roads, if needed.
7. To create vehicle despawn points, repeat steps 4 - 6, and for each despawn point, select **Vehicle Despawn** in the **Activity** drop-down.
8. Create pedestrian spawn and despawn points in the same way as described in [Define Departing Passengers \(on page 560\)](#) next to city buildings, to simulate city pedestrians leaving and entering them. For each pedestrian spawn and despawn activity, select **Shamrock** in the **Civilian AI Identifier** drop-down, to match the city population **Civilian AI Identifier**.

The city population definition is complete.

**Image-138: City population with pedestrians and vehicle traffic**



## 10.14.6.5 Define the Threat

The threat is a moving attacker entity that causes panic within a predefined distance / area from pedestrians and vehicles.

### NOTE

Panic has the following considerations:

- When panic is active, pedestrians flee, while vehicles stop.
- Panic is automatically activated as a result of a shooting or an explosion.

### Follow these steps:

1. In the Editor Objects List, select **(F1) Unit** and double-click a location on the map next to or within the train station, where you want to place the attacker entity.
2. Click **OK**.

The attacker entity is placed on the map.

Now, make the attacker move to the train station.

3. Right-click the attacker entity, select **Orders > Assign New Waypoint** in the context menu, and click a location inside the train station.
4. In the **Objects Properties** dialog, select **Individual - Move** in the **Behavior** list, and click **OK**.

The attacker entity has a Control AI Individual - Move waypoint, represented by the [Individual - Move Order \(on page 440\)](#), to enter the train station.

Now, you can define panic behavior for departing and arriving passengers. The panic behavior consists of two panic activities - one for departing and another for arriving passengers. Each panic activity is linked to its own panic area, and both panic areas are then linked to the attacker entity. For realism, it is recommended for the two areas to overlap, to simulate both departing and arriving passengers reacting in panic to the attacker entity.

5. In the Editor Objects List, select **Control AI - Activity** and place the activity on the map, close to the attacker entity.

## 6. In the **Activity Creator**, set:

- **Name** - The name of your panic activity (for example, "Departing Passengers Panic").
- **Type** - Select **Interrupt** in the drop-down.
- **Activity** - Select **Start Panic** in the drop-down.

**i** **NOTE**

This activity requires the presence of an area, which is why **Create Area** is automatically checked, to create the linked area.

This allows you to create a departing-passengers panic area.

- **Civilian AI Identifier** - Select **Cobalt** in the drop-down, to match the departing-passengers population **Civilian AI Identifier**.

## 7. Click **Place Activity**.

The departing-passengers panic activity and area are created. If you want to change the panic area size, see [Edit Areas \(on page 536\)](#).

## 8. Right-click the area, select **Attach to Unit or Vehicle** in the context menu, and click the attacker entity.

The departing-passengers panic area is attached to the attacker.

## 9. In the Editor Objects List, select **Control AI - Activity** and place the activity on the map, close to the attacker entity.

## 10. In the **Activity Creator**, set:

- **Name** - The name of your panic activity (for example, "Arriving Passengers Panic").
- **Type** - Select **Interrupt** in the drop-down.
- **Activity** - Select **Start Panic** in the drop-down.

**i** **NOTE**

This activity requires the presence of an area, which is why **Create Area** is automatically checked, to create the linked area.

This allows you to create an arriving-passengers panic area.

- **Civilian AI Identifier** - Select **Sky** in the drop-down, to match the arriving-passengers population **Civilian AI Identifier**.

## 11. Click **Place Activity**.

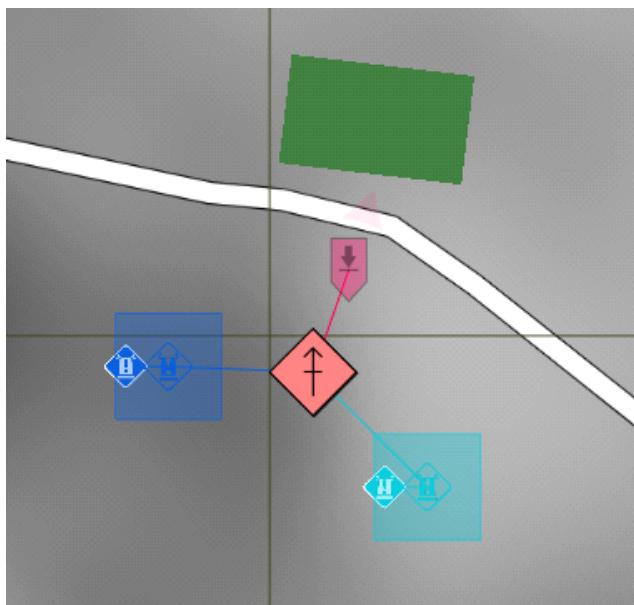
The arriving-passengers panic activity and area are created. If you want to change the panic area size, see [Edit Areas \(on page 536\)](#).

12. Right-click the area, select **Attach to Unit or Vehicle** in the context menu, and click the attacker entity.

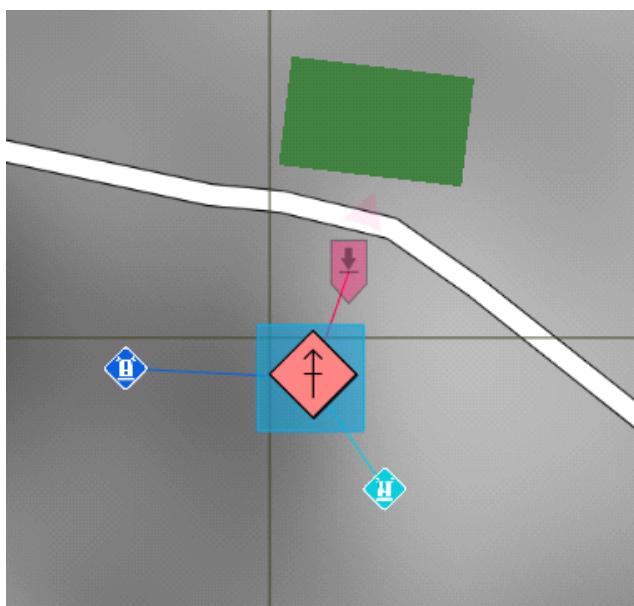
The arriving-passengers panic area is attached to the attacker.

13. Move both departing-passengers and arriving-passengers areas so that they overlap, with the attacker entity at the center of each.

**Image-139: Areas with an attacker entity, before overlap**



**Image-140: Overlapping areas with an attacker entity**



The attacker entity is set up to cause panic among departing and arriving passengers.

## 10.14.6.6 Define the Safe Zone

The scenario has a safe zone, where departing and arriving passengers flee from the threat.

From a scenario-design perspective, there are two safe zones (one for departing and another for arriving passengers) that are used to hide from the train-station attacker, where civilians run in panic. For realism, to simulate a common safe zone, the two safe zones are made to overlap and occupy the same area that all the train-station civilians (departing and arriving passengers) can use.

### Follow these steps:

1. In the Editor Objects List, select **Control AI - Activity** and place it on the map, close to where you want the common safe zone to be.
2. In the **Activity Creator**, set:
  - **Name** - The name of your panic activity (for example, "Departing Passengers Safe Zone").
  - **Type** - Select **Area Based** in the drop-down.
  - **Activity** - Select **Safe Zone** in the drop-down.
  - **Civilian AI Identifier** - Select **Cobalt** in the drop-down, to match the departing-passengers population **Civilian AI Identifier**.
  - **Create Area** - Check this option to create a departing-passengers safe zone area.
3. Click **Place Activity**.

The departing-passengers safe zone activity and area are created. If you want to change the safe-zone area size, see [Edit Areas \(on page 536\)](#).
4. In the Editor Objects List, select **Control AI - Activity** and place it on the map, close to where you want the common safe zone to be.
5. In the **Activity Creator**, set:
  - **Name** - The name of your panic activity (for example, "Arriving Passengers Safe Zone").
  - **Type** - Select **Area Based** in the drop-down.
  - **Activity** - Select **Safe Zone** in the drop-down.
  - **Civilian AI Identifier** - Select **Sky** in the drop-down, to match the arriving-passengers population **Civilian AI Identifier**.
  - **Create Area** - Check this option to create an arriving-passengers safe zone area.
6. Click **Place Activity**.

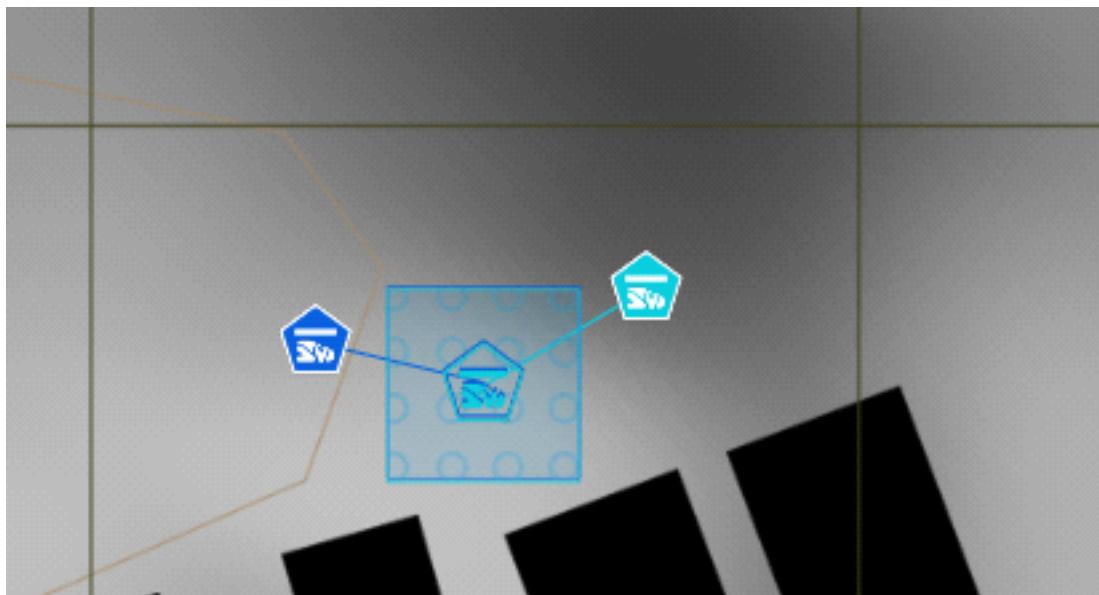
The arriving-passengers safe zone activity and area are created. If you want to change the safe-zone area size, see [Edit Areas \(on page 536\)](#).

7. Move both departing-passengers and arriving-passenger safe zone areas so that they overlap, to create a common safe zone.

**Image-141: Safe zone areas, before overlap**



**Image-142: Overlapping safe zone areas**



The common safe zone, for both departing and arriving passengers, is defined.

### 10.14.6.7 Define the Restricted Area

The train station also has a restricted area for pedestrian civilians, which can be restricted / unrestricted in-game by the scenario administrator, using a Trigger Editor Object (see Triggers in the VBS4 Editor Manual). This can be used to simulate a train-station area, where passengers are not allowed.

#### Follow these steps:

1. In the Editor Objects List, select **Control AI - Activity** and place it on the map, close to where you want the restricted area to be.
2. In the **Activity Creator**, set:
  - **Name** - The name of your panic activity (for example, "Staff-Only Area").
  - **Type** - Select **Area Based** in the drop-down.
  - **Activity** - Select **Restrict Access (Pedestrians)** in the drop-down.

 **NOTE**

This activity requires the presence of an area, which is why **Create Area** is automatically checked, to create the linked area.

3. Click **Place Activity**.

The restricted-access activity and area are created. If you want to change the restricted area size, see [Edit Areas \(on page 536\)](#).

4. In the Editor Objects List, select (**F7**) **Trigger** and place it next to the restricted-access area.
5. Fill the Trigger Editor Object settings, as required (for more information, see Triggers in the VBS4 Editor Manual), and click **OK**.

 **WARNING**

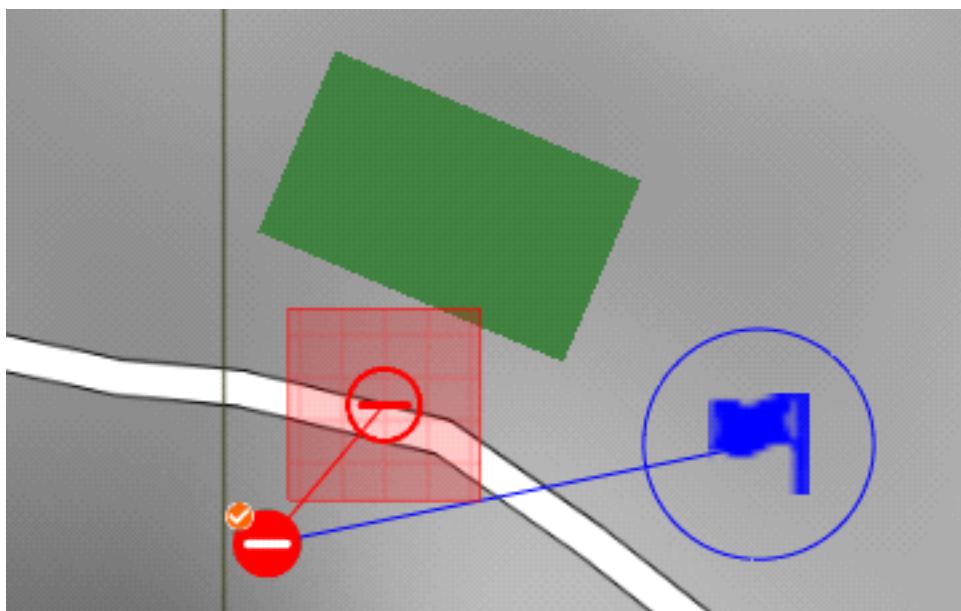
To repeatedly activate / deactivate the trigger, make sure to set **Repeatedly** to **true**.

The Trigger Editor Object is created.

6. Right-click the restricted-access activity, select **Link to Trigger** in the context menu, and click the Trigger Editor Object.

The restricted-access activity is linked to the trigger.

The restricted-access area is defined.

**Image-143: Restricted-access activity, area, and trigger**

#### 10.14.6.8 Run the Scenario as Administrator

Once the scenario is designed, you can run it as the scenario administrator.

When you run the scenario, you observe the following events in the Editor (Execute Mode):

1. The three populations are generated:
  - Departing and arriving passengers appear at the train station, and engage in their assigned activities, as described in [Define Departing Passengers \(on page 560\)](#) and [Define Arriving Passengers \(on page 564\)](#).
  - The city population (pedestrians and vehicle traffic) appears across the city. Pedestrians engage in their assigned activities, while vehicles drive from their spawn to their despawn points, as described in [Define the City Population \(on page 564\)](#).
2. The attacker entity enters the train station and causes departing and arriving passengers to flee in panic to their common safe zone, as described in [Define the Threat \(on page 566\)](#) and [Define the Safe Zone \(on page 569\)](#).

You can manually restrict / allow civilian access to the restricted-access area created in [Define the Restricted Area \(on the previous page\)](#).

**Follow these steps:**

1. In the Editor (Execute Mode), right-click the Trigger Editor Object.
2. Select **Activate Trigger / Deactivate Trigger** to activate / deactivate the Trigger Editor Object.

Activating / deactivating the trigger restricts / allows civilian access to the restricted-access area.

## 10.14.7 Civilian AI Editor Objects

The civilian Control AI uses the following Editor Objects:

Editor Object	Description
Population Editor Object (on the next page)	Defines the population (pedestrians and vehicles).
Activity Editor Object (on page 577)	Defines the population activities (for a given population).
Area Editor Object (on page 584)	Defines an area within the general population area.
Smart Objects (on page 585)	Lists additional Editor Objects that civilians can interact with.

## 10.14.7.1 Population Editor Object

The Population Editor Object (appears as **Control AI - Civilian** in the Editor (Prepare / Execute Mode) Editor Objects List - see [Control AI UI Overview \(on page 415\)](#)) defines the population (pedestrians and vehicles). For more information, see [Define Populations \(on page 522\)](#).

It consists of the following settings:

Population Setting	Description
<b>Number of Pedestrians</b>	Number of pedestrians in the population.
<b>Panic Duration</b>	Panic duration (if panic ensues, due to a threat) (in minutes). <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <b>NOTE</b> <p>If Panic Duration is less than the amount of time it takes civilians to get to a Safe Zone (see <a href="#">Define Pedestrian Flows (on page 530)</a>), the civilians stop panicking before reaching the Safe Zone.</p> </div>
<b>Threat Detection</b>	Defines how panic starts, based on the detected threat. Has the following options: <ul style="list-style-type: none"> <li>• <b>All populace reacts to the threat</b></li> <li>• <b>Only populace within hearing range reacts to threats</b></li> <li>• <b>Only populace within hearing range or line of sight reacts to threats</b></li> </ul>
<b>Flee Distance</b>	Defines the distance (in meters) from the threat to which pedestrians flee in panic. <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <b>NOTE</b> <p>If Flee Distance is smaller than the distance to a Safe Zone (see <a href="#">Define Pedestrian Flows (on page 530)</a>), some civilians hide in the Safe Zone, while others only rely on Flee Distance.</p> </div>
<b>Number of Vehicles</b>	Number of vehicles in the population. <div style="border: 2px solid red; padding: 10px; margin-top: 10px;"> <b>WARNING</b> <p>If you add vehicles to your civilian population (<b>Number of Vehicles</b> is greater than 0), you must define <b>Vehicle Spawn</b> and <b>Vehicle Despawn</b> activities. Also, <b>Vehicle Spawn</b> and <b>Vehicle Despawn</b> activities must be placed on roads. Placing them elsewhere does not create vehicle traffic. For more information, see <a href="#">Spawn / Despawn (on page 580)</a> activities.</p> </div>

Population Setting	Description
Shape	Population area shape on the map.  <b>NOTE</b> Only <b>Circle</b> is available.
Radius	Radius of the population area (in meters).
Civilian AI Identifier	Population color identifier. Different populations can have different roles, and color identifiers are used to distinguish between these roles.  <b>TIP</b> Click the <b>Information</b> icon for an explanation of how a population can only perform activities (see <a href="#">Define Pedestrian Flows (on page 530)</a> ), defined using the same color identifier. 
Smart Objects	Check this to automatically create relevant population activities for any Smart Objects placed on the map. For a full list of Smart Objects, see <a href="#">Smart Objects (on page 585)</a> .  <b>WARNING</b> To automatically create relevant population activities for your Smart Objects, make sure to place them first, before creating the population.

### 10.14.7.1.1 Range Visualization

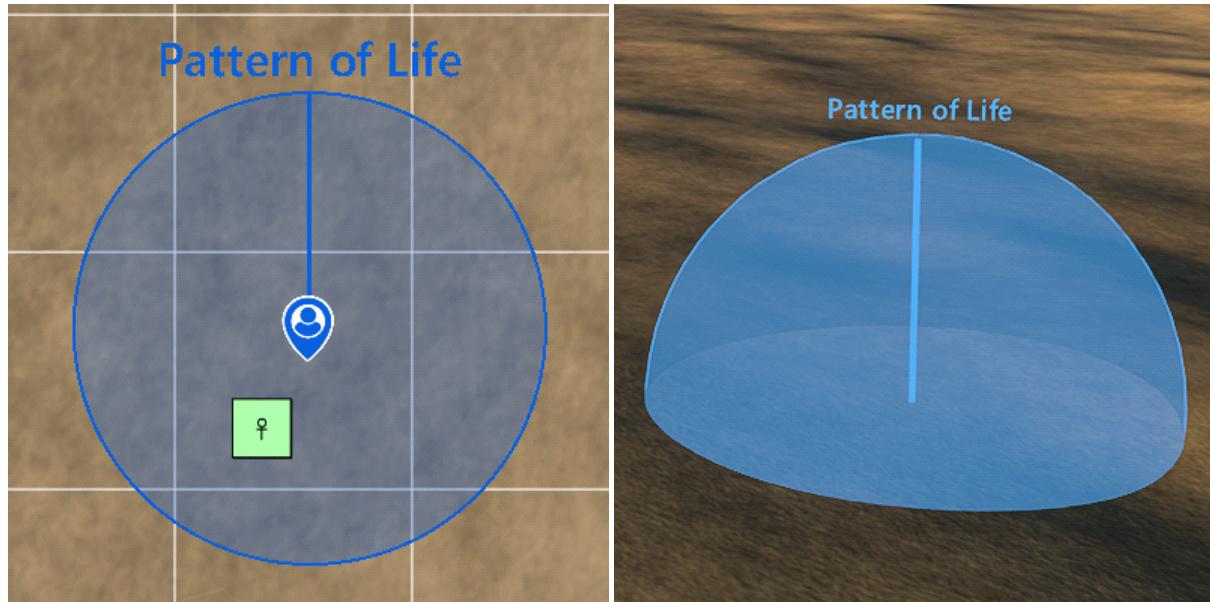
In VBS4, the **Radius** of the population area can be displayed as a range visualization.

#### 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-144: 2D and 3D range visualization**



## 10.14.7.2 Activity Editor Object

The Activity Editor Object (appears as **Control AI - Activity** in the Editor (Prepare / Execute Mode) Editor Objects List - see [Control AI UI Overview \(on page 415\)](#)) defines the population activities (for a given population - see [Population Editor Object \(on page 574\)](#) and [Define Populations \(on page 522\)](#)).

### 10.14.7.2.1 Activity Settings

It consists of the following settings:

Setting	Description
<b>Name</b>	Activity name.  <b>NOTE</b> The activity <b>Name</b> setting cannot be used as an Editor Object variable name.
<b>Type</b>	The following activity types are available for Civilian AI: <ul style="list-style-type: none"><li>• <a href="#">Spawn / Despawn (on page 580)</a></li><li>• <a href="#">Generic (on page 581)</a></li><li>• <a href="#">Interrupt (on page 581)</a></li><li>• <a href="#">Area (on page 583)</a></li></ul> <b>WARNING</b> Civilian children do not perform any activities, apart from the <b>Start Panic</b> activity.
<b>Civilian AI Identifier</b>	Activity color identifier.  <b>NOTE</b> Has to match the population <a href="#">Civilian AI Identifier (on page 524)</a> (by default, it matches the color of the latest created population). Use the color to distinguish one population from another, if each has different roles in the simulation.
<b>Sequence Number</b>	Sequence step number for generic activities (for example, an activity with a sequence number of 3 cannot begin before an activity with a sequence number of 2).  <b>NOTE</b> Only works with <b>Generic</b> activities.

Setting	Description
<b>Capacity</b>	<p>Maximum number of entities to perform the activity.</p> <p>The following considerations apply:</p> <ul style="list-style-type: none"> <li>• The automatic Control AI reservation system checks the activity capacity, before entities start moving towards the activity. This is done to avoid the problem of having entities arriving to the activity area / position, when the capacity is full.</li> <li>• For <b>Safe Zone</b> activities, entities cluster about the activity area / point in parallel.</li> <li>• For all other activity types, one entity performs the activity at a time, the rest form a queue, where:</li> </ul> <pre><code>queue length = capacity - 1</code></pre> <p>The -1 is due to one entity performing the activity.</p> <ul style="list-style-type: none"> <li>• If the activity is linked to an area (see <a href="#">Create Areas (on page 533)</a>), no queue is formed, and all the civilian entities up to the defined capacity can perform the activity at the same time, at a random position within the defined area.</li> </ul>
<b>Priority</b>	<p>Activity priority. Can be:</p> <ul style="list-style-type: none"> <li>• <b>Optional</b> - The activity is optional and does not have to be performed.</li> <li>• <b>Mandatory</b> - The activity must be performed.</li> </ul> <p>The following considerations apply:</p> <ul style="list-style-type: none"> <li>• Only works with <b>Generic</b> activities.</li> <li>• Civilians always try to perform at least one <b>Mandatory</b> activity in a sequence step (see <a href="#">Sequence Number (on the previous page)</a>).</li> <li>• If there are only <b>Optional</b> activities in a sequence step, the entities skip the sequence step.</li> <li>• If there are also <b>Mandatory</b> activities in the sequence step, the entities cannot proceed, until they complete a <b>Mandatory</b> activity.</li> <li>• If the <b>Mandatory</b> activities are at full <a href="#">Capacity (above)</a> or locked (if the activity is linked to a trigger - see <a href="#">Initiating Activities (on page 555)</a>), the entities keep performing <b>Optional</b> activities in the same sequence step, until a <b>Mandatory</b> one becomes available.</li> <li>• If the <b>Mandatory</b> and <b>Optional</b> activities are at full <a href="#">Capacity (above)</a> or locked (if the activity is linked to a trigger - see <a href="#">Initiating Activities (on page 555)</a>), the entities keep performing <b>Idle</b> (free loitering) activities in the same sequence step, until a <b>Mandatory</b> or an <b>Optional</b> activity becomes available.</li> </ul>

Setting	Description
Create Area	<p>Check <b>Create Area</b> to create an area, where the activity takes place.</p> <p><b>NOTE</b> For activities that require the presence of an area, this option is automatically checked.</p> <p>This creates an area (<a href="#">Area Editor Object (on page 584)</a>) with the default size of 25 meters x 25 meters (to change the area size, see <a href="#">Edit Areas (on page 536)</a>), linked to the Activity Editor Object.</p> <p>Alternatively, you can create the activity and the area separately, and then link the former to the latter. For more information, see <a href="#">Create Areas (on page 533)</a>.</p>

#### 10.14.7.2.2 Activity Types

The following activity types are available for Civilian AI:

- [Spawn / Despawn \(on the next page\)](#)
- [Generic \(on page 581\)](#)
- [Interrupt \(on page 581\)](#)
- [Area \(on page 583\)](#)

Each **Type** has several **Activity** sub-types.

##### **WARNING**

Civilian children do not perform any activities, apart from the **Start Panic** activity.

### 10.14.7.2.2.1 Spawn / Despawn

Locations where pedestrians or vehicles appear and disappear.

#### NOTE

The **Spawn / Despawn** activity type has the following considerations:

- The **Spawn / Despawn** are the first activities you need to create, for civilian entities to appear and disappear in your simulation.
- If no **Spawn / Despawn** activities are created, and only the [Population Editor Object \(on page 574\)](#) is placed on the map, only pedestrians spawn anywhere within the population [Radius \(on page 524\)](#) and never despawn, while vehicles never spawn, even if vehicle models are defined for the given population.

#### Spawn / Despawn Activities:

- **Spawn** - Pedestrian spawn point.
- **Despawn** - Pedestrian despawn point.
- **Vehicle Spawn** - Vehicle spawn point.
- **Vehicle Despawn** - Vehicle despawn point.

#### WARNING

Any **Vehicle Spawn** activity requires the presence of a **Vehicle Despawn** activity. Also, **Vehicle Spawn** and **Vehicle Despawn** activities must be placed on roads. Placing them elsewhere does not create vehicle traffic.

#### NOTE

**Spawn / Despawn** activities can be optionally linked to an area (see [Create Area \(on the previous page\)](#)).

### 10.14.7.2.2 Generic

Any generic crowd activity.

Generic activities form the backbone of the pattern of life simulation, and are used in a sequenced flow, which is determined by the [Sequence Number \(on page 577\)](#), [Capacity \(on page 578\)](#), and [Priority \(on page 578\)](#) of each sequence step activity.

#### Generic Activities:

##### NOTE

The **Generic** activity is performed differently, depending on the defined [Capacity \(on page 578\)](#) and an optionally linked area (see [Create Area \(on page 579\)](#)).

- **Loiter** - The civilians loiter around.
- **Buy Item** - Plays a stand or shop counter buy animation.
- **Buy Item (Vending Machine)** - Plays a vending-machine buy animation.
- **Throw Away Trash** - Plays an animation of throwing away trash.
- **Sit Down** - Plays an animation of sitting down.
- **Look At** - Plays an animation of looking at something.

### 10.14.7.2.3 Interrupt

Any activity that interrupts other activities.

##### NOTE

All **Interrupt** activities are always automatically linked to an area (see [Create Area \(on page 579\)](#)).

#### Interrupt Activities:

##### NOTE

The **Interrupt** activity is always automatically linked to an area (see and [Create Area \(on page 579\)](#)). **Start Panic** and **Move To / Run To** activities can be also attached to moving entities.

- **Start Panic** - Makes civilians run in panic.

**NOTE**

The following considerations apply:

- When panic is active, pedestrians flee, while vehicles stop.
- Panic is automatically activated as a result of a shooting or an explosion.

For more information, see the following population settings for panic: [Panic Duration \(on page 523\)](#), [Threat Detection \(on page 523\)](#), [Flee Distance \(on page 523\)](#).

- **Gather Crowd** - Causes the civilian entities to stop whatever they are doing, and look at a location.

**NOTE**

The following considerations apply:

- To look at the specified location, the civilian entities first need to be in an area, linked to the activity (see [Create Area \(on page 579\)](#)). To force the civilian entities to move to the area, use either the **Walk To** or **Run To** activities.
- Once the civilian entities are in the area, they assume a random position in it, and look at the specified location.
- The crowd continues to look at the location, until the **Gather Crowd** activity is removed or disabled with a trigger (see [Initiating Activities \(on page 555\)](#)).
- Civilians cannot gather on roads.

- **Walk To** - Causes the crowd to stop whatever they are doing, and walk to a certain location.

**NOTE**

Once the civilians arrive to the location, they resume their other activities.

- **Run To** - Causes the crowd to stop whatever they are doing, and run to a certain location.

**NOTE**

Once the civilians arrive to the location, they resume their other activities.

For more information on using the **Interrupt** activity sub-type, see [Defining Responsive Behavior \(on page 552\)](#).

#### 10.14.7.2.2.4 Area

Any activity that is area-defining.

##### Area Activities:

- **Restrict Access (Pedestrians)** - Keeps civilian pedestrians from entering an area (ignored by civilians in panic).

##### NOTE

The following considerations apply:

- The access restriction applies to all the civilian pedestrians of all the populations (see [Define Populations \(on page 522\)](#) defined in the scenario).
- This area-based activity is always automatically linked to an area (see [Create Area \(on page 579\)](#)).

- **Restrict Access (Vehicles)** - Keeps civilian vehicles from entering any roads that the area partially / fully overlaps (the roads are excluded from vehicle path-planning).

##### NOTE

The following considerations apply:

- The access restriction applies to all the civilian vehicles of all the populations (see [Define Populations \(on page 522\)](#) defined in the scenario).
- This area-based activity is always automatically linked to an area (see [Create Area \(on page 579\)](#)).

- **Safe Zone** - Designates where civilians hide, when panic sets in.

##### NOTE

It is not mandatory for this area-based activity to have an area linked to it. In the absence of an area, civilians gather around the activity position on the map, creating a crowd numbering up to the activity [Capacity \(on page 578\)](#).

### 10.14.7.3 Area Editor Object

The Area Editor Object (appears as **Control AI - Area** in the Editor (Prepare / Execute Mode) Editor Objects List - see [Control AI UI Overview \(on page 415\)](#)) defines an area within the general population area, created using the [Population Editor Object \(on page 574\)](#), which is used by pedestrian and vehicle traffic flows. For more information, [Define Pedestrian Flows \(on page 530\)](#) and [Define Traffic Flows \(on page 540\)](#).

It consists of the following settings:

Area Setting	Description
<b>Size (Left-Right)</b>	Area width (in meters).
<b>Size (Up-Down)</b>	Area height (in meters).

## 10.14.7.4 Smart Objects

Specific Editor Objects work as Smart Objects, or additional points of interest for civilians.



### TIP

You can automatically create the relevant activities for Smart Objects. For more information, see [Define Populations \(on page 522\)](#).

Add these objects in the population zone [Radius \(on page 524\)](#), to create alternate points of interest that civilians can interact with.



### WARNING

If you place the objects outside the population radius (see [Radius \(on page 524\)](#)), they are not functional. They only becomes functional, if you move them within the population radius.

#### Follow these steps:

1. In the Editor Objects List, select **(F8) Objects**.
2. Right-click a placement position in the population zone, and select **New Object**.
3. In the Object Properties dialog, select any of the Smart Objects listed below to serve as a point of interest:
4. Click **OK**.

The Smart Objects are placed on the map.

#### Generic Objects

Object Display Name	Object Class
Billboard - Arcadia	<code>Land_Bilboard_Bienvenudo</code>
Billboard - Banana King	<code>Land_Bilboard_Konstantin</code>
Billboard - blurred	<code>Land_Bilboard_HELLMART</code>
Billboard - For rent	<code>Land_Bilboard_work</code>
Billboard - Imholol	<code>Land_Bilboard_Ada</code>
Billboard - Riviera	<code>Land_Bilboard_Riviera</code>
Stands (search for stanek_3 or stanek_3B)	<code>Land_stanek_3</code> and <code>Land_stanek_3B</code>
Trashcan - concrete	<code>Land_Odpadkovy_kos</code>

## Customer Exclusive Objects

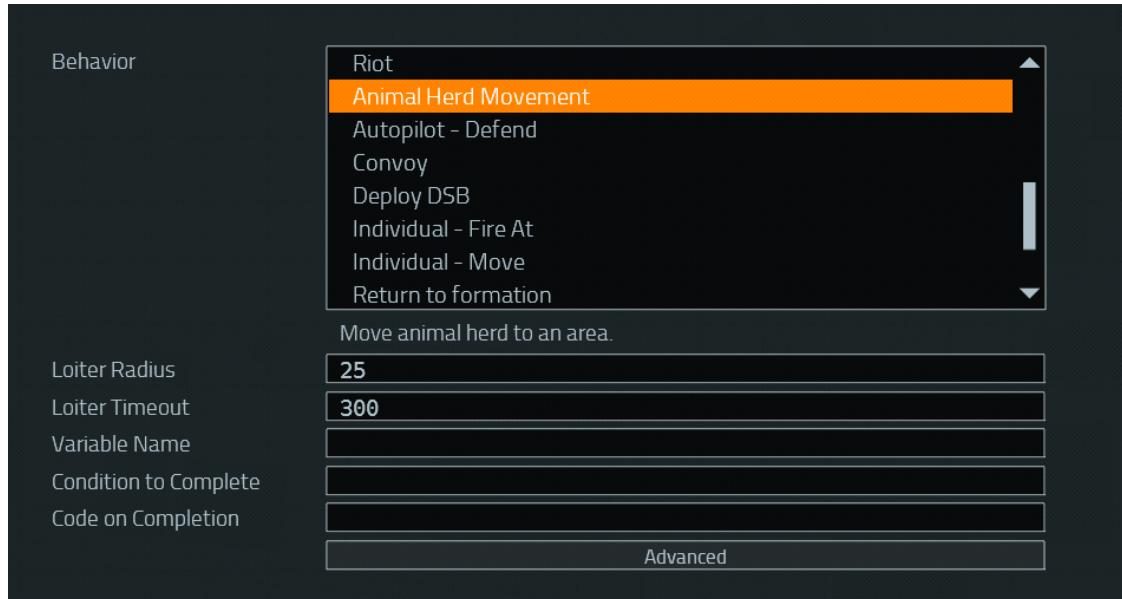
### ★ FEATURE NOTICE

These features are customer exclusive. For more information, contact [sales@bisimulations.com](mailto:sales@bisimulations.com).

Object Display Name	Object Class
Bench	land_fr_ts_bench
Info Screen	land_fr_ts_arrivalDepartureTV
Ticket Machine	land_fr_ts_ticket_machine
Trashbin	land_fr_ts_bin

## 10.15 Animal AI

You can add animal-herd movement to your scenario in VBS4 using the (F3) Waypoints Editor Object.



The following is discussed:

- [Creating a Herd \(below\)](#)
- [Reaction to Threats \(on page 589\)](#)

### 10.15.1 Creating a Herd

Add a Control AI animal herd to your mission.

**Follow these steps:**

1. In the Editor (Prepare Mode), select (**F1**) **Unit** in the Editor Objects List, and double-click a location on the map, where you want to place your animal herd.  
The Object Properties dialog opens.
2. In **Filters**, type **Animals**.  
The Object Properties dialog displays a list of all the available animals in VBS4.
3. Select an animal you want to place on the map.
4. Click **OK**.
5. If you want to place more animals of the same type, press **LCtrl + C** and then **LCtrl + V** to copy and paste the animal entity. Otherwise, if you want to place animals of different types, repeat steps 3 - 5.

The animals are placed on the map.

- Select all the animals you placed, click the **RMB**, and select **Orders > Group Selected**.

The animals are grouped into a herd.

- To assign a destination to the animal herd, create a herd waypoint (see [Waypoints \(on page 421\)](#)) by right-clicking the herd group marker, selecting **Orders > Assign New Waypoint**, and clicking a position on the map, where the herd waypoint needs to be created.
- Set the following herd-waypoint settings:

Setting	Description
<b>Behavior</b>	Select the <b>Animal Herd Movement</b> behavior in the drop-down.
<b>Loiter Radius</b>	Radius (meters) of the circular area where the animals loiter.
<b>Loiter Timeout</b>	Time (seconds) between the first animal entering the circular loiter area, defined by the waypoint position and the <b>Loiter Radius</b> , and the waypoint completion. Any further chained waypoints are executed after the <b>Loiter Timeout</b> elapses. In case of no further waypoints, the current waypoint is completed but the animals keep loitering.
<b>Variable Name</b>	In <b>Variable Name</b> , enter the Order waypoint name, which can be used in SQF scripts.

- Set the Order waypoint completion settings:

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

- Click **OK**.

- Preview the mission.

The animal herd starts moving.

 **WARNING**

Bohemia Interactive Simulations advises scenario Administrators not to change the **Advanced** settings for the behavior to work correctly.



## 10.15.2 Reaction to Threats

Animals automatically detect threats and react to them.

Animal threat detection works similarly to the [Civilian AI \(on page 521\)](#) threat detection. Animals react to shooting and explosions.

Threat reaction consists of two stages:

1. At first, the animals react individually by fleeing away from the detected threats.
2. Later (when situated at a safe distance from the threats, or after a certain period of time), animals move at full speed to a safe area, where they keep loitering, until a new **Animal Herd Movement** waypoint is assigned to the herd, or until the current waypoint is updated or moved.

## 10.16 Example Content

VBS Control AI comes with example content to demonstrate its functionality.

The example scenarios are available at:

`\VBS_Installation\optional\Behavior_Pack\Battlespaces\`

To run the example scenarios, follow these steps:

1. Copy the example scenarios to:

`\Documents\VBS4\Battlespaces\`

2. Start VBS4.
3. Select from the following example scenarios:

- **Civilian Traffic Example (CivilianTrafficExample)** - This example is based on the Sahrani terrain, and demonstrates the use of the [Control AI - Civilian Editor Object \(on page 418\)](#), [Control AI - Activity Editor Object \(on page 418\)](#), and [Control AI - Area Editor Object \(on page 419\)](#) to populate a town with pedestrian and vehicle traffic, including functioning traffic lights.
- **AI on Rails Example (AI\_on\_rails\_example)** - This example is based on the Sahrani terrain, and demonstrates the use of [AI on Rails \(on page 426\)](#) orders ([Individual - Move Order \(on page 440\)](#)) and [Individual - Fire At Order \(on page 437\)](#)) in a vehicle ambush, using both radio and presence-activated triggers.
- **Convoy Example (Convoy\_example)** - This example is based on the Sahrani terrain, and demonstrates the use of the [Convoy AI \(on page 482\)](#) with [Branching Waypoints \(on page 423\)](#) - the user can choose between two convoy paths: to go through the city (where the enemy is present) or around the city (safe route), using radio triggers. The user can also order to [Pause / Resume Convoy \(on page 485\)](#) movement.

### 10.16.1 Additional Example Content

In addition to the example scenarios, the following example content is available in:

`\VBS_Installation\optional\Behavior_Pack\Battlespaces\`

- **Airport (CivilianAI\_example\_mission\_airport)** - An example scenario with a sequence of activities, simulating passengers going through several stages of airport security.
- **Concert (CivilianAI\_example\_mission\_concert)** - An example scenario that demonstrates the use of Generic and Interrupt activities (see [Define Pedestrian Flows \(on page 530\)](#)), to simulate complex crowd behavior. The scenario also uses triggers (see Triggers in the VBS4 Editor Manual) to control the flow of civilian AI actors.

## 10.17 Known Issues

VBS Control AI has the following issues / limitations, which will be addressed in future releases of VBS4.

### NOTE

Multiplayer issues are marked with (MP).

The issue categories are:

- [Military \(below\)](#)
- [Convoy \(on the next page\)](#)
- [Bridge Laying Convoy \(on page 593\)](#)
- [Aircraft \(on page 594\)](#)
- [Civilian \(on page 594\)](#)
- [Civilian Traffic \(on page 595\)](#)
- [Animal \(on page 596\)](#)
- [General \(on page 597\)](#)

### 10.17.1 Military

The issues in the Military category are:

Issue	Workaround
Changing an <a href="#">AI on Rails (on page 426)</a> waypoint type (for example, from <a href="#">Individual - Move Order (on page 440)</a> to <a href="#">Individual - Fire At Order (on page 437)</a> ) in the Editor (Prepare Mode) leaves the old Individual Order name above the entity proxy in 3D view.	Save the mission and load it again.
Opening the Editor (Execute Mode) right after mission start results in displaying the wrong waypoints for AI on Rails in the 3D Editor (Execute Mode).	Close the Editor (Execute Mode) and open it again.
Infantry AI units not equipped with launchers (or without launcher ammunition) engage vehicles with their primary weapons.	None, will be improved in future releases.
Infantry AI units only use primary weapons and launchers.	None, will be improved in future releases.
Control AI is sometimes not able to correctly identify urban areas that are composed of generic buildings. As a result, squads cannot correctly switch formation in such areas.	None, will be improved in future releases.

## 10.17.2 Convoy

The issues in the Convoy category are:

Issue	Workaround
Driving of vehicles with powered trailers (for example, Viking, Bv206) is not supported (regular trailers work as expected).	Use a different vehicle type. Support may be added in future releases.
Non-PhysX vehicles are not supported (such as Motorcycle TT - 650 or Mountain Bike).	Use only PhysX vehicle types.
Spacing is sometimes not maintained correctly, when using tracked vehicles with different speed and acceleration in a Control AI convoy.	Set a smaller movement speed in the Control AI Convoy settings.
A Control AI convoy that is set to drive on roads (set to <b>Use only roads</b> or <b>Use only roads, respect lanes</b> ) cannot drive around obstacles on the road.	Delete or move the obstacle, or switch to <b>Prefer roads</b> .
When using off-road driving in convoys, some wheeled vehicles may not drive carefully enough on steep inclines, and as a result, can crash.	Pick a different convoy route. May be improved in future releases.
Control AI vehicles driving on roads, with <b>Use only roads, respect lanes</b> set, may be unable to get past some boom barriers (bar gates) or road signs.	Choose one of the following options: <ul style="list-style-type: none"> <li>• Delete or move the boom barrier / road sign away from the road.</li> <li>• Switch to a different road usage mode (for example, <b>Use only roads</b> or <b>Prefer roads</b>).</li> </ul>
When a vehicle is placed off-road with a Convoy waypoint (whose road usage is set to <b>Use only roads</b> ) also placed off-road, the vehicle chooses a direct off-road path (it does not move to the closest road first, and uses it to get to the waypoint).	Place the vehicle and the waypoint on the road. In case the off-road placement of the waypoint and / or the vehicle needs to be kept, use multiple waypoints, with the off-road ones set to the <b>Ignore roads</b> road usage.
The convoy behavior counts on waypoints being connected in a way that the convoy does not need to turn around.  Although the convoy can turn around in ideal conditions, it is not recommended to create a situation when this is required, since the convoy can get stuck after vehicle reordering.	Make sure that the next waypoint is always ahead of the lead vehicle, to prevent the convoy from reordering.

Issue	Workaround
The convoy behavior does not have any way of ordering the vehicles, other than assessing the distances of individual vehicles from the waypoint, so that at each turn, the vehicle order may change, if the distance to the first vehicle is not the shortest one.	To preserve the convoy vehicle order, use Follow Callsign.
Wheeled Control AI vehicles require more space than tracked vehicles while driving around obstacles due to their turning radius.	None, vehicles choose a path wide enough for them to fit in if it is possible.

### 10.17.3 Bridge Laying Convoy

The issues in the Bridge Laying Convoy category are:

Issue	Workaround
Movement of Control AI entities on a Dry Support Bridge (DSB) is not supported.  For more information on Control AI and DSB laying, see <a href="#">Bridge Laying Convoy AI (on page 501)</a> .	Support may be added in future releases.
Driving in reverse for vehicles with hitched trailers is not supported.	Ensure that those vehicles in the bridge-laying convoy with hitched trailers do not have to change direction quickly (which can happen, when there are two <a href="#">Convoy Order (on page 494)</a> waypoints with a sharp turn and / or some obstacles, when driving off the road).  Support may be added in the future releases.

## 10.17.4 Aircraft

The issues in the rotary-wing and fixed-wing aircraft category are:

Issue	Workaround
<p>The <a href="#">Fly Order (on page 513)</a> has the following limitations:</p> <ul style="list-style-type: none"><li>• The Fly Order cannot be used with omnicopters.</li><li>• The Fly Order can only be used with single aircraft, not aircraft groups.</li><li>• The <b>Weapon Control Status</b> is ignored for fixed-wing aircraft.</li></ul>	None.
<p>The <a href="#">Land Order (on page 516)</a> has the following limitations:</p> <ul style="list-style-type: none"><li>• The Land Order can only be used with rotary-wing aircraft.</li><li>• The Land Order can only be used with single aircraft, not aircraft groups.</li></ul>	None.
<p>The <a href="#">Loiter Order (on page 518)</a> has the following limitations:</p> <ul style="list-style-type: none"><li>• The Loiter Order can only be used with fixed-wing aircraft.</li><li>• The Loiter Order can only be used with single aircraft, not aircraft groups.</li><li>• The <b>Weapon Control Status</b> is ignored for fixed-wing aircraft.</li></ul>	None.

## 10.17.5 Civilian

The issues in the Civilian category are:

Issue	Workaround
If the Control AI - Civilian Editor Objects are deleted and re-created at runtime too many times, VBS4 may deplete the number of available groups, resulting in no more AI being spawned and a script error thrown.	Avoid frequent deletion and re-creation of Control AI - Civilian Editor Objects.
Civilians form queues across roads, when queue capacity is high near roads.	None, will be improved in future releases.
Restricted areas (see <a href="#">Area (on page 583)</a> activities and the <a href="#">Area Editor Object (on page 584)</a> ) can be moved, but do not get updated while moving.	None, will be improved in future releases.

## Issue

Restricted areas placed in Prepare mode might get ignored by the civilian AI, running on simulation clients.

## Workaround

Move or update the restricted area in any way, to propagate it to the simulation client.



### TIP

To do it automatically, link a trigger to the Restrict Access activity, which has a timeout set to 10 seconds, and a condition set to `true`.

Children do not execute any activities, other than **Start Panic** (see [Interrupt \(on page 581\)](#) activities).

None, will be improved in future releases.

Children do not despawn (see [Spawn / Despawn \(on page 580\)](#) activities).

None, will be improved in future releases.

## 10.17.6 Civilian Traffic

The issues in the Civilian Traffic category are:

## Issue

Bridge sections removed in an active [Population Editor Object \(on page 574\)](#) area are not updated in the road network.

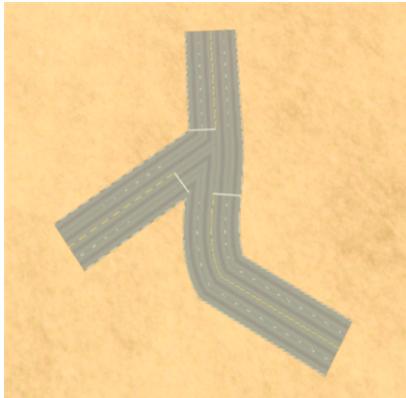
## Workaround

None, will be improved in future releases.

Improperly configured terrains may cause incorrect traffic behavior, often caused by:

Some of the wrong configuration can be exposed by using debugging tools for road networks, [traffic lights](#), and [vehicle driving](#). Alternatively, try to use a different location on the terrain.

- Improperly configured road network.
- Improperly configured traffic lights.
- Complex crossroads, containing multiple junctions.
- Combinations of turns that are too sharp.
- Lanes that are too narrow or too wide.

Issue	Workaround
High density of pedestrians and civilian traffic can result in blocked junctions.	<p>Several solutions are available:</p> <ul style="list-style-type: none"> <li>Decrease the number of vehicles and / or pedestrians.</li> <li>Modify the destinations of the AI by moving / adding / removing activities in the area.</li> <li>Provide more space for the AI by removing obstacles around the narrow area.</li> <li>Use <a href="#">traffic lights</a> to control the flow of the traffic and pedestrians.</li> </ul>
In MP with low FPS, civilian vehicles drive badly, when a player in a vehicle is present nearby.	There is no workaround. However, the occurrence intensity of this problem depends on the performance of the network scenario.
When using civilian traffic on some terrains with simulation clients, vehicles may temporarily swerve, when the simulation is transferred to a simulation client.	Vehicles continue driving as normal, when they are moved back on the road in the Editor (Execute Mode). Will be improved in future releases.
Vehicles can get stuck at Y-junctions.	<p>Offset the Y-junction arms, so that one arm is placed before / after the other arm, using VBS Geo.</p> 

## 10.17.7 Animal

The issues in the Animal category are:

Issue	Workaround
<p>Animals are only partially supported by Control AI, where they can only move forward or be idle (using the <b>Animal Herd Movement</b> behavior - see <a href="#">Animal AI (on page 587)</a>). They cannot perform actions like other Control AI units (they cannot move sideways, aim, shoot, roll, change stance, and so on).</p> <p>Also, only some animal types are supported by Control AI (for example, rabbits are not supported).</p>	None.

## 10.17.8 General

The issues in the General category are:

Issue	Workaround
An entity may be unable to find a path around obstacles larger than 50m. For more information, see Navigation Mesh Limitations in the VBS Control AI Manual.	Pick an intermediate waypoint, to plan a path around the obstacle. May be improved in future releases.
Loading the coarse navigation mesh for a large terrain may take a few seconds, which can make VBS4 unresponsive. This may happen on mission start, if any Control AI Editor Object (see <a href="#">Control AI Editor Objects (on page 415)</a> ) is in the mission, or during runtime, when the first Control AI Editor Object is placed in the Editor (Execute Mode).	Place the Control AI Editor Object ( <a href="#">(F3) Waypoints Editor Object (on page 416)</a> , <a href="#">Control AI - Civilian Editor Object (on page 418)</a> ) when creating a mission, so that the coarse navigation mesh gets loaded during mission load, and not in runtime.
Control AI units which are killed do not continue performing VBS Control AI behaviors after revival.	None. May be improved in future releases.
Path-finding does not take into account snow compression and road plowing (see the <b>Snow</b> section in <a href="#">Weather Settings (on page 285)</a> ). <ul style="list-style-type: none"><li>• Path-finding does not prefer compressed snow over uncompressed snow.</li><li>• Path-finding does not prefer plowed roads over unplowed roads.</li></ul>	None. May be improved in future releases.
Path-finding does not take surface types, such as ice or mud, into account (see the <b>Surface</b> section in <a href="#">Weather Settings (on page 285)</a> ). Therefore, vehicles may not be able to follow the found path, if the surface is frozen or slippery, and the vehicle tires are unfit for it.	None. May be improved in future releases.
Multi-lane traffic is supported only partially. Vehicles can sometimes get stuck.	Simplify the road network using VBS Geo / TerraTools. Better support may be added in future releases.

# 11. Vehicles Tools and Objects

VBS4 includes a wide variety of vehicles for land, sea, and air scenarios.

Add vehicles to missions with playable or AI-controlled crew:

- [Adding Vehicles \(on the next page\)](#)
- [Creating Vehicle Variants \(on page 609\)](#)
- [Adding Unmanned Vehicles \(on page 614\)](#)
- [Add ACATS ARH Models to Missions \(on page 616\)](#)

In addition, use Editor Objects and Tools to add enhanced simulation options to support vehicles in a scenario:

- [Control Links \(on page 618\)](#)
- [UV Network \(on page 624\)](#)
- [V-BAT Scenario Design \(on page 627\)](#)
- [First-Person View \(FPV\) Drones \(on page 632\)](#)
- [Enabling Automatic Towing \(on page 636\)](#)
- [Add Resupply Points to Missions \(on page 641\)](#)
- [Vehicle Path Recording \(VPR\) \(on page 645\)](#)
- [Gunner Arcs \(on page 650\)](#)
- [Vehicle Repair \(on page 652\)](#)
- [Slingloads \(on page 656\)](#)
- [Designing OPV River Class Missions \(on page 658\)](#)
- [Commander Machine Interface \(CMI\) Editor Object \(on page 659\)](#)
- [Military Road Signs - Scenario Design \(on page 742\)](#)

For an example of using VBS4 as a vehicle recognition trainer, watch the VBS4 Instructor Series - Vehicle IFF Trainer video at <https://youtu.be/e90vOroomqU>.

## NOTE

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

## 11.1 Adding Vehicles

VBS4 includes many vehicles to support a wide range of training scenarios:

- Military wheeled and tracked vehicles
- Civilian vehicles
- Specialized logistics and transport vehicles
- Fixed wing and rotary aircraft
- Unmanned vehicles and control stations
- Boats, ships, and hovercraft

### NOTE

Static objects such as mortars, heavy machine guns, and control stations function in a similar way to vehicles and are included in the Vehicle Editor Objects List.

For information about using vehicles in a scenario, see Vehicle Interaction in the VBS4 Trainee Manual.

VBS Editor enables vehicles to be added with or without a crew and the crew may be playable or AI controlled.

### Follow these steps:

1. In VBS Editor do one of the following:
  - To add a crewed vehicle, select **(F4) Vehicle** from the Editor Objects List.
  - To add an empty vehicle, select **(F5) Empty Vehicle** from the Editor Objects List.
2. Double-click a location on the map or right-click and select **New Object**.

The Vehicle Object Properties dialog opens:



3. Use the **Filters** and **Type** list to select the vehicle to add.

For more information on Object Property dialog filters, see [Unit and Vehicle Editor Object Filters \(on page 62\)](#).

4. Click **OK** to add the vehicle with its default options.

VBS Editor adds the vehicle to the selected location on the map and adds the vehicle, its crew, group, and group marker to the Scenario Objects Tree.

To reopen the vehicle Object Properties, right-click the vehicle and select **Edit Object**.

- Continue to [Edit Vehicle Options \(below\)](#) step 2 to create a new variant of the vehicle.
- Continue to [Edit Vehicle Options \(below\)](#) step 3 to set specific settings for the vehicle in the Scenario.

#### **WARNING**

If you use VBS Radio, re-open Radio Admin Settings to update Side assignments and apply the Default Radio Profile to new units and groups, before saving the mission.

### 11.1.1 Edit Vehicle Options

After or during vehicle creation, use the Object Properties dialog to modify the vehicle.

#### **WARNING**

Loadouts configured for new vehicles in Execute Mode (RTE) are not retained. Configure new vehicle loadouts during in Prepare Mode (OME).

#### **Follow these steps:**

1. In VBS Editor, double-click the vehicle or right-click and select **Edit Object**.
2. **Optional:** Click **New Vehicle** to create a new variant of the vehicle with a different ammunition loadout or vehicle cargo, or to enable the modification of the vehicle inventory during Scenario Execution.

For more information see, [Creating Vehicle Variants \(on page 609\)](#).

#### **NOTE**

For New Vehicle variants placed during Scenario Preparation (OME), the **Inventory** option is available during Scenario Execution (RTE). Modifying the Inventory only persists for the duration of the Scenario Execution.

3. Add a **Name** to identify the vehicle for use in scripts and optionally add a **Description**.

For more information about using Names to identify objects, see [Using Basic Scripts in the VBS4 Scripting Manual](#).

4. To use **URN Markings**, type the marking in the **URN Marking** input.

The URN marking is transmitted to all applications connected to VBS4 through VBS Gateway.

5. **Optional:** In the **Type** list, click the **star** icon in front of the vehicle type, so that it is filled white, to add it to your Favorites list.



Click the **star** icon again, so that it is unfilled, to remove the vehicle from your Favorites list.

**i** **NOTE**

The Favorites list contains units, vehicles, and placeable objects that you use frequently, and enables you to quickly find and place them when creating new scenarios, see [Unit and Vehicle Editor Object Filters \(on page 62\)](#).

Your Favorites list is also saved locally in a **.cfg** file, which can then be ported to other computers. The corresponding **favorites.cfg** file is found at the following location:

**C:\Users\username\Documents\VBS4\Config\**

Entity names are saved as classes, similar to those shown in the following example:

```
class cfgVehicles {  
    class bisim_ig_ir_army_soldier_des_m;  
    class vbs2_af_taliban_ak74;  
    class Land_Ind_Shed_01_EP1;  
    ...  
}
```

6. Use the **Initialization Statements** input to execute scripts for the vehicle when the mission starts.

For more information, see [Using Basic Scripts in the VBS4 Scripting Manual](#).

## 7. Crewed (F4) Vehicles Only: Use the Has Crew? inputs to modify crew playability:

Select **true** or **false** to populate the vehicle with a crew.

### NOTE

This option is only available before the vehicle is added to the map.

**Prepare Mode Only:** Use the Playable drop-down to select the player positions displayed in the Network Lobby for player allocation prior to starting the mission:

- **Non-Playable:** The vehicle positions do not appear for selection in the Network Lobby and the vehicle is populated with an AI crew.
- **Player or Player as Commander / Driver / Gunner:** Typically used to support single user and mission preview use cases, set **Player ...** to determine the position of the user when the mission starts.

### NOTE

Setting a vehicle to **Player** or **Player As ...** resets any previously placed **Player** units, groups, or vehicles to **Playable**.

- **Playable or Playable as Commander / Driver / Gunner:** Typically used for playable vehicles in multiplayer missions, set **Playable ...** to make the positions available for user selection in the Network Lobby before the start of a mission.

### NOTE

Some vehicles have multiple, additional, or alternate specialist positions, for example **Pilot** and **Loader**. These extra positions are not always available for **Player As ...** or **Playable As ...** selection. For **Player As ...** scenarios, start the mission and open the IWV to switch to the required position. For **Playable As ...** scenarios, we recommend selecting the last **Playable As ...** option that should enable all positions. At the start of the mission, players should check the IWV to verify that they are in the correct position.

Regardless of the option selected, users may change position and enter other vehicles using the Interact with Vehicles Interface (IWV) in the VBS4 Trainee Manual.

8. Use the **Special** drop-down to select additional conditions for vehicles:

- **None**: Auto-places the object so that it is not in collision with other objects.
- **Can Collide (default)**: Enables exact vehicle placement.
- **In Cargo**: Not applicable to vehicles.
- **Flying**: Use this option to start a mission with an aircraft in the air.



**NOTE**

For fixed-wing aircraft, setting the **Special** drop-down to **Flying** creates a [Loiter Order \(on page 518\)](#) at the aircraft position, with a 5 km radius, if no other Orders are assigned to the aircraft.

- **In Formation**: Not applicable to vehicles.

9. Click **Advanced** to view more settings for Vehicles including vehicle access, crew behavior, and vehicle health.

For more information, see [Advanced Vehicle Settings \(on the next page\)](#)

10. Click **Set GPS Coordinates** to specify the exact position of the vehicle.

For more information, see [Set GPS Coordinates \(on page 65\)](#).

11. Click **Set Azimuth** to specify the vehicle orientation.

For more information, see [Set Azimuth \(on page 67\)](#).

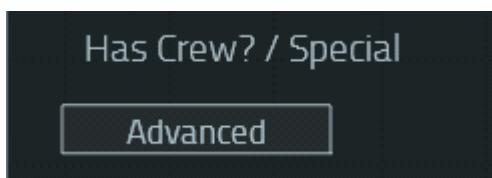
12. Click **OK** to confirm the vehicle properties and close the dialog.

VBS Editor saves the settings for the vehicle as part of the mission.

To modify the vehicle crew, right-click the crew entry in the Scenario Objects Panel, and select **Edit Object**. For more information, see [Adding Units \(on page 344\)](#).

## 11.1.2 Advanced Vehicle Settings

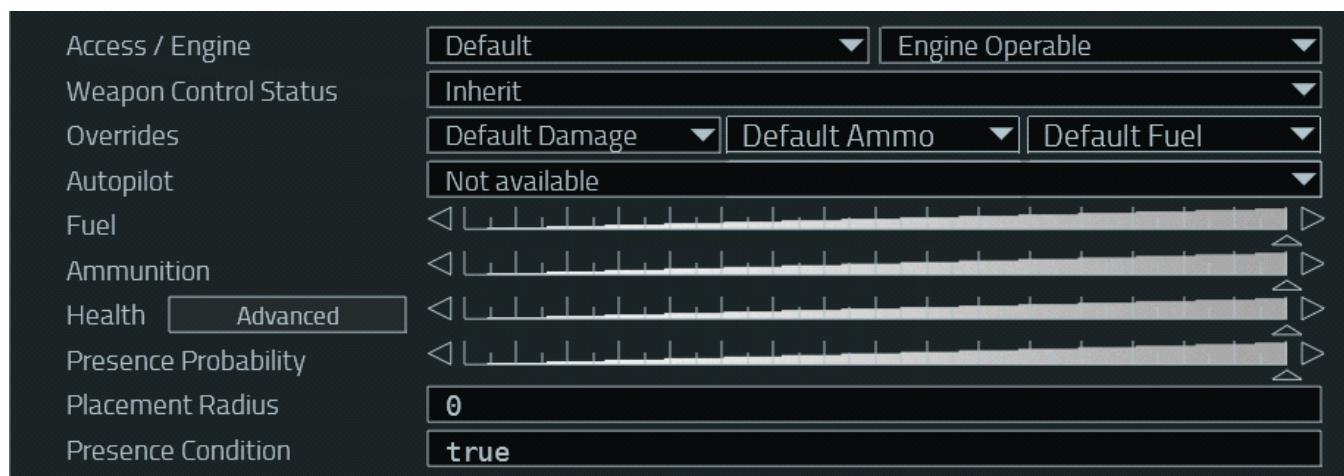
The Vehicle Editor Object Properties dialog contains an additional set of Advanced parameters. Click the **Advanced** button to access them.



### Follow these steps:

1. Open the Vehicle Editor Object Properties dialog, and click **Advanced**.

The dialog expands to show additional vehicle properties.



2. Use the **Access** drop-down to enable (Unlocked) or disable (Locked) vehicle access. Default uses the vehicle configuration to control access.

**NOTE**

In Execute mode, administrators can lock and unlock individual vehicle positions. For more information, see Vehicle Management Actions in the VBS4 Instructor Manual.

3. Use the **Engine** drop-down to enable (**Engine Operable**) or disable (**Engine Inoperable**) the vehicle engine.

4. Use the **Weapon Control Status** drop-down to control the AI Combat Mode of the Vehicle Crew in response to enemy contact:

Behavior	Description
<b>Weapons Free</b>	Fire at enemy forces, when they are encountered.
<b>Hold Fire</b>	Do not fire at enemy forces, when they are encountered.
<b>Inherit</b>	Inherit the combat mode from the group the entity is in (unless the entity is not part of a group).

 **NOTE**

The vehicle combat mode only applies to the Vehicle Crew when mounted. When dismounted, the Vehicle Crew use the combat mode set in their **AI Parameters** (see [Adding Units \(on page 344\)](#)).

5. Use the **Overrides** drop-downs to select from the following options:

Setting	Description
<b>Default Damage</b>	Standard VBS behavior applies, the vehicle is vulnerable to damage.
<b>Take No Damage</b>	The vehicle cannot be damaged.
<b>Default Ammo</b>	The vehicle weapon / turret has access to the standard amount of ammunition.
<b>Unlimited Ammo</b>	The vehicle has unlimited ammunition available for its weapon / turret. Magazines are automatically replaced when they become exhausted.
<p> <b>WARNING</b></p> <p>The vehicle weapon / turret must have at least one magazine at the start of the scenario. If the vehicle has no ammunition at all, this setting does not work.</p>	
<b>Default Fuel</b>	Standard VBS behavior applies, the vehicle has the normal amount of fuel.
<b>Unlimited Fuel</b>	The vehicle has unlimited fuel available.

**NOTE**

These settings have the following characteristics:

- Can be applied to both crewed and empty vehicles.
- They work for all vehicles placed in Single Player and Multiplayer scenarios.
- They work for all vehicles created in-game in **Execute Mode** (in Single Player and Multiplayer scenarios).
- The settings can be saved / loaded to and from Battlespaces.
- If set to **None**, standard VBS behavior applies.
- Global Overrides supersede entity override settings while active, see **Global Overrides** in [Define Scenario Settings \(on page 278\)](#).
- Empty vehicles are classed as **Civilian** when applying global settings.

To apply these settings globally to all vehicles in a scenario, see **Global Overrides** in [Define Scenario Settings \(on page 278\)](#).

6. Use the **Autopilot** drop-down to select if the vehicle can be used as an Autonomous Vehicle (AV).

**NOTE**

The drop-down values are only available for vehicles that can be converted to AVs, but not for vehicles that already are AVs, such as Unmanned Ground Vehicles (UGVs) and Unmanned Aerial Vehicles (UAVs).

Setting	Description
<b>Not Available</b>	The vehicle cannot be controlled as an AV.
<b>Active</b>	The vehicle starts the scenario with active AV control.
<b>Inactive</b>	The vehicle starts the scenario with an inactive AV control.

For more information, see AV Mission Preparation in the Introduction to VBS4 Guide.

7. Use the **Fuel** slider to adjust the fuel level of the vehicle (right is full).

8. The **Health** slider controls the overall damage level of the vehicle (right is undamaged).

Click **Advanced** to view individual vehicle components.

 **NOTE**

These settings may vary between vehicle types.

Move the slider from right to left to increase the amount of damage for each individual component. The damage state for most components is binary (undamaged / damaged) and most components become damaged at 0.5 health. To be sure of the component damage state, always use the extreme ends of the sliders.

The exact set of components available for a vehicle depend on its configuration. For more information, see Complex Vehicle Damage in the VBS Developer Reference. Components may also be damaged using scripts, for more information see Scripted Damage Control in the VBS4 Scripting Manual.

 **NOTE**

The Developer Reference is in the `\docs\` folder of the VBS Developer Suite installation.

9. Use the **Ammunition** slider to adjust the amount of available ammunition for the vehicle (right is maximum).
10. **Prepare Mode Only:** Use the **Presence Probability** slider to set a percentage probability that the vehicle is present when the mission starts (right is 100%).
11. **Prepare Mode Only:** Use **Placement Radius** to add variation to the position where the vehicle appears. When the mission starts the vehicle is placed in a random position within the specified radius (in meters).
12. **Prepare Mode Only:** Use **Presence Condition** to specify a script that determines whether the vehicle appears. The script is evaluated when the mission starts.  
For more information, see the Using Basic Scripts in the VBS4 Scripting Manual.
13. If you are adding a fixed-wing aircraft, you can use the JSBSim flight model simulation by setting **JSBSim Flight Model** to **Enabled** (for more information, see [JSBSim Flight Model \(on page 197\)](#)).
14. Use the **IFF Modes** and **IFF Classification** fields to add identification codes for fixed-wing and rotary aircraft, see [IFF Codes \(on the next page\)](#).
15. Click **OK** to save the settings for the vehicle.

The Object Properties dialog closes.

### 11.1.3 IFF Codes

IFF (Identification Friend or Foe) is an identification system that enables Air Traffic Control (ATC) to identify aircraft as friendly, or otherwise.

The Object Properties dialog enables you to add up to three IFF transponder codes (Mode 1 - 3), toggle flight level display information (Mode C), and specify a classification for an aircraft.

#### Image-145: IFF Modes fields

IFF Modes (1,2,3/A,C)				Off	▼
-----------------------	--	--	--	-----	---

Enter transponder codes, and toggle the flight level:

#### **i** NOTE

Not all fields must be filled, some may be left blank. Use numbers only. The resultant codes are displayed on the 2D map.

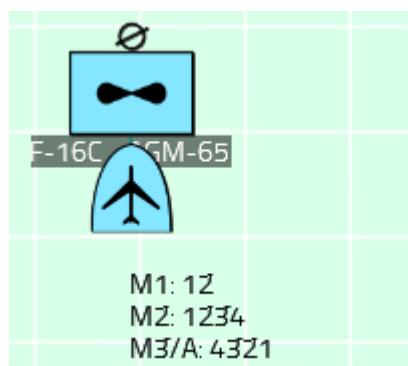
1. Use the first field for Mode 1 code types, enter a **two digit** octal mission code to identify the aircraft type or mission. Use numbers from 0 to 7 (maximum value: 73).
2. Use the second field for Mode 2 code types, enter a **four digit** octal unit code or tail number for the aircraft. Use numbers from 0 to 7.
3. Use the third field for Mode 3 code types, enter a **four digit** octal ID code for the aircraft (assigned by the ATC controller).
4. Use the drop-down to activate / deactivate transponder Mode C. If activated (**On**), the Flight Level (**FL**) of the aircraft is displayed on the 2D map in feet.

Use the **IFF Classification** drop-down to select from:

- Pending
- Unknown
- Suspect
- Friendly
- Hostile

Hover your cursor over the aircraft on the 2D map to see the IFF code information.

#### Image-146: IFF information on the 2D map



## 11.2 Creating Vehicle Variants

VBS Editor enables custom variants of vehicles with alternate weapon loadouts or vehicle cargo.

**TIP**

For a more advanced tool to create vehicle variants, see [ORBAT Editor \(on page 366\)](#).

- [Customize Vehicle Weapon Loadouts \(below\)](#)
- [Customize Vehicle Cargo \(on page 611\)](#)

### 11.2.1 Customize Vehicle Weapon Loadouts

Some military vehicle models enable you to create variants with customized ammunition loads.

**NOTE**

Vehicle loadout can only be customized for the main turret of the vehicle. Secondary turrets (such as those belonging to the Commander or Loader positions) are not affected.

**Follow these steps:**

1. In the Editor Objects List, select **(F4) Vehicle** or **(F5) Empty Vehicle**.
2. Right-click a position on the map, and select **New Object**.

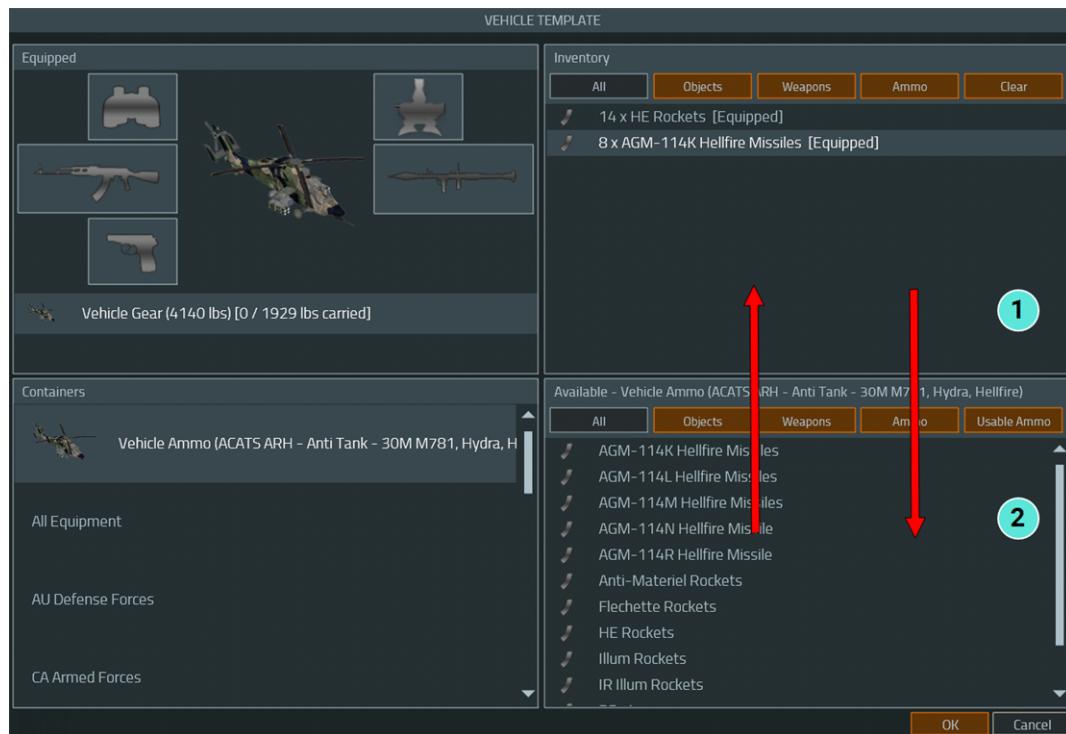
The Vehicle Object Properties dialog opens.

3. In the Object Properties dialog, select the vehicle to copy, and click **New Vehicle**.

**NOTE**

In Execute mode this option is only available when adding a new vehicle to the map.

The Vehicle Template dialog opens, displaying the current Vehicle Ammo loadout.



The current vehicle displays in the top left, with ammunition to the right.

**1** Equipped Ammunition

**2** Available Ammunition

**NOTE**

If the vehicle does not have a **Vehicle Ammo** option in the bottom-left panel, custom weapon loadouts are not available for the vehicle.

4. Change the ammunition load:

- To remove an item, drag-and-drop from Equipped to Available ammunition, and select the number to move.
- To add an item, drag-and-drop from Available to Equipped ammunition, and select the number to move.

5. Click **OK**.

6. Input a **Name** for the new variant, and click **OK**.

 **NOTE**

When exchanging missions between computers, ensure that you save any modified Vehicles with a different name. This avoids the possibility of duplicate display names showing in the VBS Editor on the machine of the mission recipient.

VBS Editor adds the new variant to the list of available vehicles, with an asterisk (\*) to indicate that it is a custom variant.

 **NOTE**

VBS4 saves new vehicles in:

`\Documents\VB4\Config\editorVehicles.cfg`

7. Click **OK** in the Object Properties panel to add the new variant to your mission.

To transfer the custom object to another computer, see [Export Custom Object Variants \(on page 98\)](#).

## 11.2.2 Customize Vehicle Cargo

Some military vehicle models enable you to create new variants with customized equipment cargo.

 **WARNING**

Loadouts configured for new vehicles in Execute Mode (RTE) are not retained. Configure new vehicle loadouts during in Prepare Mode (OME).

### Follow these steps:

1. In the Editor Objects List, select **(F4) Vehicle** or **(F5) Empty Vehicle**.
2. Right-click a position on the map, and select **New Object**.

The Vehicle Object Properties dialog opens.

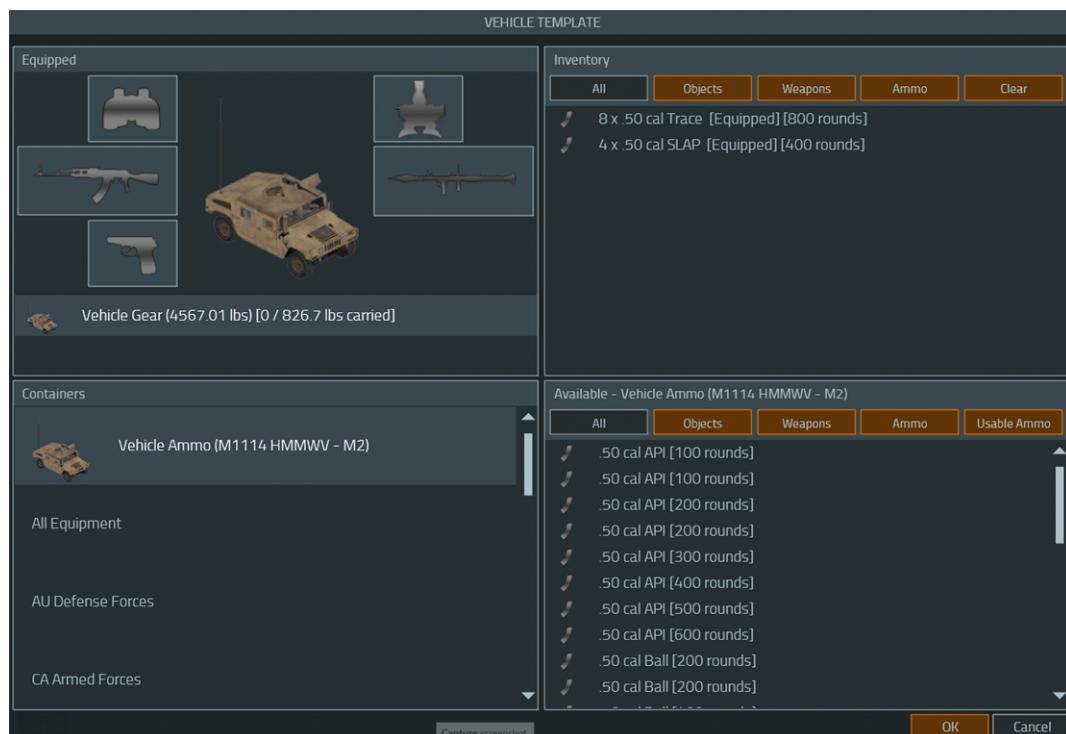
- In the Object Properties dialog, select the vehicle to copy, and click **New Vehicle**.

If the vehicle is already a custom variant, use **Edit Vehicle** to modify it, or **New Vehicle** to create another variant.

**NOTE**

In Execute mode this option is only available when adding a new vehicle to the map. For existing vehicles the **Inventory** option enables the vehicle cargo to be modified, but only for the duration of the current mission runtime.

The Vehicle Template dialog opens.



- Use the force categories in the bottom-left panel and the equipment filters in the bottom-right panel to filter the list of equipment displayed.
- Drag equipment from the bottom-right to the top-right to add the equipment to the cargo. Select an amount in the pop-up, and click **OK**.

VBS Editor adds the equipment to the vehicle cargo and adds its weight to the Vehicle Gear.

**NOTE**

If a UCS weapon (name prefixed by **modular weapon**) is added, the Create Custom Weapon dialog opens. For more information, see [Edit Weapon Components \(on page 665\)](#).

6. Click **OK** to confirm the cargo change.

The Save Vehicle dialog opens.

7. Input a vehicle **Name**, and click **OK**.

 **NOTE**

When exchanging missions between computers, ensure that you save any modified Vehicles with a different name. This avoids the possibility of duplicate display names showing in the VBS Editor on the machine of the mission recipient.

VBS Editor returns to the Object Properties dialog with the new vehicle added to the Type list, marked with an asterisk, \*, to indicate that it is a custom variant.

8. Edit the other vehicle settings as required and click **OK**.

For more information about Vehicle Properties, see [Adding Vehicles \(on page 599\)](#).

VBS Editor adds the custom vehicle variant to the scenario.

Custom vehicle variants are saved locally to:

`\Documents\VBS4\Config\editorVehicles.cfg`.

These variants are then available for all other missions created on the same computer.

To transfer the custom object to another computer, see [Export Custom Object Variants \(on page 98\)](#).

## 11.3 Adding Unmanned Vehicles

VBS4 unmanned vehicles include UAVs and robots that you can add to the scenario.

### Follow these steps:

1. In the Editor Objects List, select either **(F4) Vehicle** or **(F5) Empty Vehicle**.
2. Double-click a location on the map, where you want to place the unmanned vehicle.  
The Object Properties dialog opens.
3. In **Filters**, type: **Unmanned Vehicles**.  
The Unmanned Vehicles category is displayed.
4. Expand the category and select the wanted unmanned vehicle.
5. (Optional - UAV-only) If you want to start the scenario with the UAV flying, in the **Special** drop-down, select **Flying**.

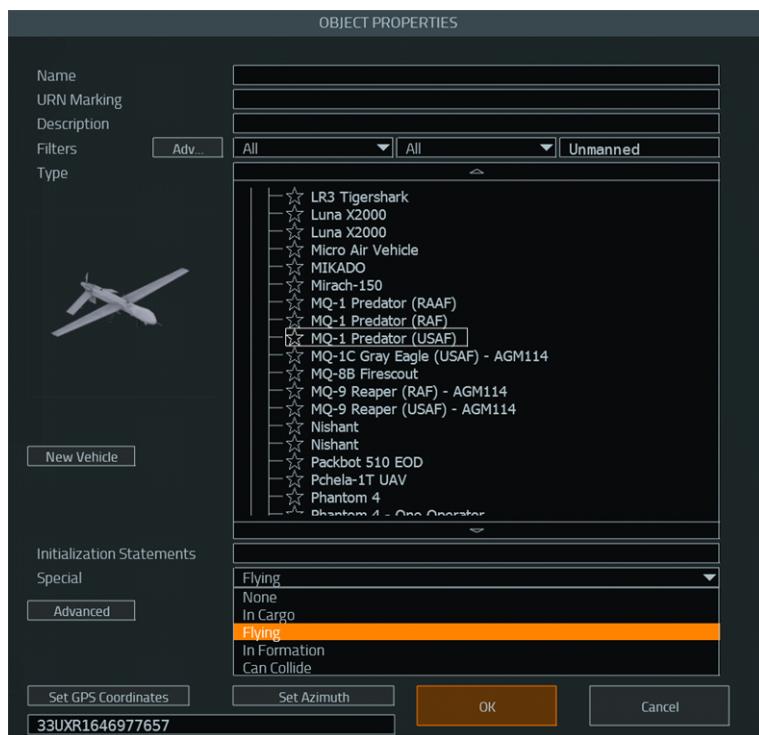
#### NOTE

For fixed-wing aircraft, setting the **Special** drop-down to **Flying** creates a [Loiter Order \(on page 518\)](#) at the aircraft position, with a 5 km radius, if no other Orders are assigned to the aircraft.

6. Click **OK**.

The unmanned vehicle is placed in the scenario.

**Image-147: Unmanned vehicles**

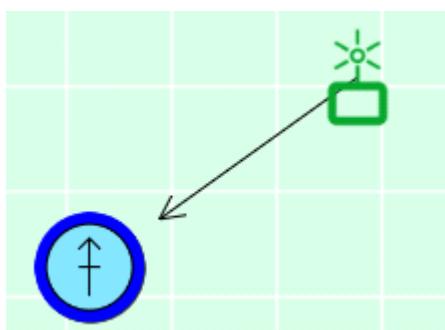


An unmanned vehicle can be controlled through waypoints like a normal vehicle (see [Fly Order \(on page 513\)](#), [Land Order \(on page 516\)](#), [Loiter Order \(on page 518\)](#)) or it can be controlled using one of the following Editor Objects:

- **Control Link** - Allows unmanned vehicles to be either driven or flown remotely, and for vehicle cameras and [Drone Munitions \(on page 696\)](#) to be used.
- **UV Network** - Allows the **V-Bat** UAV to be flown remotely, and its camera to be used.

For more information, see [Control Links \(on page 618\)](#) and [UV Network \(on page 624\)](#), which explain how to set up the parameters, link them to unmanned vehicles, and use them with the vehicle cameras. The Control Link and UV Network must be linked to the unit / vehicle that controls the unmanned vehicle (the controlling vehicle must be on the same side as the player).

**Image-148: Linking a Control Link Editor Object to a player**



## 11.4 Add ACATS ARH Models to Missions

The Editor enables you to add the ACATS ARH variants to your missions and further customize their weapons load.

### Follow these steps:

1. Launch VBS4.
2. Open the mission where you want to use ACATS ARH models.
3. Select **(F4) Vehicles** from the Editor Objects List, right-click a location on the map, and select **New Object**.
4. Expand the **AU Army Air - Woodland** category, and select the ACATS ARH variant to add:

ACATS ARH Variant	ACATS ARH Model	Loadout Capacity
Reconnaissance	Recon - M781, Hydra, Hellfire	2 Hellfire Missiles, 26 Rockets
Firepower	Firepower - M781, Hydra, Hellfire	4 Hellfire Missiles, 33 Rockets
Anti-Tank	Anti-Tank - M781, Hydra, Hellfire	8 Hellfire Missiles, 14 Rockets

5. Input any additional Object Properties that you require for the vehicle.

For more information, see [Adding Vehicles \(on page 599\)](#).

6. Click **OK** to add the default ACATS ARH variant to the mission or [Customize the ARH Ammunition Load \(below\)](#).

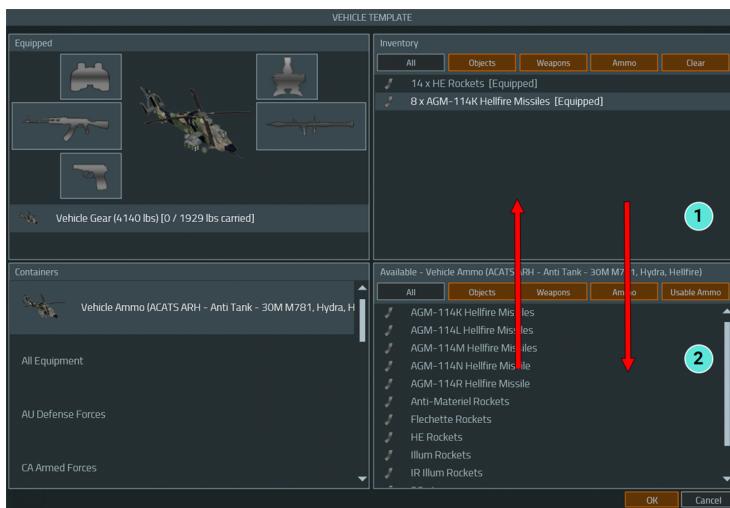
### 11.4.1 Customize the ARH Ammunition Load

The ARH models enable you to create new variants with customized ammunition loads.

In the Editor Object Properties dialog, select the ARH variant to copy, and click **New Vehicle**.

The Vehicle Template panel opens.

## Image-149: Vehicle Template



The current vehicle displays in the top left, with ammunition to the right.

- 1** Equipped Ammunition
- 2** Available Ammunition

### Follow these steps:

#### 1. Change the ammunition load:

- To remove an item, drag-and-drop from Equipped to Available ammunition, and select the number to move.
- To add an item, drag-and-drop from Available to Equipped ammunition, and select the number to move.

#### **i** NOTE

The maximum number of missiles and rockets for the new variant is the same as the copied variant.

#### 2. Click **OK**.

#### 3. Input a name for the new variant and click **OK**.

A new variant is added to the list of available vehicles, with an asterisk (\*) to indicate that you can **Edit Vehicle**.

#### **i** NOTE

VBS4 saves new vehicles in:

`\Documents\VBS4\Config\editorVehicles.cfg`

#### 4. Click **OK** in the Object Properties panel to add the new variant to your mission.

## 11.5 Control Links

The Control Link is an Editor Object that enables control over unmanned vehicles such as UAVs, UGVs, security cameras, or other objects found in **(F5) Empty Vehicle > Unmanned Vehicles** in the Editor. The Control Link object is found in the Editor Objects List (see Mission Designer Interface in the VBS4 Editor Manual).

### **WARNING**

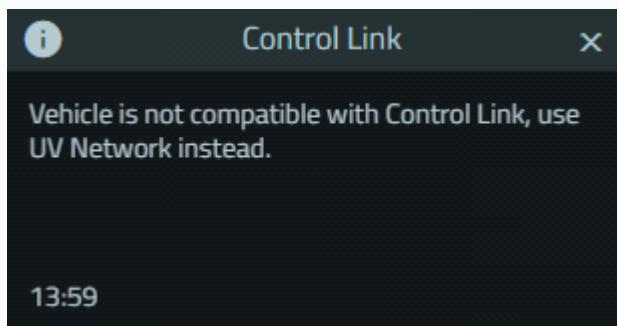
Adding / deleting this Editor Object in the VBS Editor during a multiplayer scenario may not be reflected on other clients.

### **NOTE**

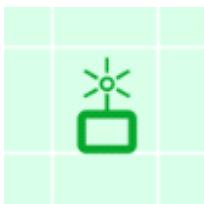
The following additional considerations apply:

- Control Links are essential when streaming video from UAVs. For more information, see UAV Video Streaming in the VBS4 Editor Manual.
- Unmanned Vehicle System (UVS)-compatible UAVs / UGVs need to use the [UV Network \(on page 624\)](#) Editor Object instead of the Control Link Editor Object.

Attempting to link a UVS-compatible UAV / UGV to a Control Link results in the following error popup:



Control Links are represented on the map by the following icon.



Double-click the **Control Link icon** to open the Object Properties dialog.

**Image-150: Control Link Object Properties dialog**

Type of Control Station	UAV Controller
Origin /W/S/Zone/Hem	-383513   4577756   33   North
Coordinates Type	UTM
Allow Camera Locking	True
Activate on Veh Entry	False
Activate on Msn Start	False
Enable Auto Orbiting	Enable (When Controlled Unit Runs out of Waypoints)
Show Hints	Show Hints
Can Mark Tgts on Map	True
Enable Map	True
Relocate Locked Target	Allow Relocating

## 11.5.1 Control Link Parameters

The following table lists the available parameters in the Control Link Object Properties dialog. Some fields may not be available depending on the selected Control Link type.

### NOTE

For some UAVs and UGVs, using the Control Link places the user in direct control of the vehicle. For more information, see Unmanned Vehicles in the VBS4 Trainee Manual.

Parameter	Description
<b>Type of Control Station</b>	Select the Control Link type from the following options: <ul style="list-style-type: none"><li>• UAV Controller - Unmanned Aerial Vehicle camera, movement, or munitions.</li><li>• UAV Controller (Old Style) - Old style controller for Unmanned Aerial Vehicles.</li><li>• UGV Controller - Unmanned Ground Vehicle (for example, MarcBot, TALON controller).</li><li>• Security Camera - GBOSS security camera, see <a href="#">GBOSS Security Camera (on page 875)</a>.</li><li>• MAV - Micro Air Vehicle.</li><li>• Rover III - Pure Camera stream, no control (only shows UAV feeds).</li><li>• LITENING Targeting Pod - Provides control over a targeting pod on an aircraft equipped with this pod. This Control Link type does not have Lock and Targeting Cursor options.</li></ul>
<b>Origin W/S/Zone/Hem</b>	If a - Map Origin (UTM) - is present in the Scenario Settings, or a geo-referenced map is loaded into the editor, these coordinates are shown here. The fields are read-only.   <b>NOTE</b> When a player accesses a UGV Control Link using the Quick Menu (see Quick Menu Actions in the VBS4 Trainee Manual), they see all available UGVs.

Parameter	Description
<b>Coordinates Type</b>	Choose from the following coordinate types: <ul style="list-style-type: none"> <li>• UTM</li> <li>• MGRS</li> <li>• Lat / Long Decimal</li> <li>• Lat / Long to be displayed</li> </ul> <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"> <p><b>i NOTE</b></p> <p>To be able to choose a coordinate system to be displayed, the terrain must be one which is geo-referenced to a real world location, or the - Map Origin (UTM) - set in Scenario Settings. Otherwise, this drop-down is not shown.</p> </div> <p>If no origin is defined, UAV coordinates default to standard VBS4 UTM coordinates.</p>
<b>Allow Camera Locking</b>	Locks the camera on a target or a position in-game. If set to <b>True</b> , pressing <b>Toggle Camera Lock (L)</b> in-game locks the camera view. Default is <b>True</b> .
<b>Activate on Veh Entry</b>	If set to <b>True</b> , and the Control Link is linked to a vehicle (as opposed to a unit), the Controller starts as soon as a unit gets into the vehicle. Default is <b>False</b> .
<b>Activate on Msn Start</b>	If set to <b>True</b> , the Controller starts on mission start when under player control (not for an empty vehicle). This only works if the Control Link is linked to units, not vehicles.
<b>Enable Auto Orbiting</b>	If enabled, the controlled vehicle orbits around the last waypoint position, or the target, when it runs out of waypoints or locks. <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"> <p><b>i NOTE</b></p> <p>This functionality is only available for the UAV or Rover III controllers.</p> </div>
<b>Show Hints</b>	If set to <b>Show Hints</b> , helpful hints are shown explaining the most important keys. <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"> <p><b>i NOTE</b></p> <p>Only available for UAVs.</p> </div>
<b>Can Mark Tgts on Map</b>	If set to <b>True</b> , pressing the <b>K</b> key in-game adds a target marker to the map at current target position in the camera sight.

Parameter	Description
<b>Enable Map</b>	If set to <b>True</b> , <b>GPS (Toggle) (RCtrl + M)</b> opens the Mini-Map. Default is <b>True</b> .
<b>Relocate Locked Target</b>	If set to <b>Allow Relocating</b> , you can relocate the target when the camera is locked. <b>Follow these steps:</b> <ol style="list-style-type: none"><li>1. Click the <b>target</b>.</li><li>2. Press and hold <b>LCtrl</b> and drag your mouse. The target moves.</li><li>3. Click at the new location to place the target.</li></ol>

## 11.5.2 Unmanned Vehicle and Security Camera Setup

Control Links are one of the components used to setup unmanned vehicles and remotely controlled security cameras. The following list includes the other components:

- **Control Link** - The Editor Object that initiates the unmanned vehicle simulation.
- **Operator** - A single unit, or any number of units or vehicles, grouped or ungrouped operating the unmanned vehicle or security camera.
- **Stations / Terminals** - Unmanned terminals that can be entered to activate the Control Link (not essential).
- **Unmanned Vehicle / Security Camera** - A UAV, UGV, GBOSS security camera, or other remote controlled unit.

### **NOTE**

To use the Control Link, it must be linked to an Operator or one or more Stations / Terminals.

#### **Follow these steps:**

1. Place a Control Link on the map.
2. In the [Control Link Object Properties dialog \(on page 619\)](#), set the parameters relevant to the UAV, UGV, or Security Camera.

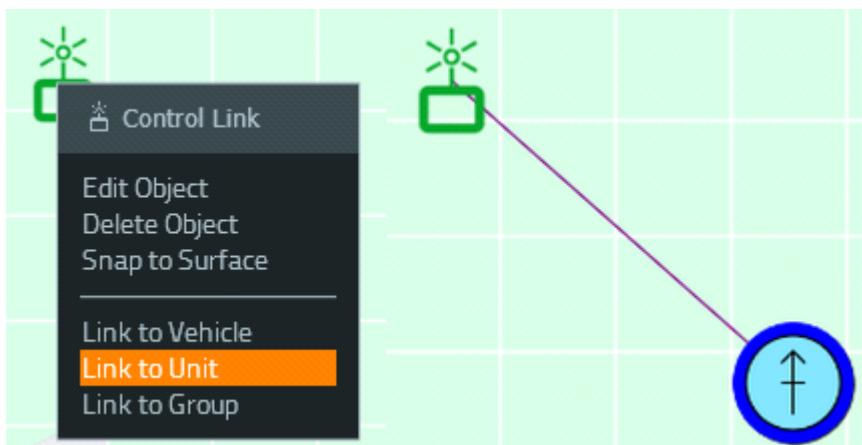
3. Right-click the Control Link and select one of the following from the context menu:

- **Link to Vehicle**
- **Link to Unit**
- **Link to Group**

4. Click the unit, vehicle, or group you want to link to.

Any unit or vehicle(s) linked to the Control Link can now access the UAV, UGV, or Security Camera using their Quick Menu (see Quick Menu Actions in the VBS4 Trainee Manual).

#### Image-151: Linking a Control Link to a unit



In this example, the Operator is able to access all unmanned vehicles in the mission using the Quick Menu.

#### **NOTE**

There must be at least one Control Link placed on the map for each unmanned vehicle type.

## 11.6 UV Network

The Unmanned Vehicle (UV) Network Editor Object allows you to link units (Operators) and vehicles (Control Stations) to Unmanned Vehicle System (UVS)-compatible UAVs / UGVs, so that they can be controlled using the UVS interface (see Unmanned Vehicle System (UVS) in the VBS4 Trainee Manual).

### NOTE

While the UV Network Editor Object itself is visible in the AAR (see After Action Review (AAR) in the VBS4 AAR Manual), any interaction with it at scenario runtime is not reflected in the AAR.

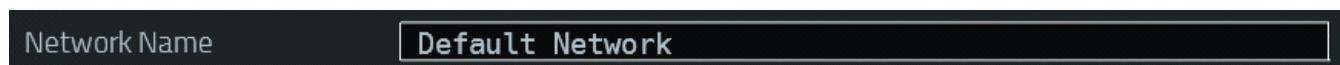
### Follow these steps:

1. Make sure to place:
  - a. A UVS-compatible UAV / UGV.
  - b. A unit (Operator) or vehicle (Control Station) to control the UAV / UGV.

For more information, see [Adding Units \(on page 344\)](#) and [Adding Vehicles \(on page 599\)](#).

2. In the Editor Objects List, select **UV Network**.
3. Click anywhere on the map to place the UV Network Editor Object.

The UV Network Object Properties dialog opens.



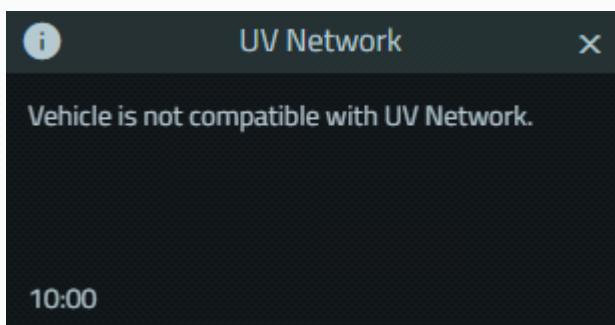
4. In **Network Name**, enter the UV Network name.
  5. Click **OK**.
- The UV Network Editor Object is placed on the map.
6. Right-click the UV Network Editor Object, and select **Link to Unmanned Vehicle**.

7. Click the UAV / UGV you want to link to the UV Network.

The UAV / UGV is linked to the UV Network.

**NOTE**

If the UAV / UGV is not UVS-compatible, the following error popup appears:



This means that the UAV / UGV can be controlled using the [Control Links \(on page 618\)](#) Editor Object, but the UVS interface cannot be used for it.

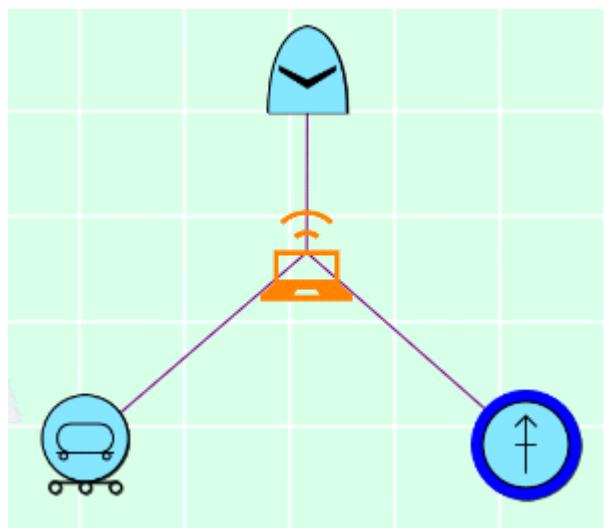
8. Link the UV Network to any of the following:

- Unit (Operator):
  - a. Right-click the UV Network Editor Object, and select **Link to Operator**.
  - b. Click the Operator unit.
- Vehicle (Control Station):
  - a. Right-click the UV Network Editor Object, and select **Link to Control Station**.
  - b. Click the Control Station vehicle.

**NOTE**

The UV Network can be linked to multiple UVS-compatible UAVs / UGVs, Operators, and Control Stations. Also, multiple UV Networks can be linked to a single UVS-compatible UAV / UGV and Operator / Control Station.

The UV Network is linked to the UAV / UGV and to the unit (Operator) and / or vehicle (Control Station).

**Image-152: UV Network linked to UAV, Operator, and Control Station**

You can now use the UVS interface (see Unmanned Vehicle System (UVS) in the VBS4 Trainee Manual) to control the UAV / UGV.

## 11.7 V-BAT Scenario Design

The V-BAT 128 is a long-endurance Vertical Takeoff or Landing (VTOL) UAV, which can be used in:

- Search and Rescue (SAR) operations.
- Border security.
- Rapid tactical deployment.
- Firefighting and disaster management.
- Transportation and logistic resupply.
- Infrastructure protection.

**Image-153: V-BAT aboard a Combatant Craft Medium (CCM)**



For information on how to use the V-BAT at Scenario runtime, see [Using the V-BAT in the VBS4 Trainee Manual](#).

The V-BAT model available in VBS4 is:

- **US USAF Air > V-Bat**

For more information on how to add it to your Scenario, see [Adding Vehicles \(on page 599\)](#).

The following is discussed, and can be done in the VBS Editor in Prepare / Preview / Execute Mode:

- [Setting Up the V-BAT with UVS \(on the next page\)](#)
- [Attaching the V-BAT to a Landing Point \(on the next page\)](#)
- [Assigning Waypoints to the V-BAT \(on page 631\)](#)

## 11.7.1 Setting Up the V-BAT with UVS

The V-BAT is controlled using the Unmanned Vehicle System (UVS) (see Unmanned Vehicle System (UVS) in the VBS4 Trainee Manual). The V-BAT has to be linked to a UV Network, which allows you to connect and control any UVS-compatible UAVs / UGVs that have been linked to it.

To link a UVS-compatible UAV / UGV to a UV Network, see [UV Network \(on page 624\)](#).

## 11.7.2 Attaching the V-BAT to a Landing Point

You can attach the V-BAT to watercraft with Landing Points (for example, a Landing Point can be a platform or helipad), so that it is positioned on the Landing Point at the start of a Scenario.

The following watercraft models have Landing Points:

- **US Army Watercraft > LCU-2000 Class**
- **US Coast Guard Watercraft > National Security Class Coast Guard Cutter**
- **US Navy Watercraft > Arleigh Burke Class - Flight I**
- **US Navy Watercraft > Freedom Class**
- **US Navy Watercraft > San Antonio Class LPD**
- **US SOCOM Watercraft > CCM**



### WARNING

In Prepare Mode, make sure to place the watercraft before the V-BAT in the VBS Editor for the attachment to work. However, in Preview / Execute Mode, the placement order does not matter.



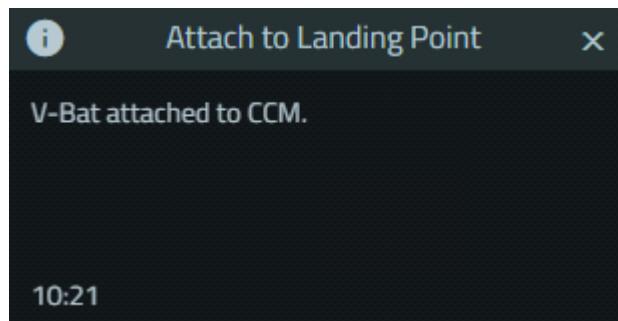
### NOTE

A watercraft can have only one Landing Point. For information on configuring watercraft to have Landing Points, see Adding Landing Points to Watercraft in the VBS Developer Reference.

## Follow these steps:

1. Right-click the V-BAT either in the 2D / 3D View or the Scenario Objects Panel, and select **Attach to Landing Point** in the context menu.

The V-BAT is attached to the Landing Point of the nearest watercraft, and the following popup appears:



### **NOTE**

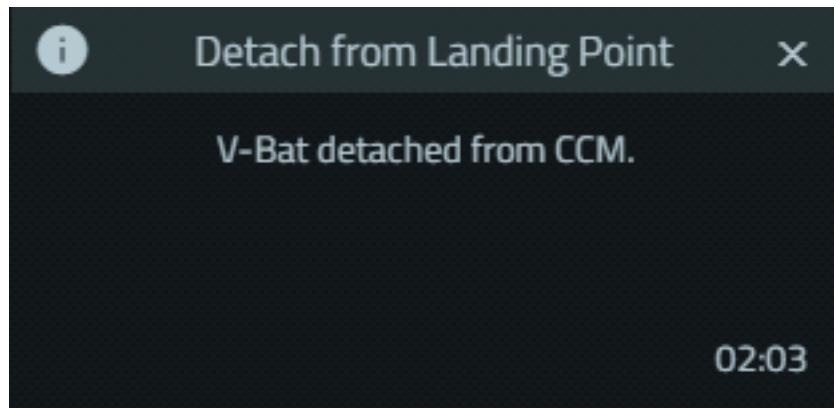
A suitable watercraft has to be within a 500 m radius from the V-BAT.

Also, the V-BAT Editor Object appears nested under the watercraft Editor Object in the Scenario Objects Panel, but not in the same group (running the [group](#) (<https://sqf.bisimulations.com/display/SQF/group>) SQF command does not return the same group for the watercraft and the V-BAT).



- To detach, right-click the V-BAT either in the 2D / 3D View or the Scenario Objects Panel, and select **Detach from Landing Point**.

The V-BAT is detached from the Landing Point, and the following popup appears:



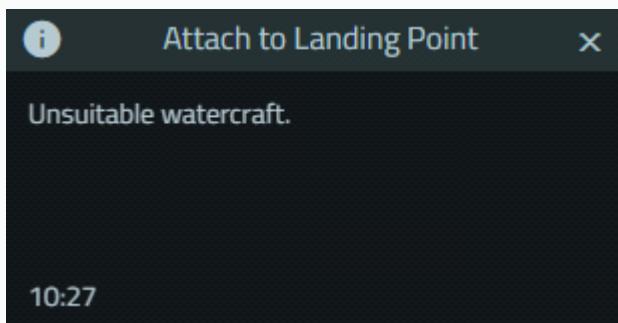
Also, the V-BAT Editor Object appears unnested / alongside the watercraft Editor Object in the Scenario Objects Panel.



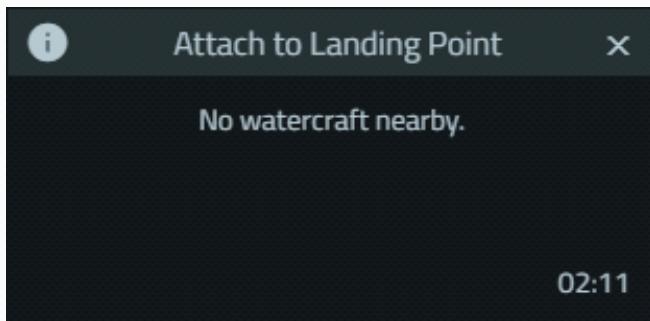
**NOTE**

The following Landing Point attachment aspects should be considered:

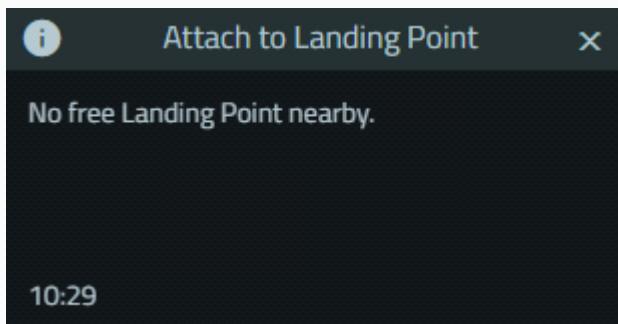
- If the watercraft is within a 500 m radius from the V-BAT, but is unsuitable (does not have a Landing Point), the following popup appears:



- If the watercraft is suitable, has a free Landing Point, but is outside the 500 m radius from the V-BAT, the following popup appears:



- If the watercraft is suitable, within a 500 m radius from the V-BAT, but has no free Landing Point, the following popup appears:



### 11.7.3 Assigning Waypoints to the V-BAT

Use the [Fly Order \(on page 513\)](#) to assign flight waypoints to the V-BAT.

**NOTE**

It is currently not possible to assign landing waypoints to the V-BAT.

## 11.8 First-Person View (FPV) Drones

VBS4 offers First-Person View (FPV) Drone functionality. FPV Drones differ from traditional drones in that they offer a "bird's-eye view" of their surroundings, as opposed to the pilot on the ground perspective of traditional drones. Pilots using an FPV Drone see exactly what the drone sees.

**Image-154: FPV Drone in VBS**



To use an FPV Drone in a scenario, the following items are required:

<b>FPV Drone</b>	Empty Vehicle Editor Object (see <a href="#">Adding Vehicles (on page 599)</a> ), currently: <b>(F5) Empty Vehicle &gt; Unmanned Vehicles &gt; Pegasus (FPV Flight model prototype)</b>
<b>Control Link</b>	Enables the pilot to control the drone, and access the FPV Drone HUD. For more information, see <a href="#">Control Links (on page 618)</a> .
<b>Munitions</b>	Optional: To equip an FPV Drone with munitions, an additional Editor Object is required. For more information, see <a href="#">Drone Munitions (on page 696)</a> .

For information about how to operate FPV Drones, see FPV Drones Simulation in the VBS4 Trainee Manual.

## 11.8.1 Considerations

The following considerations apply to FPV Drones in VBS4:

- They are effective for approximately 4 kilometers.
- By default, they have a 10-minute battery life.
- To simulate signal degradation in drone communication, film grain is shown when an FPV Drone is close to the ground, or far away from the UAV controller.

## 11.8.2 Controls

FPV Drones use the standard VBS4 UAV controls, although a more typical use case is to use a device, such as a Microsoft Xbox controller. For more information, see UAV Controls and Aircraft Controls in the VBS4 Trainee Manual.

To remap any of the controls, it is necessary to adjust the **Helicopter Controls** in the VBS4 Controls Settings (see Controls Settings in the VBS4 Administrator Manual).

Helicopter Controls		
Increase Thrust		XBox Left Thumb Y Up
Decrease Thrust		XBox Left Thumb Y Down
Left Turn		
Right Turn		
Bank Left		XBox Left Thumb X Left
Bank Right		XBox Left Thumb X Right
Left Pedal		XBox Right Thumb X Left
Right Pedal		XBox Right Thumb X Right
Nose Down		XBox Right Thumb Y Up
Nose Up		XBox Right Thumb Y Down



### TIP

If you are having difficulty controlling the FPV Drone when using a Microsoft Xbox controller, try switching the **bank** controls to **pedal** controls.

In addition, script variables can be used to customize some controls / features. This enables the use of controllers other than the Microsoft Xbox controller. The script variables can be placed in the `init.sqf` file (see Init.sqf in the VBS4 Scripting Manual) of a Battlespace, for example.

Variable	Description	Example
<code>fpv_display_input</code>	If <code>true</code> , forces the current values of inputs to be shown onscreen.	<code>fpv_display_input = false;</code>
<code>fpv_yaw_offset</code>	Defines the yaw offset.	<code>fpv_yaw_offset = 0;</code>
<code>fpv_yaw_multiplier</code>	Defines the yaw sensitivity.	<code>fpv_yaw_multiplier = 1;</code>
<code>fpv_pitch_offset</code>	Defines the pitch offset.	<code>fpv_pitch_offset = 0;</code>
<code>fpv_pitch_multiplier</code>	Defines the pitch sensitivity.	<code>fpv_pitch_multiplier = 1;</code>
<code>fpv_bank_offset</code>	Defines the bank offset.	<code>fpv_bank_offset = 0;</code>
<code>fpv_bank_multiplier</code>	Defines the bank sensitivity.	<code>fpv_bank_multiplier = 1;</code>
<code>fpv_throttle_offset</code>	Defines the throttle offset.	<code>fpv_throttle_offset = 0;</code>
<code>fpv_throttle_multiplier</code>	Defines the throttle sensitivity.	<code>fpv_throttle_multiplier = 1;</code>
<code>FPV_GRAIN_MAX_DIST</code>	Defines the distance at which the grain reaches 100 %.	<code>FPV_GRAIN_MAX_DIST = 12000;</code>
<code>FPV_BATTERY_TIME</code>	Defines the battery life in seconds.	<code>FPV_BATTERY_TIME = 60 * 10;</code>
<code>FPV_RANGE_CUSTOMIZED</code>	If <code>true</code> , forces <code>FPV_GRAIN_MAX_DIST</code> and <code>FPV_BATTERY_TIME</code> to take effect.	<code>FPV_RANGE_CUSTOMIZED = true;</code>

Every analog input (`yaw`, `pitch`, `bank`, `throttle`) has an `offset` and a `multiplier`. The `offset` is a value that is added to the readout of the input. The `multiplier` is the value the input readout is multiplied by.



### EXAMPLE

`fpv_pitch_offset = 0.5;` means that when the pitch stick is centered, and the drone behaves as if it is pushed forward by 0.5.

To reduce pitch sensitivity to half, use `fpv_pitch_multiplier = 0.5;`

### 11.8.3 Limitations

FPV Drones in VBS4 have the following limitations:

- The rotor sound cannot be turned off, and continues playing, even if the FPV Drone is destroyed.
- FPV Drones cannot be flown upside down.

## 11.9 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 \(on page 638\)](#)
- [Towing Scripting Functions \(on page 639\)](#)

### 11.9.1 Towing Options

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

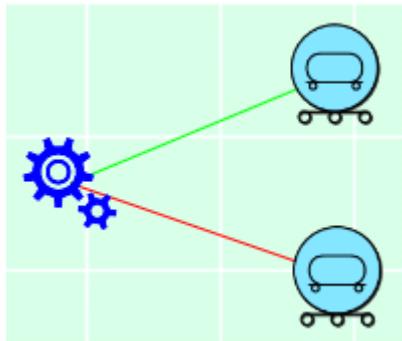
Towing Option	Description
Type	Towing type. Can be: <ul style="list-style-type: none"><li>• <b>Rope Towing</b> - Select this option to attach a rope between two vehicles.</li><li>• <b>Trailer Hitch</b> - Select this option to hitch a trailer to a vehicle.</li></ul>

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

## 11.9.2 Linking

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

**Image-155: 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).

### 11.9.3 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 \(on page 810\)](#)).
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.

## 11.9.4 Towing Scripting Functions

The following towing scripting functions are available:

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

### [fn\\_tow\\_setPointLocked](#)

([https://sqf.bisimulations.com/display/SQF/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.

## 11.10 Add Resupply Points to Missions

Resupply Points (FARP) provide supplies to vehicles in their designated areas (shown on the map with a yellow rectangle or circle).

Configure resupply points to specify the following:

- The available supplies and repairs
- The vehicles that can use the resupply point
- Custom event handlers to execute custom code when vehicles interact with the resupply point
- Links to vehicles and objects to tie the resupply area to the linked vehicle or object

Add Resupply Points in VBS Editor.

**Follow these steps:**

1. In the Editor Objects List, select **Resupply Point**, right-click a location on the map, and select **New Object**.
2. Set the following basic parameters for the Resupply Point:

Resupply Parameter	Description
<b>Name</b>	Specifies the variable name to reference in scripts.
<b>Rectangular</b>	Specifies the shape of the resupply area: <ul style="list-style-type: none"><li>• True - Rectangular</li><li>• False - Circular</li></ul>
<b>Size (Left-Right) / (Up-Down)</b>	Specifies the size in meters for rectangular areas.
<b>Radius</b>	Specifies the size in meters for circular areas.
<b>Time (hr)</b>	Specifies the time a vehicle must spend in the area <i>before</i> it receives any supplies.

**NOTE**

Vehicles must spend the entire time within the resupply area. There are no partial resupplies

3. Set the following **Options** to specify the available supplies and resupply point visibility:

Resupply Option	Description
<b>Rearm</b>	Specifies whether vehicles receive ammunition resupply.
<b>Refuel</b>	Specifies whether vehicles receive fuel resupply.
<b>Repair</b>	Specifies whether vehicles receive repairs.
<b>Supply (Rearm / Refuel / Repair)</b>	Specifies the available resupply units for each supply type (-1 = unlimited supplies).
	<p><b>i NOTE</b></p> <p>Vehicles use up full units even if they only require partial resupply</p>
<b>Restock Repair Parts</b>	Specifies if repair vehicles receive new spare parts.
<b>Create Map Marker</b>	Specifies whether the resupply point is visible on maps.
	<p><b>i NOTE</b></p> <p>Only administrators and users on the same side see the map marker</p>

4. Set the following **Conditions** to specify which vehicles to resupply:

Resupply Condition	Description
<b>Side</b>	Specifies which side can use the resupply point (or ALL).
<b>Specific</b>	Specifies additional conditions for vehicles to use the resupply point: <ul style="list-style-type: none"> <li>• Landed</li> <li>• Engine Off</li> <li>• Vehicle Parked</li> </ul>
<b>Code</b>	Specifies a scripted condition that a vehicle must meet before it receives resupply. Use <code>_this</code> in the condition to refer to the vehicle to resupply.
<b>Fail Message</b>	Specifies a custom message to display if a vehicle does not meet the scripted condition in the Code input.
<b>Resupply Linked</b>	Specifies whether to also resupply linked vehicles.

5. Set scripts to execute at specified **Events**:

Resupply Event	Description
<b>On Arrive</b>	Specifies a script to execute when a vehicle arrives at the resupply point. Use <code>_this</code> to specify the arriving vehicle.
<b>On Leave</b>	Specifies a script to execute when a vehicle leaves the resupply point. Use <code>_this</code> to specify the departing vehicle.
<b>On Start Supply</b>	Specifies a script to execute when a vehicle resupply starts. Use <code>_this</code> to specify the resupplied vehicle.
<b>On End Supply</b>	Specifies a script to execute when a vehicle resupply ends. Use <code>_this</code> to specify an array for the resupplied vehicle, <code>[vehicle, result]</code> , where <code>result</code> is true for a successful resupply.

6. Click **OK**.

VBS Editor adds the Resupply Point to the mission.

7. **Optional:** Right-click the Resupply Point and use a **Link To ...** option to associate the Resupply Point with a vehicle or object.

For more information about scripting, see the Scripting Overview in the VBS4 Scripting Manual.

### 11.10.1 Resupply Point (FARP) setvariables

You can reference named resupply points and change their properties with the `setVariable` script command.

**NOTE**

If you use `setVariable` in Execute mode, the values in the Editor Object edit dialog change only after VBS Editor closes and opens again.

#### Available Variables:

```
VBS2_RESUPPLYPOINT_SIZEX - number
VBS2_RESUPPLYPOINT_SIZEY - number
VBS2_RESUPPLYPOINT_RECTANGULAR - boolean
VBS2_RESUPPLYPOINT_TIME - number
VBS2_RESUPPLYPOINT_REARM - boolean
VBS2_RESUPPLYPOINT_REARM_VOL - number
VBS2_RESUPPLYPOINT_REFUEL - boolean
VBS2_RESUPPLYPOINT_REFUEL_VOL - number
VBS2_RESUPPLYPOINT_REPAIR - boolean
```

```
VBS2_RESUPPLYPOINT_REPAIR_VOL - number
VBS2_RESUPPLYPOINT_RESUPPLY_REPAIR - boolean
VBS2_RESUPPLYPOINT_SIDE - string
- Any
- West
- East
- Guer
- Civ
VBS2_RESUPPLYPOINT_SPECIFIC - string
- None
- Landed
- EngineOff
- Parked
VBS2_RESUPPLYPOINT_CONDITION - string
VBS2_RESUPPLYPOINT_EVTARRIVE - string
VBS2_RESUPPLYPOINT_EVTLEAVE - string
VBS2_RESUPPLYPOINT_EVTSTART - string
VBS2_RESUPPLYPOINT_EVTEND - string
VBS2_RESUPPLYPOINT_RESUPPLY_LINKED - boolean
VBS2_RESUPPLYPOINT_MINIMAP - boolean
VBS2_RESUPPLYPOINT_FAILMSG - string
```

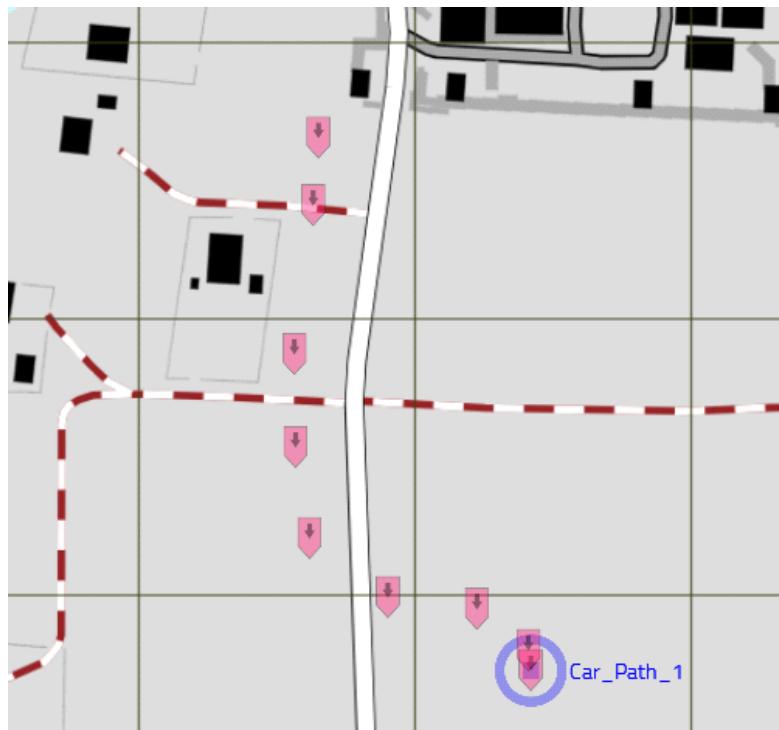
For more information, see [setVariable](https://sqf.bisimulations.com/display/SQF/setVariable) (<https://sqf.bisimulations.com/display/SQF/setVariable>) in the online Scripting Reference.

## 11.11 Vehicle Path Recording (VPR)

Vehicle Path Recording (VPR) enables the playback of a pre-recorded vehicle path during a mission. The vehicle assigned to the path follows the recorded path reliably and repeatedly without any random deviations.

For unit path recording, see [Unit Path Recording \(UPR\) \(on page 408\)](#).

**Image-156: VPR with pre-recorded path loaded**



VPR can record the vehicle path, while driving a vehicle, or while another player and / or AI drives their vehicle.

### **⚠️ WARNING**

VPR is mainly intended to be used with **helicopters**. Using VPR with fixed-wing aircraft, wheeled, or tracked vehicles does not produce a 100% imitation of vehicle movement. For example, steering and particle effects are not visible, and vehicle parts are not animated correctly or at all.

Use the VPR to record a vehicle path, while driving a vehicle.

**Follow these steps:**

1. Ensure that there is a control binding for **Player Path Recording**. Open the **VBS4 Settings > Controls** menu, and filter for **Editor Controls**. By default, **Player Path Recording** is bound to P.

2. Open VBS Editor on the terrain where you want to use the recording later.

**NOTE**

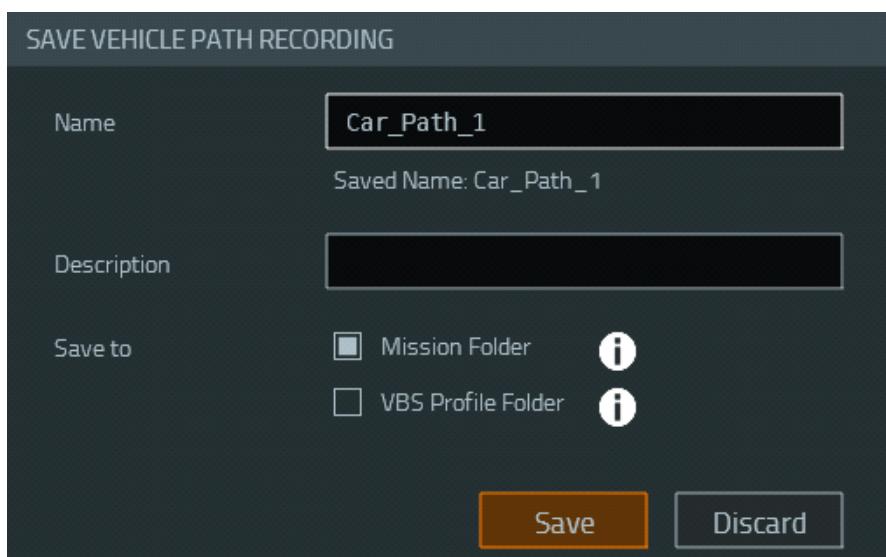
The recording itself is not tied to a specific terrain or even to a particular location. It can run on any terrain, but bear in mind possible issues with terrain elevation differences between the recording terrain and the playback terrain.

3. Place the vehicle you intend to use during playback.

**NOTE**

The vehicle is also not strictly tied to the recording. It is possible to use a different vehicle for playback, but the visual simulation of the vehicle may be degraded.

4. Preview the mission (press **Scenario Preview (H)**).
  5. Open VBS Editor (press **Map (M)**).
  6. Open the Tools menu and select **Enable Record Path Hot Key**.
  7. Press **Pause (Esc)** to return to the simulation.
  8. Maneuver the vehicle to the point where you want the recorded path to start.
  9. Press **Player Path Recording (P)** to start the VPR.
- The HUD displays the current duration of the recording.
10. Maneuver the vehicle along the path you require.
  11. To finish your recording, press **Player Path Recording (P)** to open the Save Recording dialog.



12. Input a **Name** and a **Description** for the recording.

13. Do one of the following:

- Check **Mission Folder**, if you want to save the recording to the Battlespace folder:

`\Battlespace Folder\VehiclePathRecordings\`

- Check **VBS Profile Folder**, if you want to save the recording to the VBS4 Profile folder:

- Default VBS4 Profile location:

`\Documents\VBS4\VehiclePathRecordings\`

- Other VBS4 Profile location:

`Path\User\VehiclePathRecordings\`

`Path` is specified using the `-profiles=Path` command-line option.

For more information, see Command Line and Launcher Options in the VBS4 Administrator Manual.

 **NOTE**

The following considerations apply:

- When there are two recordings with the same name in the **Mission Folder** and **VBS Profile Folder**, the former takes priority.
- To use VPR in a multiplayer network mission, copy the path recording from your **VBS Profile Folder** location to the following folder on the server hosting the mission, or to the mission folder you want to pack:

`\Documents\VBS4\Battlespaces\Battlespace\Missions\Battlespace\VehiclePathRecordings\`

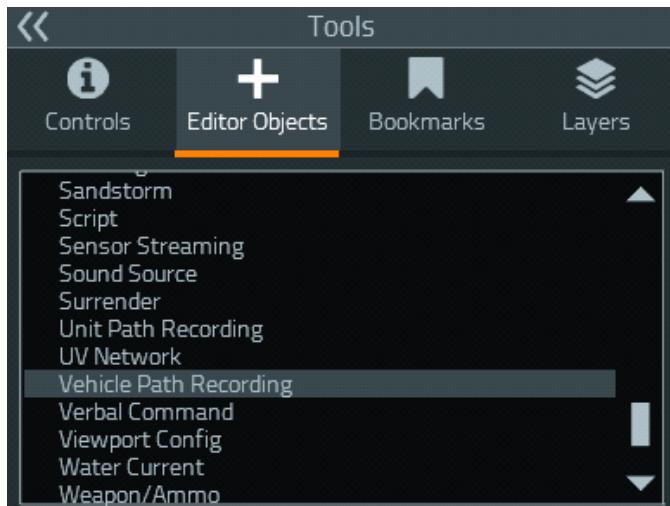
14. Click **Save** to save the recording. If you want to discard the recording, click **Discard**.

The VPR recording is saved as a `Recording_Name.path` file, and you can also use it with another player or an AI-controlled vehicle.

## Follow these steps:

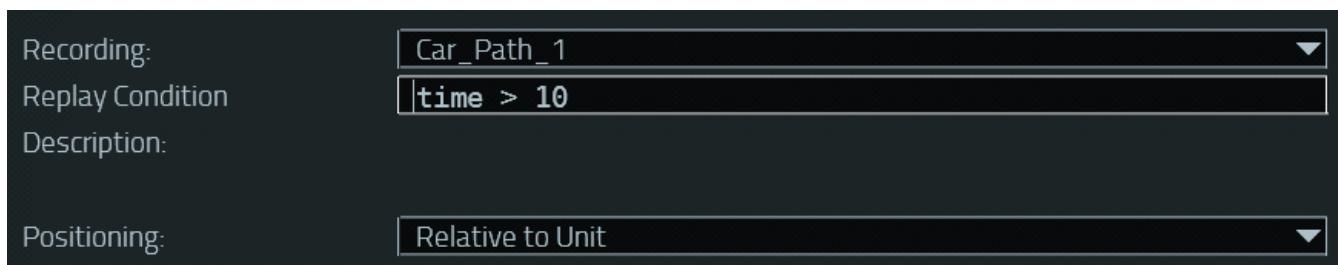
1. Open a new mission on the terrain you wish to use the recording on.
2. Place the **Vehicle Path Recording** Editor Object.

**Image-157: Vehicle Path Recording Editor Object**



3. Set the following object properties:

**Image-158: Vehicle Path Recording Editor Object properties**



- **Recording:** Select the recording you want to use. The descriptive text displays under the selected recording.
- **Condition:** Select a condition for the recording to play. The default is a 10 second delay, but you can specify any valid script syntax. Make sure to use code that returns a Boolean.
- **Positioning:** Select **As Recorded** to use the start position of the recording or **Relative to Unit** to use the VPR Editor Object position.

**NOTE**

Using **Relative to Unit** with land vehicles may have undesirable results due to elevation differences between the original recorded position and the current position.

The map displays a blue icon with the name of the recording and a path indication.

4. Add the vehicle that you want to follow the path to the map. This can be an empty or crewed vehicle of any type.

**i** **NOTE**

The vehicle teleports to the start position when the path start condition is met. Place it as close as possible to the start point in the appropriate orientation.

5. Hold **LShift**, click the Vehicle Path Recording Editor Object, and click the vehicle.

Alternatively, you can right-click the Vehicle Path Recording Editor Object, select **Link to Vehicle** (if the vehicle is empty or has one crew member) or **Link to Group** (if the vehicle has several crew members), and click the vehicle.

When the mission starts, the vehicle follows the recorded path when the conditions are met.

#### Additional Options:

- **Path Preview:** Right-click on any of the path-points and select **Show Vehicle Ghost** to display the position of the vehicle in the 3D View at that point. This enables you to see the position of the linked vehicle at intervals of 2 seconds during the playback. Use this to position the vehicle correctly around obstacles. The ghost image turns red when a heavy collision violation occurs.
- **Attach the VPR:** A VPR can attach to any vehicle. This results in the VPR following this object in its current relative position. This is especially useful when using VPR with a Landing Helicopter Dock or an Aircraft Carrier. Right-click the VPR Editor Object, select **Attach to Object**, and click the vehicle.

During the playback of the VPR, the velocity of an object or vehicle that the VPR is attached to is added to the vehicle being controlled by the VPR. To reduce any problems this may cause, keep the VPR as short as possible. For example, when using VPR for landing on an aircraft carrier, keep the landing VPR as short as possible, ideally just short final phase of the landing.

- **Pause a VPR:** A VPR can be paused at every indicated waypoint. Conditions evaluate using regular script syntax, so the script must return a Boolean. Once a waypoint is reached, the VPR playback pauses until the condition returns true. This is very useful to pause a VPR when the vehicle is stopped to load or unload troops.

#### VPR Limitations:

- Parachutes are vehicles for the purpose of VPR.
- VPR stops replaying when the vehicle is destroyed.
- VPR does not stop replay even if all the crew are killed.
- VPR is applicable to empty vehicles.

## 11.12 Gunner Arcs

It is possible to assign a fire arc to the primary gunner of a vehicle, preventing the gunner from engaging any target outside the defined arc. Arcs maintain a relative position to the vehicle orientation.

### ★ FEATURE NOTICE

This feature has no effect / is not available for Control AI.

#### Follow these steps:

1. In the 2D view of the Editor, right-click a vehicle with a gunner.
2. Select **Orders > Set Arcs**.
3. Move the mouse to adjust the arc, and click the **LMB** to confirm.

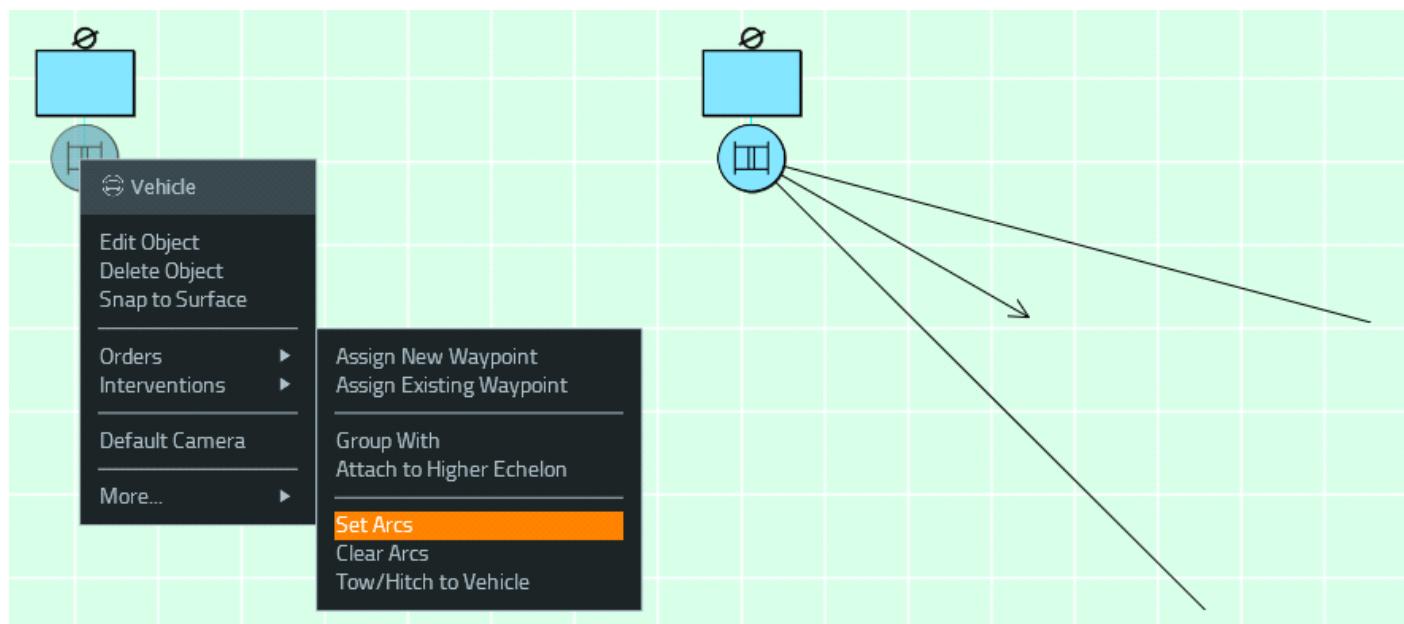
To remove the arc, right-click the vehicle and select **Orders > Clear Arcs**.

The gunner arc is set.

Extended gunner-arc features can be accessed using the following script commands:

- [fireArc](https://sqf.bisimulations.com/display/SQF/fireArc) (<https://sqf.bisimulations.com/display/SQF/fireArc>)
- [setFireArc](https://sqf.bisimulations.com/display/SQF/setFireArc) (<https://sqf.bisimulations.com/display/SQF/setFireArc>)
- [withinFireArc](https://sqf.bisimulations.com/display/SQF/withinFireArc) (<https://sqf.bisimulations.com/display/SQF/withinFireArc>).

**Image-159: Setting arcs**



## 11.12.1 Arc Limits

A gunner arc has the following limits:

- Operates in the parameter ranges defined in the vehicle configuration (minimum / maximum Turn and Elevation).
- Only available to the primary gunner, when used in the Editor.
- Only adjusts the horizontal fire arc, when used in the Editor.

## 11.13 Vehicle Repair

VBS4 has a vehicle repair system that uses spare parts to repair damaged vehicles. Spare parts are carried by repair vehicles and are used up during the repair process. The maximum number of spare parts carried by a repair vehicle is defined in its configuration file (using configuration parameter `repairPartsCargoMax`), see General Vehicle Parameters in the VBS Developer Reference.

Vehicles in VBS4 have a repair value defined in their configuration (using parameter `repairValue`). This value represents the number of spare parts it takes to repair the vehicle, after being fully damaged (maximum 80% damage), to a fully repaired state (0% damage), see General Vehicle Parameters in the VBS Developer Reference.

### **i** NOTE

The Developer Reference is in the `\docs\` folder of the VBS Developer Suite installation.

For information about how to repair damaged vehicles in-game, see Repairing Vehicles in the VBS4 Trainee Manual.

### **i** NOTE

For manual repairs, ensure that Realistic Repairs is enabled in the Simulation settings of VBS4, see Simulation Settings in the VBS4 Administrator Manual.

## 11.13.1 Vehicle Damage

Damage can be applied to all damageable parts (hit zones) of a vehicle by manipulating its overall "health" or by adjusting individual hit zones to affect specific functions using the [Object Properties Dialog \(on the next page\)](#).

Hit zones are created and configured in the configuration file of the vehicle and are placed inside `class HitPoints`.

When damage occurs to a vehicle during a mission (either applied by an administrator or as a result of being hit by weapon fire) icons appear at the top-right corner of the screen, indicating which parts of the vehicle are damaged:



Parts (hit zone types) include:

- **ENGINE** - If damaged, vehicle performance is restricted until the vehicle reaches a stage when it cannot move. If the engine is destroyed (for example, from shooting), the vehicle bursts into flames. The exception is if you set the **Engine** slider (see [Health slider bar \(on the next page\)](#)) to less than 11%, in which case, the Engine health defaults to 11% after confirming the changes.
- **HULL** - If damaged, the body of the vehicle has a charred appearance.

 **TIP**

You can also use the following SQF commands to add / remove vehicle charring:

- [addCharring](https://sqf.bisimulations.com/display/SQF/addCharring) (<https://sqf.bisimulations.com/display/SQF/addCharring>)
- [removeCharring](https://sqf.bisimulations.com/display/SQF/removeCharring) (<https://sqf.bisimulations.com/display/SQF/removeCharring>)

- **L. WHL, R. WHL (Wheels)** - If damaged, the wheel does not work and vehicle driving is affected.
- **TRACKS** - If damaged, the track does not move.
- **TURRET** - If damaged, the turret cannot be traversed, all sub-turrets are disabled, and the attached weapon cannot be fired.
- **WEAPON** - If damaged, the weapon elevation cannot be changed, and the weapon cannot be fired.
- **WINDOWS** - If damaged, bullet proof windows can no longer block shots (they break after taking sufficient damage).

All damaged hit zones are repaired when the whole vehicle is repaired.

 **NOTE**

Hit zones are considered completely destroyed if the damage is greater than 80%.

## 11.13.2 Object Properties Dialog

Mission designers and administrators can apply damage to a vehicle using sliders (whose increments are in percentages) in the Object Properties dialog.

### Follow these steps:

1. Open the Object Properties dialog of the vehicle you want to damage.
2. Click the **Advanced** button.

The dialog expands (see [Health slider bar \(on the next page\)](#)).

3. Click the arrow on the **Health** slider bar and move the mouse to the left (more damage) or right (less damage) to apply equal amounts of damage to all hit zones on the vehicle.
4. Click **OK**.

If you want, you can apply more specific amounts of damage to individual hit zones.

### Follow these steps:

1. Click the **Advanced** button next to the **Health** slider.

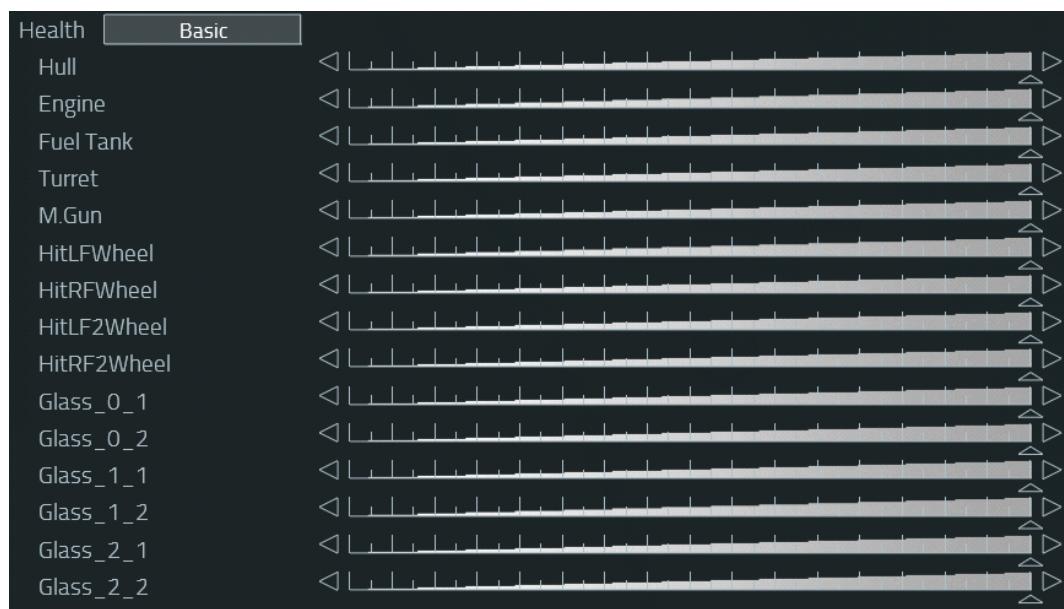
The dialog expands to show more slider bars, one for each hit zone (see [Advanced hit zone slider bars \(on the next page\)](#)).

2. Using the arrows on the slider bars, adjust the amount of damage you want to apply to individual hit zones.
3. Click **OK**.

You can undo damage to individual hit zones and reapply equal damage to all hit zones by clicking the **Basic** button next to **Health**. This collapses the dialog so that the Health slider bar reappears.

**Image-160: Health slider bar**



**Image-161: Advanced hit zone slider bars****NOTE**

If you set the **Engine** slider lower than 11%, the Engine health defaults to 11% after you confirm and close the dialog. Other sliders set to lower than 10% completely destroy the part of the vehicle they represent.

## 11.14 Slingloads

VBS4 includes slingload script objects to enable helicopters to carry other objects.

A slingload enables helicopters to carry the following objects:

- All PhysX land vehicles.
- All PhysX watercraft.

### NOTE

The default weight limit that a helicopter can carry is its own weight. Override this with the **maxSlingloadWeight** parameter in the vehicle configuration. The parameter has no effect on aircraft, since it is not possible to use slingloads with aircraft.

**To equip a helicopter with a slingload, follow these steps:**

1. Open the Editor (Prepare Mode), and place or locate a helicopter on the map.
2. Select (**F8**) **Objects** from the Editor Objects List.
3. Double-click a location on the map near the helicopter.
4. Expand **VBS Scripts** objects and select from the following options:

- **Slingload - allow carry of nearest object**

Equips the helicopter with a sling of default length, not attached to any object.

- **Slingload - XXm on nearest helicopter**

Equips the helicopter with a sling of the specified length, not attached to any object.

- **Slingload - start carrying nearest object**

Equips the helicopter with a sling, already attached to the nearest applicable object.

### NOTE

It is recommended to edit the helicopter object and set the **Special** option to **Flying** to avoid collisions, when the sling automatically attaches to the object. For more information about the **Special** option, see [Adding Vehicles \(on page 599\)](#).

5. Click **OK**.

At the start of the scenario, the slingload is attached to the helicopter and to the nearest object, if applicable. This may take a few seconds.

During flight, position the hook within 2m of an applicable object to automatically attach the hook and start carrying the object.

A helicopter with a slingload has the **VEHICLE > RAISE / LOWER HOOK** options in the Quick Menu (see Quick Menu Actions in the VBS4 Trainee Manual) for the helicopter crew, as well as non-crew units.

A helicopter carrying an object has the **VEHICLE > RELEASE LOAD** option in the Quick Menu for the helicopter crew, as well as non-crew units.

## 11.15 Designing OPV River Class Missions

To design a River Class ship mission, you need to place the River Class Ship Editor Object in the OME.

For RTE interaction with the River Class ship, see Monitoring the OPV River Class in the VBS4 Instructor Manual.

### Follow these steps:

1. In the OME Editor Objects List, select (**F4**) **Vehicle** and double-click a location on the map, where you want to place the River Class ship.



#### WARNING

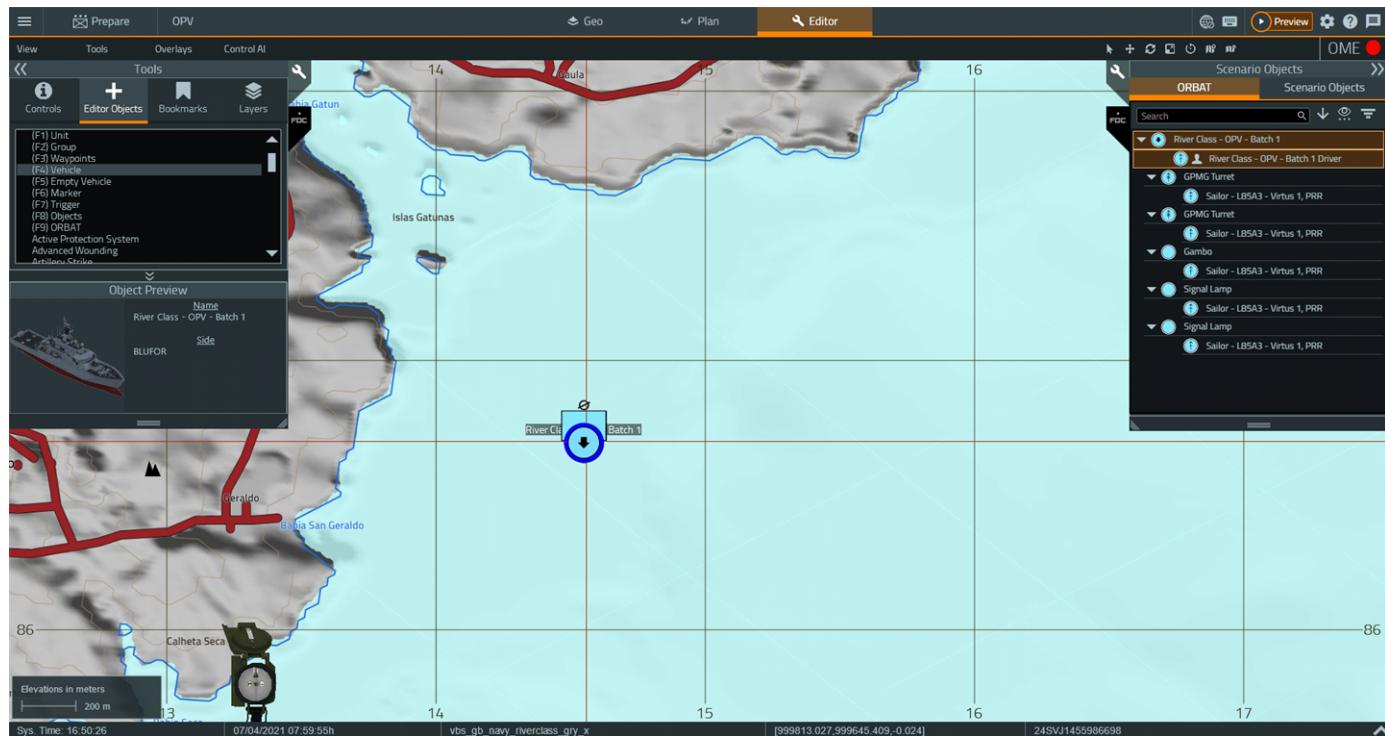
Do not place the ship in shallow water, to avoid keeling over.

The Object Properties dialog opens.

2. In **Filters**, type **River Class - OPV - Batch 1** and select it.
3. Click **OK**.

The River Class ship is placed on the map.

**Image-162: River Class Ship Editor Object in the OME**



## 11.16 Commander Machine Interface (CMI) Editor Object

The Commander Machine Interface (CMI) Editor Object allows commanders to display land-vehicle status information for all vehicles in a convoy.

### NOTE

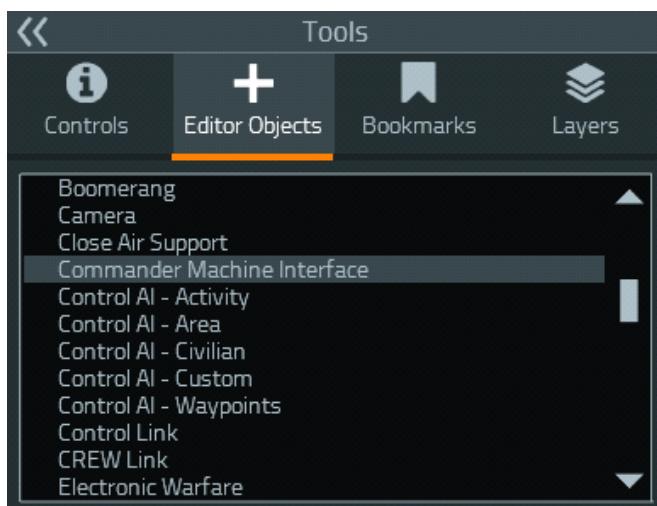
The CMI only displays the status information for:

- Vehicles in the player group.
- Vehicles assigned to the player.

For information on how to use the CMI in the simulation, see [Using the Commander Machine Interface \(CMI\) in the VBS4 Trainee Manual](#).

### Follow these steps:

1. Place a vehicle on the map for which you want to add the CMI.  
For more information, see [Adding Vehicles \(on page 599\)](#).
2. In the Editor Objects List, select **Commander Machine Interface**.



3. Double-click a location on the map where you want to place the CMI Editor Object.

The Object Properties dialog opens.

Information	Select the seats the CMI is available for.
Commander	Yes
Driver	No
Gunner	No
Cargo	No
Allow Globally	No

4. Select the vehicle positions for the CMI to be available in, using the **Yes / No** options in the following drop-downs:

- **Commander**
- **Driver**
- **Gunner**
- **Cargo**
- **Allow Globally**

**NOTE**

Makes the CMI available in the Editor / C2 to all the scenario participants (Administrators / Instructors / Trainees).

5. Right-click the CMI Editor Object, and select **Link to Vehicle** and click the vehicle you want to add the CMI to.

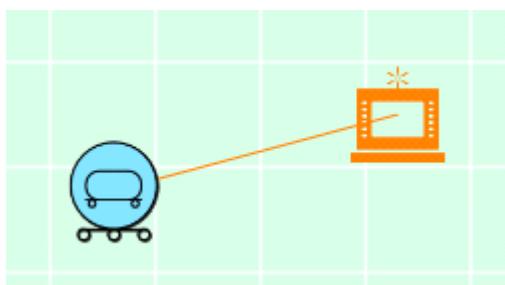
**NOTE**

This step can be skipped, if **Allow Globally** is selected in the previous step.

**WARNING**

Linking multiple CMI Editor Objects to the same vehicle is unsupported.

The CMI is added to the vehicle.



## 12. Equipment Tools and Objects

VBS4 includes a wide variety of weapons, equipment, and specialized objects to enhance training scenarios.

Use the Editor to modify the default equipment of units and vehicles:

- [Edit Equipment Loadout \(on the next page\)](#)
- [Edit Weapon Components \(on page 665\)](#)

In addition, equipment may be added to the scenario as objects that can be picked up and used, or added directly to units or vehicles:

- [Weapon / Ammo Editor Object \(on page 673\)](#)
- [Active Protection System \(on page 676\)](#)
- [ATGM Attractor \(on page 683\)](#)
- [Ballistics Computer \(on page 685\)](#)
- [Boomerang \(on page 687\)](#)
- [CBRN Equipment \(on page 691\)](#)
- [Drone Munitions \(on page 696\)](#)
- [Electronic Warfare \(on page 698\)](#)
- [Enabling CREW \(on page 717\)](#)
- [Fast Rope \(on page 725\)](#)
- [HHMD / AN/PSS-14 Mine Detector \(on page 730\)](#)
- [Infantry Assault Bridge \(on page 734\)](#)
- [Laser Warning Receiver \(on page 736\)](#)
- [Light Beacon \(on page 740\)](#)
- [Military Road Signs - Scenario Design \(on page 742\)](#)
- [Mixed Reality Helmet \(on page 747\)](#)
- [Advanced Mortars \(on page 754\)](#)
- [Radio Jamming Device \(on page 758\)](#)
- [Reference Documents \(on page 765\)](#)
- [Retractable Radio Mast \(on page 767\)](#)
- [Swedish Body Armor \(on page 780\)](#)

## 12.1 Edit Equipment Loadout

You can configure a unit to have a starting loadout in Prepare mode, and change the current loadout of a unit in Execute mode.

**Customize Starting Loadout** - Available only in Prepare mode and is used for creating units with a customized loadout. This modifies the loadout of the unit as part of the mission and is available every time the mission is replayed.

**Edit Current Loadout** - Available only in Execute mode and is used for a quick loadout edit of a particular unit (for example, adding more ammunition when the unit runs out during the mission). This only modifies the loadout for the duration of the current mission runtime.

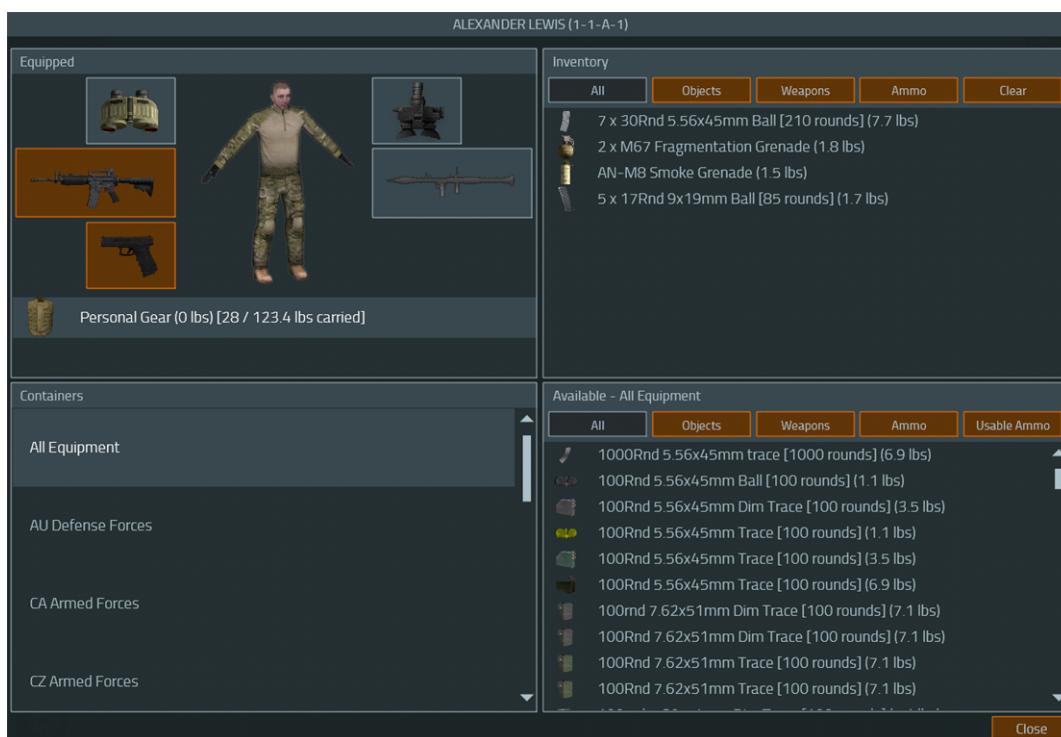
### NOTE

These options customize the unit only in the scope of the saved mission or the current runtime. To add a custom unit to the Editor Objects List, see [Creating Unit Variants \(on page 357\)](#).

### Follow these steps:

1. In VBS Editor, right-click the unit and select:
  - In Prepare mode: **More... > Customize Starting Loadout**
  - In Execute mode: **More... > Edit Current Loadout**

The unit inventory opens with new equipment available in the bottom half of the dialog.



2. Use the force categories in the bottom-left panel and the equipment filters in the bottom-right panel to filter the list of equipment displayed.
3. Drag equipment from the bottom-right to the top-right or top-left to add the equipment to the unit loadout. If prompted, select an amount in the pop-up, and click **OK**.

VBS Editor adds the equipment to the unit loadout and adds its weight to the Personal Gear.

 **NOTE**

If a UCS weapon (name prefixed by **modular weapon**) is added, the Create Custom Weapon dialog opens. For more information, see [Edit Weapon Components \(on page 665\)](#).

4. Click **Close**.

VBS Editor changes the starting or current loadout of the unit.

**Prepare Mode Only:** To restore the default loadout of a unit, right-click the unit and select **More... > Return to Default Loadout**.

For information about creating custom units as new Editor Objects, see [Creating Unit Variants \(on page 357\)](#).

## 12.1.1 JTAC Digital Watch

All units in VBS4 have access to a standard analogue watch. However, the JTAC digital watch is also available.

The following units are already equipped with the digital watch by default:

- **US USMC Desert > FAC / JTAC - M16A3 ACOG**
- **US USMC Woodland > FAC / JTAC - M16A3 ACOG**

To equip any unit with the digital watch, use the following script command:

```
player setItemResource ["watch", "RscWatchDigital"]
```

For more information, see [setItemResource](#)

(<https://sqf.bisimulations.com/display/SQF/setItemResource>), Using Basic Scripts, and Developer Console in the VBS4 Scripting Manual.

### Image-163: Digital watch in-game



As with the analogue watch, the hours, minutes, and seconds are in sync with the scenario time.

#### 12.1.2 Optical Imaging Devices

Control AI units automatically use any optical imaging devices (such as for thermal imaging or night vision) that is in their inventory in conditions of reduced visibility.

When in a vehicle, Control AI units can only use the optical imaging devices the vehicle has when turned in, and their personal optical imaging devices from their inventory, when turned out.

## 12.2 Edit Weapon Components

The Universal Component System (UCS) enables mission designers and administrators to customize the weapon components for unit inventories or for vehicle cargo in a mission.

The method required to customize a weapon varies depending on the Editor mode and the type of inventory containing the Editor Object:

- Adding a custom weapon to a unit in the Prepare mode modifies the unit as part of the saved mission.

 **NOTE**

To create a custom unit as an entry in the Editor Objects List for use in other missions, see [Creating Unit Variants \(on page 357\)](#).

- Adding a custom weapon to a vehicle cargo or container object inventory in Prepare mode adds a new vehicle or object type to the Editor list that is available for all missions. For more information, see [Creating Vehicle Variants \(on page 609\)](#).
- Adding a custom weapon to a unit, vehicle, or container object inventory in Execute mode only modifies the object for the duration of the current mission runtime.

 **NOTE**

In the Inventory equipment list, UCS compatible weapons, such as the M4A1 or Glock 17, have their names prefixed by **modular weapon**. The availability of UCS and the placement of attachment points is determined by the weapon configuration. Also, bear in mind that, technically, impossible attachment combinations are allowed, for which there are no supported animations and functionality. For more information, see Universal Component System in the VBS Developer Reference in the `\docs\` folder of your VBS Developer Suite installation.

UCS provides the following component categories:

- Buttstocks
- Flashhiders

- Flashlights

Toggled by **Lights On / Off** in **VBS4 Toolbar > Settings Icon > Controls**, and mapped to the **L** key by default.

**i NOTE**

When a weapon has multiple flashlights, use the **Cycle Lights On / Off** control in **VBS4 Toolbar > Settings Icon > Controls** to cycle between the flashlights (only one is activated at a time) and light modes for each flashlight.

- Lasers

Toggled by **Laser On / Off** in **VBS4 Toolbar > Settings Icon > Controls**, but is not mapped by default.

**i NOTE**

When a weapon has multiple lasers, use the **Cycle Laser On / Off** control in **VBS4 Toolbar > Settings Icon > Controls** to cycle between the lasers (only one is activated at a time) and laser modes for each laser.

- Foregrips
- Grenade Launchers
- Optics

**i NOTE**

If a weapon uses multiple optics, select a key binding for **Cycle Optics** in **VBS4 Toolbar > Settings Icon > Controls** to enable switching between optics components.

- Suppressors
- Bayonets

**i NOTE**

Can only be used by units equipped with L85 Rifle variants (see Bayonets in the VBS4 Trainee Manual).

The UK **Virtus** units in the following (**F1**) Unit categories (see [Adding Units \(on page 344\)](#)) are usually equipped with L85 Rifles:

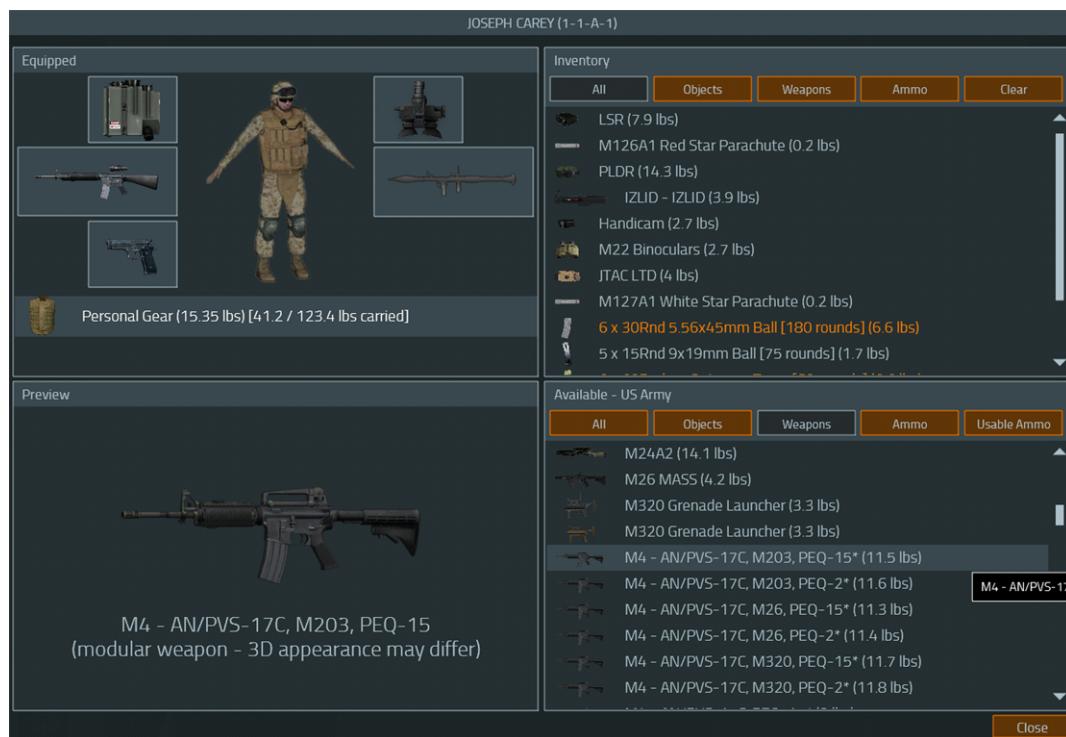
- **GB Army - MTP**
- **GB Royal Marines MTP**
- **GB Royal Navy**

## To access the Create Custom Weapon dialog:

1. Do one of the following to access the inventory:
  - **For units in Prepare mode:** Right-click the unit and select **More... > Customize Starting Loadout**.
  - **For units in Execute mode:** Right-click the unit and select **More... > Edit Current Loadout**.
  - **For vehicles in Prepare mode:** Place a new vehicle, or right-click an existing vehicle and select **Edit Object**, to open object properties, and click **New Vehicle**.
  - **For vehicles in Execute mode:** Right-click the vehicle, select **Edit Object** to open object properties, and click **Inventory**.
  - **For objects in Prepare mode:** Place a new object, or right-click an existing object and select **Edit Object**, to open object properties, and click **New Object**.
  - **For objects in Execute mode:** Right-click the object, select **Edit Object** to open object properties, and click **Inventory**.

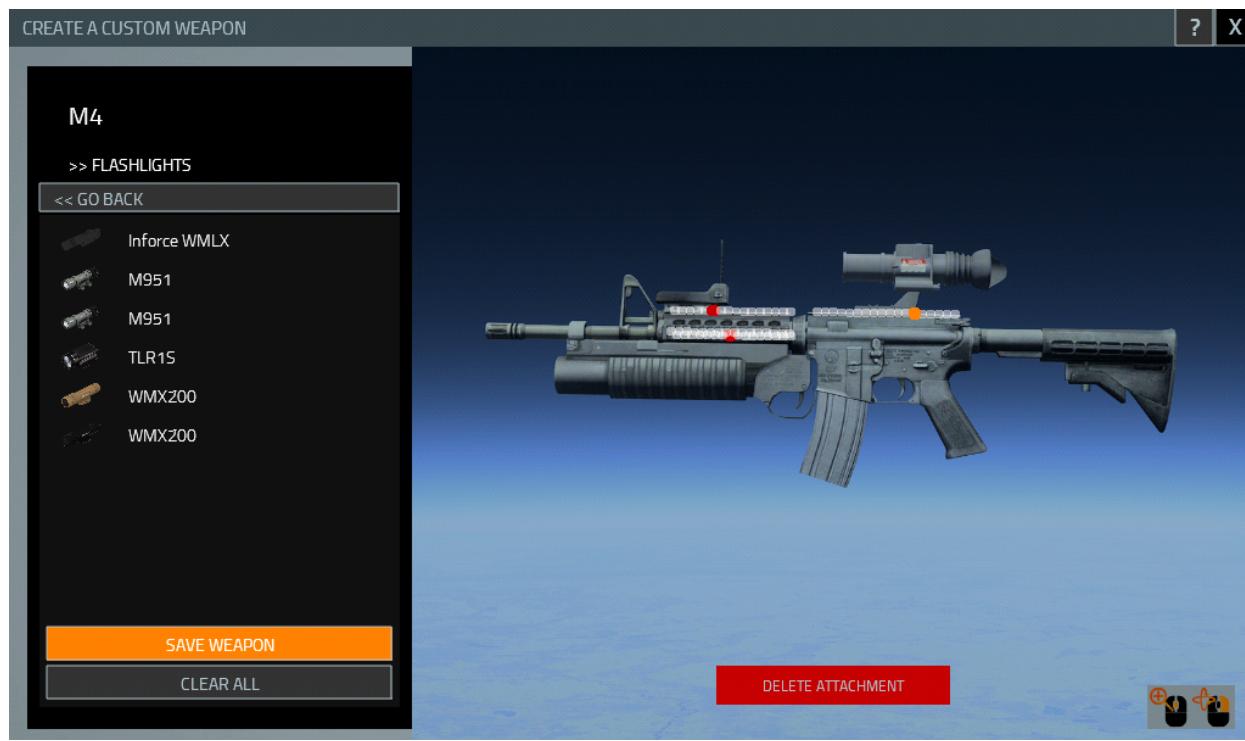
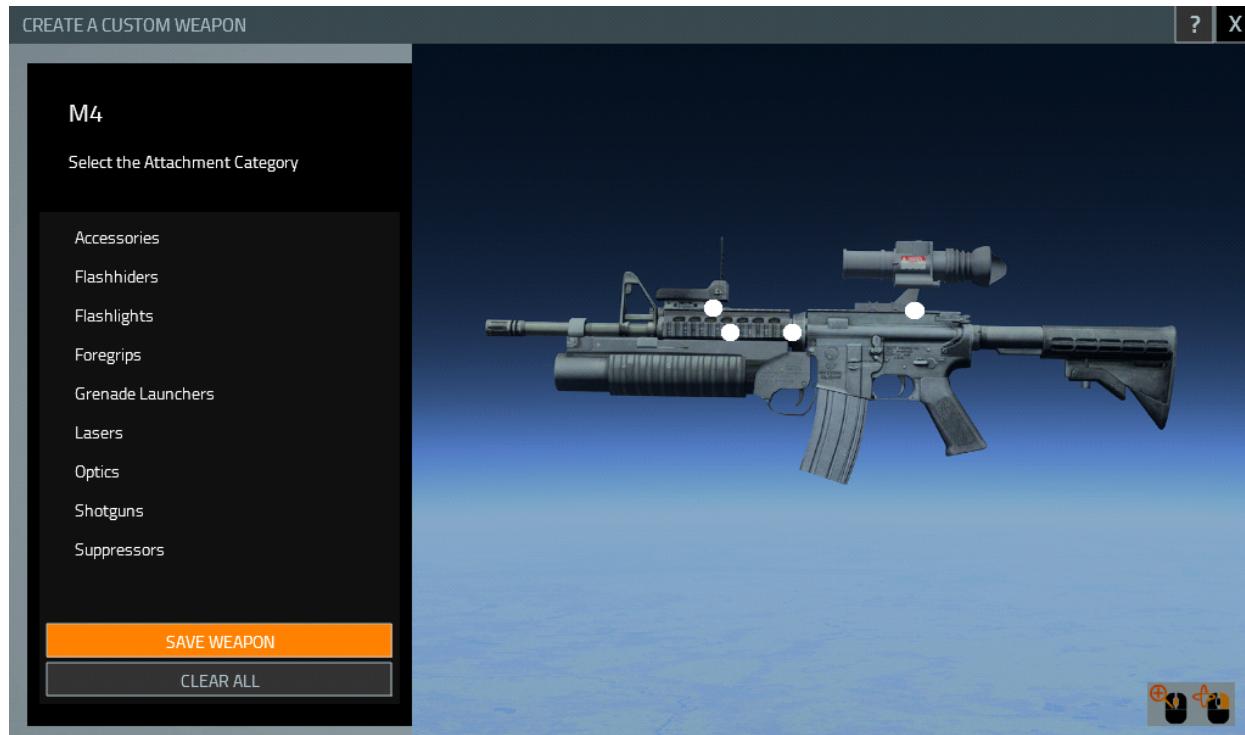
The Inventory for the unit, vehicle, or object opens.

2. Using the equipment categories in the bottom-left panel and the **Weapons** filter in the bottom-right panel, locate the weapon to add to the unit or vehicle.



3. Drag a UCS-compatible weapon from the equipment list to the unit or vehicle inventory; either directly into an equipped weapon slot in the top-left, or into the available equipment list in the top-right.

The **Create a Custom Weapon** dialog opens showing the weapon with its default components and attachment locations.



The initial view displays the weapon with its default components and attachment locations - indicated by the larger white dots. When you select a location or an attachment, the view displays the individual attachment points:

**NOTE**

When creating a custom weapon, if the weapon does not have demountable components added by default, white dots do not appear in the initial view.

- **Red** indicates an occupied attachment point.
- **Orange** indicates the current attachment point for the selected component.
- **Grey** indicates an available attachment point.
- Place the cursor over an attachment point to highlight it in **White**. Click the highlighted point to place or move the current component.

In the above screenshots, the M4 rifle has five attachment locations, four along the barrel handguard, and one along the top of the receiver. Each of these locations uses an attachment rail with a set of attachment points to choose from.

Use the dialog to do any of the following:

**To View Dialog Help:**

- Click **?** to view the dialog help text.

**To View the Current Weapon and Components:**

- Hold the **RMB** and move the mouse to rotate the weapon.
- Use the scroll wheel to zoom in and out.
- Click a weapon attachment location to view the weapon attachment points.
- Click in empty space to restore the weapon attachment location display.

**To Remove Weapon Components:**

1. Click a weapon attachment location.

The dialog displays all attachment points with the active component attachment point highlighted in **Orange**.

2. Click **Delete Attachment**.

The dialog removes the attachment.

Alternatively, click **Clear All** to remove all weapon components.

**To Add Weapon Components:**

1. Select an attachment category.

The attachment list displays the available components for the selected category.

2. Select an attachment.

The weapon image shows the available attachment points.

3. Move the cursor to highlight the required attachment point and click the **LMB** to place it.

The dialog adds the selected component to the selected attachment point.

#### To Move Weapon Components:

1. Click a weapon attachment location.

The dialog displays all attachment points with the active component attachment point highlighted in **Orange**.

2. Move the cursor to highlight the required attachment point and click the **LMB** to place it.

The dialog moves the selected component to the selected attachment point.

#### NOTE

It is possible to add components that occupy the same physical space as another component. Rotate the weapon view with all the required components attached to verify that there are no overlapping components.

#### Click **Save Weapon**.

VBS Editor adds the customized weapon to the unit, vehicle, or object inventory.

Do one of the following:

- **For units in VBS Editor:** Click **Close**.
- **For vehicles in Prepare mode:**
  1. Click **OK** to close the inventory.
  2. Specify a new **Vehicle Name** and click **OK**.
  3. Click **OK** to close the Object Properties dialog.
- **For vehicles in Execute mode:** Click **Close**, and click **OK**.
- **For objects in Prepare mode:**
  1. Click **OK** to close the inventory.
  2. Specify a new **Object Name** and click **OK**.
  3. Click **OK** to close the Object Properties dialog.
- **For objects in Execute mode:** Click **Close**, and click **OK**.

The object is modified to contain the custom weapon as part of its inventory:

- Modifications in Execute mode only affect the current mission runtime.
- Unit modifications in Prepare mode only affect the unit as part of the saved mission.

**NOTE**

To create a custom unit as an entry in the Editor Objects List for use in other missions, see [Creating Unit Variants \(on page 357\)](#).

- Vehicle and object modifications in Prepare mode create a new custom vehicle or object available for all missions as an entry in the Editor Objects List.

**NOTE**

It is not possible to edit weapon components after a weapon is added to the inventory.

## 12.2.1 UCS Scripting Commands

The following script commands are available to obtain and modify the weapons and components in a unit inventory or vehicle cargo.

The commands require the knowledge of weapon component and slot names. You can find the weapon component and slot names by opening the weapon configuration class in the Configuration Browser (see Configuration Browser in the VBS Developer Reference).

For more information on UCS configuration, see UCS Weapons in the VBS Developer Reference.

**NOTE**

The Developer Reference is in the `\docs\` folder of the VBS Developer Suite installation.

Script Command	Description
<a href="#"><u>addComponentToSlot</u></a> ( <a href="https://sqf.bisimulations.com/display/SQF/addComponentToSlot">https://sqf.bisimulations.com/display/SQF/addComponentToSlot</a> )	Add a component to an attachment slot on a weapon.
<a href="#"><u>addWeapon</u></a> ( <a href="https://sqf.bisimulations.com/display/SQF/addWeapon">https://sqf.bisimulations.com/display/SQF/addWeapon</a> )	Add a weapon to a unit or vehicle.
<a href="#"><u>addWeaponCargo</u></a> ( <a href="https://sqf.bisimulations.com/display/SQF/addWeaponCargo">https://sqf.bisimulations.com/display/SQF/addWeaponCargo</a> )	Add weapons to the cargo space of vehicles, which can be taken out by infantry units.
<a href="#"><u>configOf</u></a> ( <a href="https://sqf.bisimulations.com/display/SQF/configOf">https://sqf.bisimulations.com/display/SQF/configOf</a> )	Returns the full configuration path of a weapon or component object.

Script Command	Description
<a href="https://sqf.bisimulations.com/display/SQF/getComponents"><u>getComponents</u></a> ( <a href="https://sqf.bisimulations.com/display/SQF/getComponents">https://sqf.bisimulations.com/display/SQF/getComponents</a> )	Returns the components attached to the slot of a weapon object / component.
<a href="https://sqf.bisimulations.com/display/SQF/getWeaponObjects"><u>getWeaponObjects</u></a> ( <a href="https://sqf.bisimulations.com/display/SQF/getWeaponObjects">https://sqf.bisimulations.com/display/SQF/getWeaponObjects</a> )	Returns the object references of weapons for the specified unit or vehicle.
<a href="https://sqf.bisimulations.com/display/SQF/getWeaponObjectsCargo"><u>getWeaponObjectsCargo</u></a> ( <a href="https://sqf.bisimulations.com/display/SQF/getWeaponObjectsCargo">https://sqf.bisimulations.com/display/SQF/getWeaponObjectsCargo</a> )	Returns an array of weapon objects available in the cargo space of a given object.
<a href="https://sqf.bisimulations.com/display/SQF/moveComponentToSlot"><u>moveComponentToSlot</u></a> ( <a href="https://sqf.bisimulations.com/display/SQF/moveComponentToSlot">https://sqf.bisimulations.com/display/SQF/moveComponentToSlot</a> )	Move an existing component to another slot or slot position.
<a href="https://sqf.bisimulations.com/display/SQF/removeComponent"><u>removeComponent</u></a> ( <a href="https://sqf.bisimulations.com/display/SQF/removeComponent">https://sqf.bisimulations.com/display/SQF/removeComponent</a> )	Remove a component from its parent object or item.
<a href="https://sqf.bisimulations.com/display/SQF/removeWeapon"><u>removeWeapon</u></a> ( <a href="https://sqf.bisimulations.com/display/SQF/removeWeapon">https://sqf.bisimulations.com/display/SQF/removeWeapon</a> )	Remove a weapon from a unit or vehicle.
<a href="https://sqf.bisimulations.com/display/SQF/removeWeaponCargo"><u>removeWeaponCargo</u></a> ( <a href="https://sqf.bisimulations.com/display/SQF/removeWeaponCargo">https://sqf.bisimulations.com/display/SQF/removeWeaponCargo</a> )	Remove a weapon from the cargo of a vehicle.

**NOTE**

Click the command name to view the full script command description and syntax in the [VBS Scripting Reference](https://sqf.bisimulations.com/display/SQF/) (<https://sqf.bisimulations.com/display/SQF/>) or search for the command in the offline reference in `\VBS_Installation\docs\Wiki.zip`.

## 12.3 Weapon / Ammo Editor Object

The Weapon / Ammo Editor Object allows the placement of individual weapons and / or magazines (ammunition) in VBS Editor. Once placed, a weapon holder object would be created with the selected weapon or magazine added and it could be placed anywhere using the regular manipulation tools.

A Weapon / Ammo Editor Object can be created in the following ways:

- In VBS Editor, by placing a Weapon / Ammo Editor Object in the mission.
- By dropping a weapon / ammunition / item on the ground manually in the simulation.
- By dropping the weapon when a unit surrenders or gets damaged by amputation (and is still alive).

**Image-164: Weapon and ammunition laid on the ground**



When placed, the Editor Object provides an option to select either a weapon or ammunition.

**Image-165: Weapon selection**

Select Category	Weapon
Weapon Type	None Selected
Loaded	false

For weapons, **Loaded** provides an option to load the weapon with the default magazine. In the weapon listing you can show the weapon description or the available ammunition for that weapon.

**Image-166: Ammo (magazine) selection**

Select Category	Ammo
Ammo Type	None Selected
	Select Type

### Image-167: Weapon / Ammo Editor Object



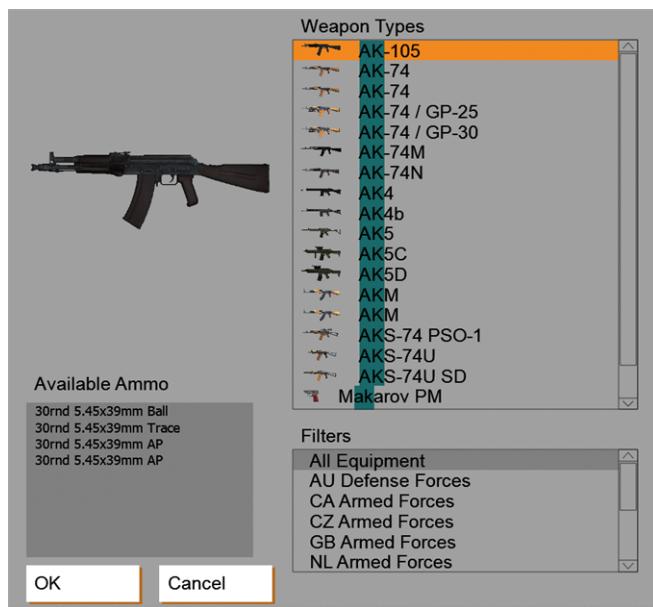
### 12.3.1 Filtering the List

When selecting a weapon or magazine to place, you can filter the displayed list by selecting the list frame and typing in the a few letters of the text you want to use as a filter.

For example, the image below shows the unfiltered weapon listing. If we wanted to narrow the list to just weapons that contain the letters "AK" we would first **put the focus into the list (by clicking on a weapon listing)** then type in the letter "a" and then the letter "k".

### Image-168: Unfiltered weapon listing



**Image-169: Filtered on the letters "ak"**

Press **Backspace** to remove the last typed letter, and **Esc** to cancel the filter.

### 12.3.2 Limitations

- The ammunition inventory dialog preview might differ from the ammunition 3D model in the player default view.
- Ammunition has a wrong initial position, and appears to float above ground or to be stuck in the ground.
- The Weapon / Ammo Editor Object holder has no physics:
  - Anything can be placed anywhere (for example, on a vertical wall, without falling down).
  - Not affected by gravity, collision, or explosion.
- Many magazines are configured only for one weapon type, even though they should be usable in multiple weapon types. Therefore, weapon-specific versions of the same magazine might not be recognizable in the Weapon / Ammo Editor Object preview.
- Adding / deleting the Weapon / Ammo Editor Object in VBS Editor during a multiplayer scenario may not be reflected on other clients.

## 12.4 Active Protection System

Administrators can apply the Active Protection System (APS) to vehicles in VBS4 using the **Active Protection System** Editor Object (EO), when there is a perceived threat to them from enemy missiles. The APS works by countering incoming projectiles, using "hard-kill" measures.

### ★ FEATURE NOTICE

Turret manipulation by an AI vehicle crew is temporarily unsupported on APS-enabled vehicles. For more information, see One AI in the VBS4 Release Notes.

When an enemy projectile is fired at an APS enabled vehicle, the vehicle fires a shot-gun like blast from the front or sides to intercept it.

### ℹ NOTE

This countermeasure is abstract in VBS4, so that while the mechanism cannot be seen, the protection effect is present, and vehicle occupants see a small explosion when a missile is intercepted.

Vehicles with the APS are also equipped with the [Vehicle Countermeasures HUD \(on page 680\)](#), which alerts the crew to incoming projectiles.

**Image-170: Rocket launcher missile intercepted by the APS**



### ℹ NOTE

Multiple APS EOs can be placed in a single scenario, and each can be configured differently. In addition, one APS EO can be linked to several vehicles.

## 12.4.1 Equip a Vehicle with the APS

The following procedure explains how to equip a vehicle with the APS.

### Follow these steps:

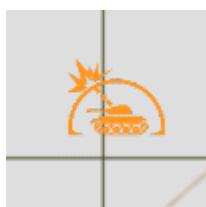
1. In the Editor Objects list, select **Active Protection System**.
2. Double-click anywhere on the map.

The Object Properties dialog opens.

Effectiveness (%)	<input type="range" value="90"/> 90
Projectile Speed (m/s)	900
Defeat these munitions:	Rockets, Missiles & Shells
Defeat shots from:	All sides
Min Defeat Distance (m)	10
Engagement Distance (m)	25
Projectile Trajectory	Ignore projectiles that will miss the vehicle.
Auto-Align VC Turret	false
Distribution	Full coverage on all reloads.
Reload Capacity	2
Multiple Engagement	Requires Reload
Reload Time (s)	1

3. Adjust the [APS Settings \(below\)](#) as required, and click **OK**.

The APS EO icon appears on the map.



### APS Settings

Setting	Description
<b>Effectiveness (%)</b>	Click and hold the slider arrow, and drag your mouse to adjust the effectiveness of the APS, as a percentage (%). 
<b>Projectile Speed (m/s)</b>	Enter a projectile speed, in meters per second (m/s). <b>Default:</b> 900

Setting	Description
Defeat These Munitions	<p>Use the drop-down to select the type of missiles you want to counter:</p> <ul style="list-style-type: none"><li>• <b>Unguided Rockets</b></li><li>• <b>Guided Missiles</b></li><li>• <b>Explosive Shells</b></li><li>• <b>Rockets and Missiles</b></li><li>• <b>Rockets and Shells</b></li><li>• <b>Missiles and Shells</b></li><li>• <b>Rockets, Missiles, and Shells</b></li></ul>
	<div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><p><b>i</b> <b>NOTE</b></p><p>The APS is not effective against bullets due to the quick-fire nature of guns / machine guns.</p></div>
Defeat Shots From	<p>Use the drop-down to select which side you want to counter projectiles from:</p> <ul style="list-style-type: none"><li>• <b>Only OPFOR</b></li><li>• <b>All sides</b></li><li>• <b>Only BLUFOR</b></li></ul>
Min Defeat Distance (m)	<p>Enter the minimum safe distance that a missile can be engaged at, in meters (m). This setting can be visualized on the 2D Map / in 3D Camera View (see <a href="#">Range Visualization (on page 680)</a>).</p> <p><b>Default:</b> 10 m</p>
Engagement Distance (m)	<p>Enter the distance at which the APS considers a missile to be a threat, in meters (m). The APS blast intercepts the incoming missile here, causing it to explode mid-flight. This setting can be visualized on the 2D Map / in 3D Camera View (see <a href="#">Range Visualization (on page 680)</a>).</p> <p><b>Default:</b> 25 m</p>
Projectile Trajectory	<p>Use the drop-down to select one of the following options:</p> <ul style="list-style-type: none"><li>• <b>Engage all projectiles that enter engagement range</b></li><li>• <b>Ignore projectiles that will miss the vehicle</b></li></ul>
Auto-Align VC Turret	<p>Use the drop-down to specify if the turret should auto-align to face the direction the threat is coming from:</p> <ul style="list-style-type: none"><li>• <b>False</b></li><li>• <b>True</b></li></ul>
Distribution	<p>Use the drop-down to select the reload type:</p> <ul style="list-style-type: none"><li>• <b>Full coverage on all reloads</b> - Reloading is done for an APS fixture that covers the whole vehicle.</li><li>• <b>Separate left and right reloads</b> - Reloading is done whenever the APS fixture on either side of the vehicle runs out of ammunition.</li></ul>

Setting	Description
<b>Reload Capacity</b>	Enter how many times the APS system can reload (number of rounds). <b>Default:</b> 2
<b>Multiple Engagement</b>	Using the drop-down, select if the APS can defeat multiple incoming missiles, or whether a reload is required between defeats: <ul style="list-style-type: none"><li>• <b>Requires Reload</b></li><li>• <b>Simultaneous</b></li></ul>
<b>Reload Time(s)</b>	Enter the APS reload time, in seconds (s). <b>Default:</b> 1

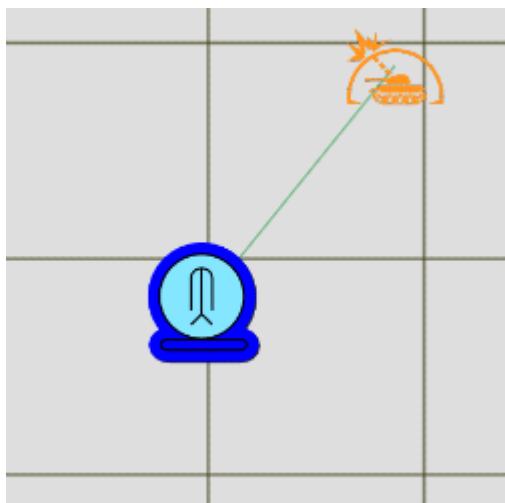
The APS EO must be linked to the vehicle that requires APS functionality to enable it.

**Follow these steps:**

1. Right-click the **APS EO**.
2. Select **Link Vehicle** in the context menu.  
A black arrow is attached to your cursor.
3. Click the **Vehicle** that you want to have APS functionality.  
The arrow becomes a **green** line, which indicates that the APS EO is linked to the vehicle.
4. If required, repeat steps 1 to 3 to apply the APS to other vehicles.

The vehicle has APS functionality applied, and can counteract incoming projectiles.

**Image-171: APS EO linked to a vehicle on the 2D Map**



### 12.4.1.1 Range Visualization

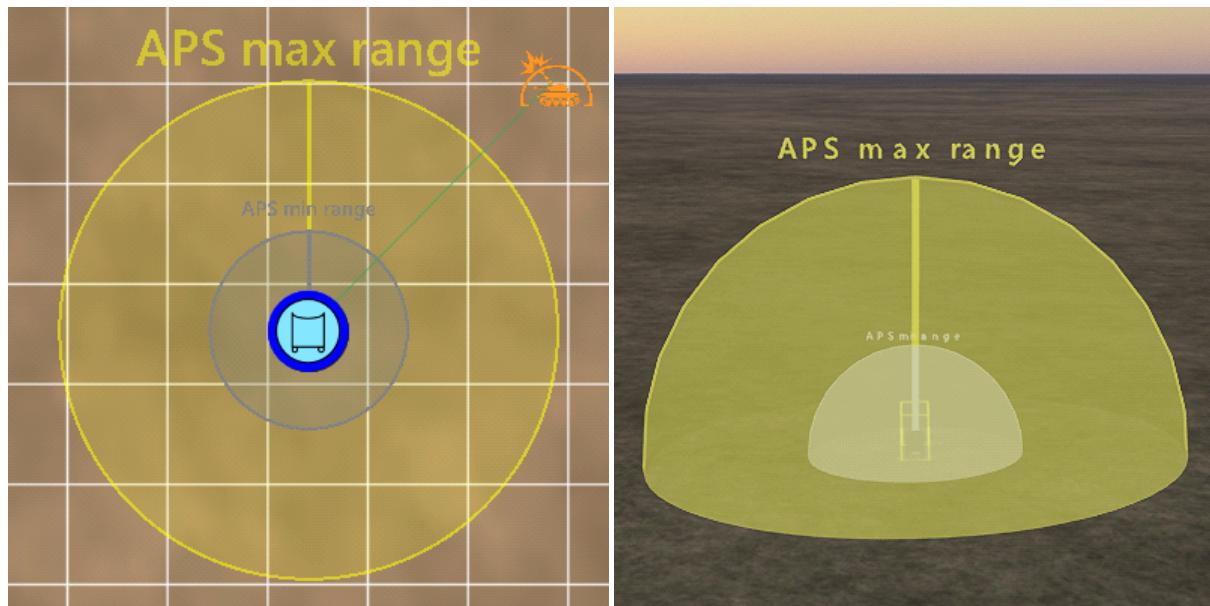
In VBS4, the [Min Defeat Distance \(m\)](#) (on page 678) and [Engagement Distance \(m\)](#) (on page 678) of the APS can be displayed as range visualizations.

#### **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-172: 2D and 3D range visualization**



### 12.4.2 Vehicle Countermeasures HUD

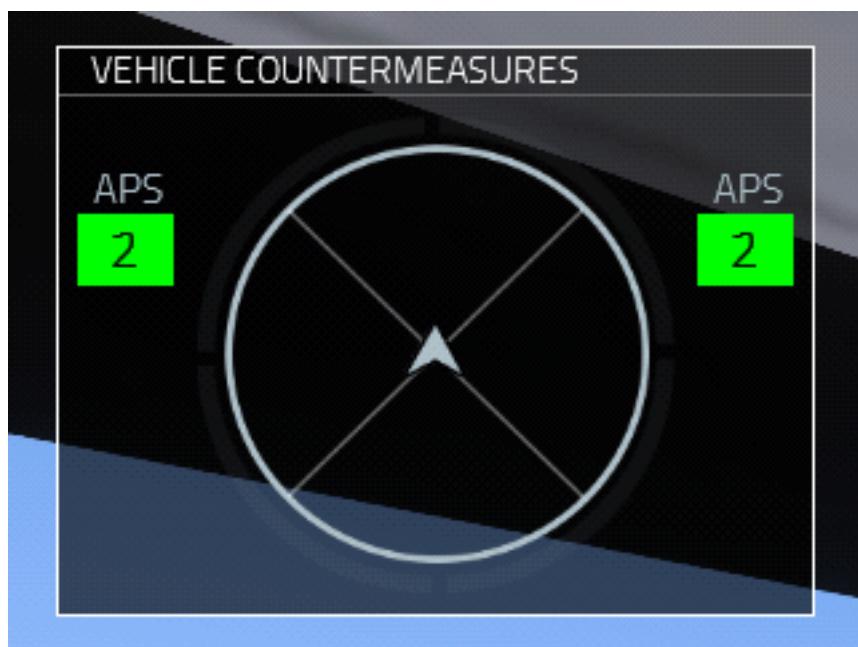
Depending on the vehicle type, if the APS EO is linked to the vehicle, the Vehicle Countermeasures HUD is enabled in one of two ways:

- Automatically.
- By the Commander using the Quick Menu / Systems Menu (see [Quick Menu Actions / Systems Menu](#) in the VBS4 Trainee Manual).

#### **NOTE**

The Vehicle Countermeasures HUD is seen by units in the Commander, Gunner, Driver and Loader positions. Units in Cargo positions do not see the Vehicle Countermeasures HUD.

### Image-173: Vehicle Countermeasures HUD

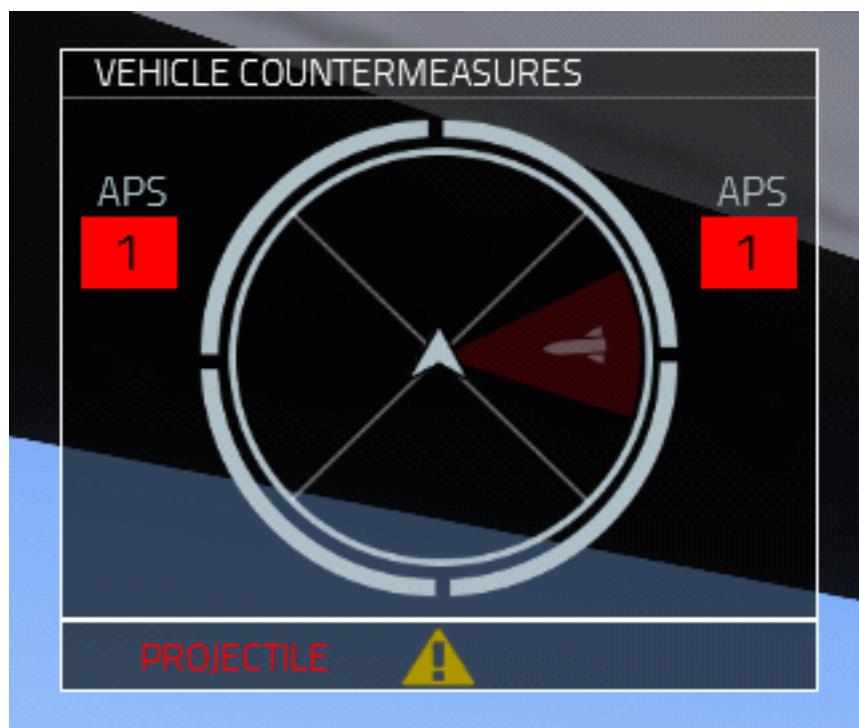


The HUD displays the following information.

Information	Description
<b>Compass</b>	Used to show the direction a projectile is coming from, and the approximate direction in which the countermeasure is fired (shown by the white segment line along the outer edge of the compass).
<b>APS</b>	Shows the number of charges left in the APS system.
<b>SM</b>	If the vehicle has smoke launchers, shows the number of smoke charges available.
<b>MAN / AUTO</b>	If the vehicle has smoke launchers, shows the smoke launcher mode (manual / auto).

For more information about smoke launchers, see Countermeasures - Smoke in the VBS4 Trainee Manual.

When the APS system detects an incoming projectile, the compass shows where it is coming from (missile icon) and a warning triangle with the word **PROJECTILE** is displayed. Based on this information, the APS system automatically deploys a countermeasure.

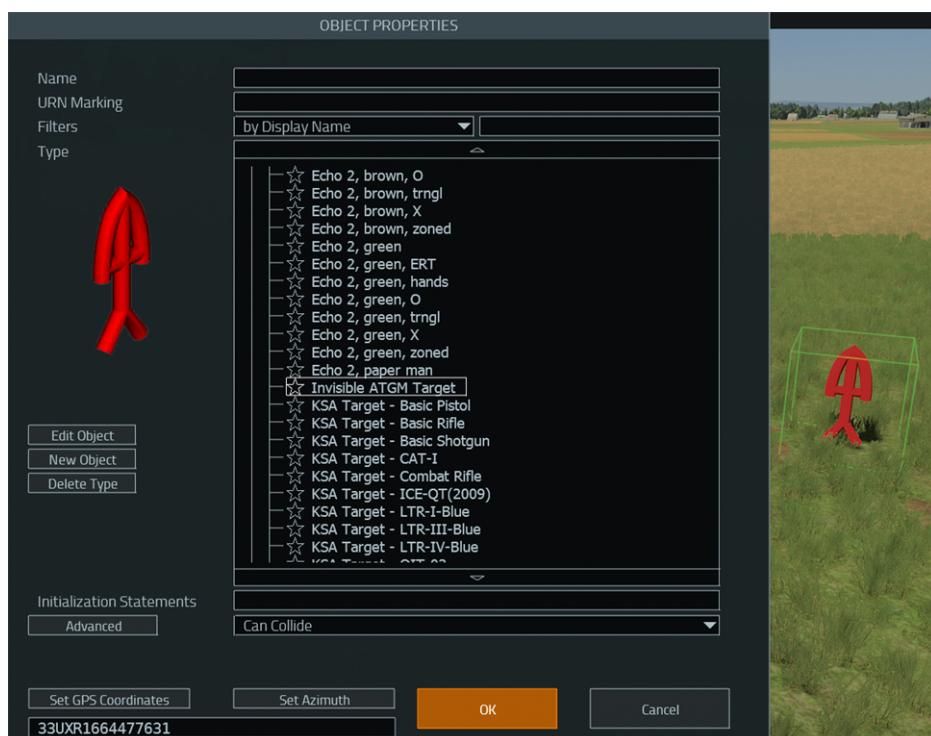
**Image-174: Detected threat and countermeasure deployed**

## 12.5 ATGM Attractor

Invisible Anti-Tank Guided Missile (ATGM) Attractors allow targeting of non-vehicle targets by player units (not AI).

ATGM Attractors are invisible targets (only visible to administrators and mission designers) that can be locked onto by weapon systems with locking capability, such as the M47 Dragon launcher. Placing them in or beside buildings and objects allows the player ATGM operators to target and lock on those locations.

**Image-175: Invisible ATGM Target**



**Follow these steps:**

1. Place an ATGM Attractor (found in **(F8) Objects > Targets - Static > Invisible ATGM Target**) on the target / location that you want to become lockable (for example, next to or on top of a building).

2. In the game, a player with a M47 Dragon launcher can now lock onto the target with an ATGM Attractor.

**i NOTE**

Since the ATGM Attractor is invisible to players, the player needs to know the target with an ATGM Attractor.

**Image-176: Locked-on square using an M47 Dragon launcher**



## 12.6 Ballistics Computer

The M32 Lightweight Handheld Mortar Ballistics Computer (LHMBC) allows players to calculate firing solutions for mortars, and is represented in VBS4 as an Object - a PDA-type device.

When added to the Inventory of a player, the HUD Quick Menu item **BALLISTIC COMPUTER MENU** becomes available (see Quick Menu Actions in the VBS4 Trainee Manual), enabling the player to access the device settings.

The LHMBC is added to a unit loadout in VBS Editor (see [Edit Equipment Loadout \(on page 662\)](#)) or placed on the ground using the Editor Objects List for any player to retrieve it themselves:

### Follow these steps:

1. Click (**F8**) **Objects** on the Editor Objects List.
2. Double-click on the **map** where you want to place the LHMBC.
3. On the Object Properties dialog, scroll down the Type window and select **Objects - Military > M32 LHMBC**.
4. Click **OK**.

The Ballistics Computer is placed on the map.

For how to use the LHMBC, see Ballistics Computer in the VBS4 Trainee Manual.

### 12.6.1 Presets

If you wish to preset the LHMBC with saved units or targets, you can do so using scripting. The examples here use the following conventions:

- The name of the Ballistic Computer object is `myBC`.
- The name of the Forward Observer unit is `myFO`.
- The name of the mortar unit is `myMortar`.
- If the LHMBC object is on the ground, you can assign it a name (`myBC` for example).
- If the LHMBC is in the inventory of a unit, you cannot assign it a name. Instead, use the following format (replace `someUnitWithBC` with the unit that has the LHMBC in their inventory), replacing `myBC` with `_bcObject`:

```
_bcObject = someUnitWithBC getVariable ["VBS_BALISTIC_COMPUTER_OBJECT", objNull];
```

#### **WARNING**

You must place the `myFO` and `myMortar` units beside the player unit before you copy the `init` file into the Battlespaces folder, otherwise you receive an error message.

## Adding Units

You can add units without overwriting any existing registered mortar crews or forward observers, see the following example.

```
// Gets the array for all saved Units.  
_savedUnits = myBC getVariable ["VBS_BALLISTIC_COMPUTER_SAVED_UNITS", []];  
// Store the details of the object you want to add. The format is:  
// [unit type, unit name, position, direction, weapon, [ammunition types]]  
// ...for a mortar that exists in the scenario, and is called myMortar.  
// You need to get the magazine strings manually. Only use the 1rnd variants!  
  
// The following example ammunition is for an 81mm M252 mortar:  
_mortarAmmo = ["vbs_mag_1rnd_Sh_81_HE_141a1", "vbs_mag_1rnd_Sh_81_HE_141a2",  
    "vbs_mag_1rnd_Sh_81_illum_154a1", "vbs_mag_1rnd_Sh_81_wp_142a4"];  
_myNewMortarUnit = ["Mortar Section", "My Mortar", getPosASL2 myMortar,  
    getDir myMortar, currentWeapon myMortar, _mortarAmmo];  
  
// Forward Observer (FO) unit that exists in the scenario, and is called myFO:  
// no need for weapon or ammo data for FOs  
_myNewFO = ["Observer", "My FO", getPosASL2 myFO, getDir myFO, "", []];  
  
// Add each of the new units to the saved array:  
_savedUnits set [count _savedUnits, _myNewMortarUnit];  
_savedUnits set [count _savedUnits, _myNewFO];  
  
// Store the updated array in the Ballistics Computer object:  
myBC setVariable ["VBS_BALLISTIC_COMPUTER_SAVED_UNITS", _savedUnits, true];
```

## Adding Targets

You can add targets without overwriting any existing registered targets, see the following example:

```
// Gets the array for all saved Targets  
_savedTargets = myBC getVariable ["VBS_BALLISTIC_COMPUTER_SAVED_TARGETS", []];  
// Store the details of the object you want to add.  
// The format is: [target name, position]  
// ...for a target that exists in the scenario, and is called myTarget:  
_myNewTarget = ["My Target", getPosASL2 myTarget];  
  
// Add a new target to the saved array:  
_savedTargets set [count _savedTargets, _myNewTarget];  
  
// Store the updated array in the Ballistics Computer object:  
myBC setVariable ["VBS_BALLISTIC_COMPUTER_SAVED_TARGETS", _savedTargets, true];
```

## 12.7 Boomerang

The Boomerang shooter detection system is a gunfire locator, used as a countermeasure against snipers.

The system is generally available on most US Army vehicles (such as the Buffalo and Husky). For other US Army vehicles that are incompatible with it, the following error pop-up notification appears:



The Boomerang system has the following features:

- Filters out background noise, fire from friendly units, and ricochets.
- Operational within 50 - 150 m of the vehicle.
- A shooter is detected in ranges from 50 m to the set Boomerang range.
- Detects bullets that hit the vehicle, or fly by it within a 30 m range.
- Only reports bullets of other sides (with no regard to enemies or allies - shots from the side that uses the Boomerang are ignored and shots from any other side, regardless of alliances, are reported).
- Only detects supersonic bullets.
- Operational when the vehicle is moving, up to around 100 km/h.
- Auditory warning gives enemy range, elevation, and direction.
- Visual warning of the position of the shooter, indicated on a 360 degree azimuth clock display (see [Operation \(on page 690\)](#)).
- Bullet proximity indicated by a colored LED display (see [Operation \(on page 690\)](#)).

The Boomerang Editor Object (EO) is available in the Editor Object List, and has the following settings in the Object Properties dialog.

Boomerang Start On	false
Boomerang Audio On	false
Operational Radius	150
Link Selected Vehicles	false

Setting	Description
<b>Boomerang Start On</b>	Use the drop-down and select <b>true</b> to start with the Boomerang enabled.
<b>Boomerang Audio On</b>	Use the drop-down and select <b>true</b> to enable auditory warnings for the Boomerang, which report the "o'clock" direction of the shooter, and their range.  <b>NOTE</b> Can be set at any time in VBS Editor, even when the Boomerang is operational.
<b>Operational Radius</b>	Enter a number to set the maximum effective range of the Boomerang. This setting can be visualized on the 2D Map / in 3D Camera View (see <a href="#">Range Visualization (on the next page)</a> ).  <b>NOTE</b> Can be set at any time in VBS Editor, even when the Boomerang is operational.
<b>Link Selected Vehicles</b>	Use the drop-down to select from the following options: <ul style="list-style-type: none"><li>• <b>true</b> - Selected (blinking) vehicles on the 2D Map are automatically linked to the Boomerang EO when you click <b>OK</b>.</li><li>• <b>false</b> - You are required to manually link the Boomerang EO to a vehicle after you click <b>OK</b>, see <a href="#">Linking to a Vehicle (on the next page)</a>.</li></ul>

### 12.7.0.1 Range Visualization

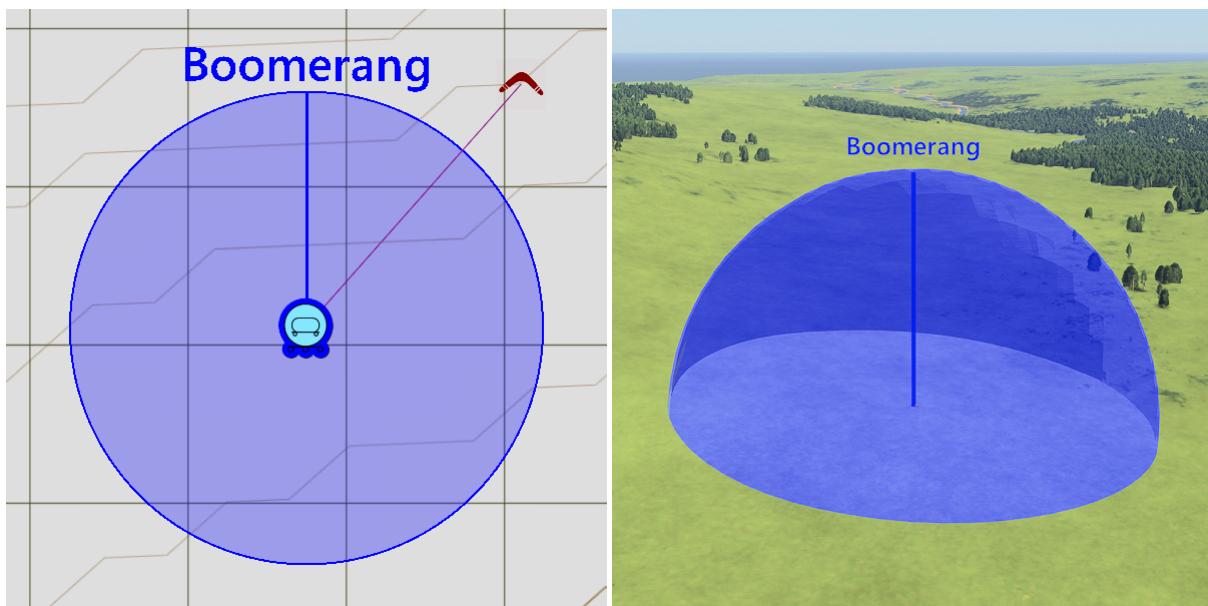
In VBS4, the [Operational Radius \(on the previous page\)](#) of the Boomerang can be displayed as a range visualization.

#### 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-177: 2D and 3D range visualization**



#### NOTE

If the Boomerang is **enabled**, the range visualizations are **blue**. If it is **disabled**, they are **gray**.

### 12.7.1 Linking to a Vehicle

To link the Boomerang EO to a vehicle, see [Linking Editor Objects](#) in the VBS4 Editor Manual.

Linking the Boomerang EO to a vehicle causes the following things to happen:

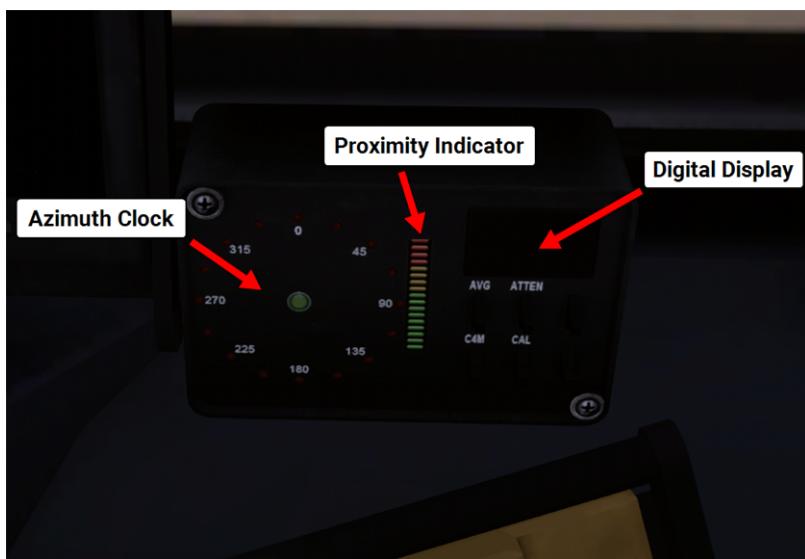
- The Boomerang microphone array and internal controller (see [Internal controller HUD \(on the next page\)](#)) are attached to the vehicle.
- Trainees can access the **VEHICLE > START / STOP BOOMERANG** options in the Quick Menu (see [Quick Menu Actions](#) in the VBS4 Trainee Manual).

**Image-178: Boomerang microphone array attached to the vehicle**

## 12.7.2 Operation

When the Boomerang is **enabled**, any OPFOR unit or vehicle (in a range greater than 50m) firing supersonic rounds that pass within 30 m of the vehicle, is reported. The Boomerang is capable of back-tracing the shots fired, reporting the range, azimuth and elevation of a hostile shooter, as well as the bullet proximity. These are indicated on the internal controller HUD.

The azimuth and bullet proximity are also indicated on the internal controller HUD.

**Image-179: Internal controller HUD**

In order to replicate the calculation time of the real Boomerang system, there is a delay of one second before data is reported back to the user. Also, when dealing with high-rates of fire, upon initiating the calculation of the first registered shot, the following shots are not registered or reported until the first report has completed. After this time the next shot that is fired can be registered.

## 12.8 CBRN Equipment

VBS4 includes a selection of CBRN related equipment Editor Objects that you can place in a scenario.

Some of the objects can be placed directly in the Equipment Inventory of a Trainee. Use **Customize Starting Loadout** (see Edit Equipment Loadout in the VBS4 Trainee Manual) in the OME to add portable objects to a Trainee inventory. Alternatively, you can place them on the ground in the vicinity of the Trainee for them to retrieve.

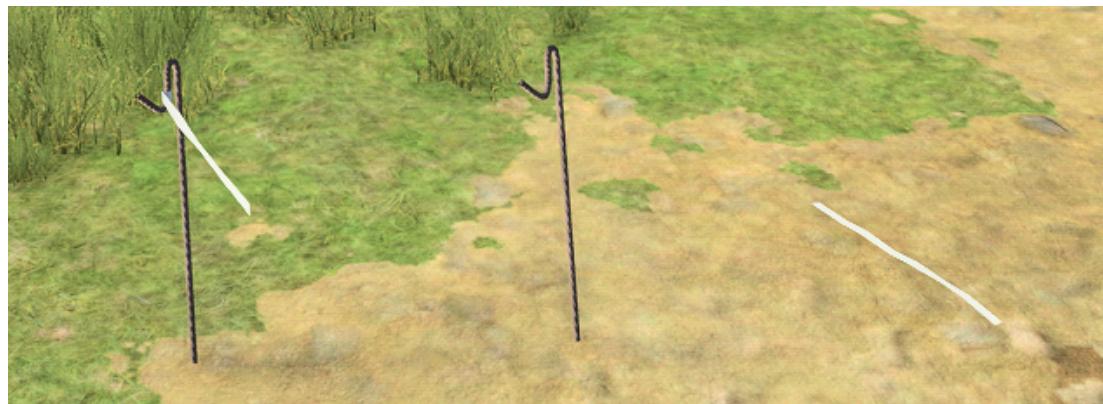
This topic discusses the following Editor Objects:

- [Area Marker Equipment \(on the next page\)](#)
- [Area Marking Kit \(on the next page\)](#)
- [CBRN Markers \(on page 693\)](#)
- [CBRN Suits Crate \(on page 693\)](#)
- [Decontamination Equipment \(on page 693\)](#)
- [Detection Devices \(on page 694\)](#)
- [M8 Chemical Detection Paper \(on page 695\)](#)
- [M9 Chemical Detection Paper \(on page 695\)](#)
- [SCBA Mask \(on page 695\)](#)
- [CBRN1 and CBRN3 Forms \(on page 695\)](#)

## 12.8.1 Area Marker Equipment

Area Marker Equipment is available to place and assemble directly in a scenario using the 3D Camera View (see [Interacting with Editor Objects \(on page 52\)](#)).

Object	Description
<b>Area Tape Marker 1 / 5 / 10 m</b>	Area Tape Spike, with a length of tape already attached. Add an additional spike to complete.
<b>Area Tape Spike</b>	Single spike, which is automatically placed upright in the ground, when you place it on the map.
<b>Engineer Tape 1 / 5 / 10 m</b>	Length of ground-placed Engineering / Area Tape intended as a visualization device for Administrators.
<b>Area Tape</b>	



## 12.8.2 Area Marking Kit

The Area Marking Kit enables Trainees to mark areas or vehicles contaminated by CBRN substances. Place the kit in the Equipment Inventory of a Trainee, or on the map for retrieval and assembly.

(F8) Objects > Object - CBRN - Area Marking Kit



For information about using the Area Marking Kit as a Trainee, see [Area Marking Kit in the VBS4 Trainee Manual](#).

## 12.8.3 CBRN Markers

CBRN Markers are used to warn scenario participants that an area is contaminated by a CBRN substance.

### (F8) Objects > Object - CBRN > CBRN Atom / Bio / Gas Mine Marker

Place them directly in the scenario.

If necessary, Trainees can carry CBRN Markers and place them on the ground using their Equipment Inventory UI.

How these objects appear and are used in-game is discussed in CBRN Markers in the VBS4 Trainee Manual.

## 12.8.4 CBRN Suits Crate

Individual CBRN clothing items are available in a crate in VBS4. Trainees can remove items from the crate, put them into their inventory, and put them on.

### (F8) Objects > Object CBRN > CBRN Suits (parts) contains 10 of each of the following items:

- |         |            |          |
|---------|------------|----------|
| • Boots | • Jacket   | • Gloves |
| • Hood  | • Trousers | • Mask   |

Place the crate directly in the scenario.

How these objects appear and are used in-game is discussed in CBRN Suits Crate in the VBS4 Trainee Manual.

### **WARNING**

The equipment within the CBRN Suits Crate can only be used by USMC units that do not wear any special equipment / uniform by default (for example, EOD bombsuit technicians or pilots).

## 12.8.5 Decontamination Equipment

Various decontamination and antidote objects are available, which you can place directly in the scenario.

### (F8) Objects > Object - CBRN includes the following objects:

- **33 Gallon Trash Can - Decontaminant (grey)**
- **33 Gallon Trash Can - Water (blue)**
- **CBRN Tarp - Black / Blue / Green**
- **Shufflepit (Dirt / Sand)**
- **ATNAA (Antidote Treatment Nerve Agent Auto-injector)**

- **CANA** (Convulsive Antidote, Nerve Agent)
- **M100** (Decontamination Kit)
- **M26** (Vehicle decontamination apparatus)
- **RDSL** (Reactive Skin Decontamination Lotion)

How these objects appear and are used in-game is discussed in CBRN Decontamination in the VBS4 Trainee Manual.

## 12.8.6 Detection Devices

VBS4 includes the following CBRN detection devices:

### **AN / PDR-77 Probes**

A series of hand-held probes used to detect Radiation.

#### **(F8) Objects > Object - CBRN > AN/PDR-77 Alpha / Beta / Micro / Pancake / X-Ray**

Using the probes is discussed in AN / PDR-77 Probes in the VBS4 Trainee Manual.

### **Chemical Agent Monitor (CAM)**

A portable, hand-held device capable of detecting Blister or Liquid Nerve Agent contamination on people, objects, and elements of the surrounding environment. It also detects Sarin Gas.

How Trainees use the CAM is discussed in Chemical Agent Monitor (CAM) in the VBS4 Trainee Manual.

### **Joint Chemical Agent Detector (JCAD)**

A hand-held detector used to alert Trainees to the presence of hazardous substances, including noxious gases and Liquid Nerve Agents.

#### **(F8) Objects > Object - CBRN > JCAD M4A1**

Using the JCAD is discussed in Joint Chemical Agent Detector (JCAD) in the VBS4 Trainee Manual.

### **Lightweight Chemical Agent Detector (LCAD)**

A hand-held detector designed to detect Chemical Warfare Agents (CWAs). It forms part of a two-tier detection capability with the MCAD.

Using the LCAD is discussed in Lightweight Chemical Agent Detector (LCAD) in the VBS4 Trainee Manual.

### **Man-Portable Chemical Agent Detector (MCAD)**

This portable device is capable of detecting and identifying the full range of Chemical Warfare Agents (CWAs). MCAD is a point detector, which quantifies the CWA it is configured to respond to.

Using the MCAD is discussed in Man-Portable Chemical Agent Detector (MCAD) in the VBS4 Trainee Manual.

## 12.8.7 M8 Chemical Detection Paper

The M8 Chemical Detection Paper (M8 CDP) is a booklet containing paper which changes color when it detects the presence of Liquid Nerve Agents.

### (F8) Objects > Object - CBRN > M8 Chemical Detection Paper

Usage is discussed in M8 Chemical Detection Paper in the VBS4 Trainee Manual.

## 12.8.8 M9 Chemical Detection Paper

The M9 Chemical Detection Paper (M9 CDP) is a box / strip of gray-colored adhesive tape which changes color when it detects the presence of Liquid Nerve Agents, including Sarin Gas.

### (F8) Objects > Object - CBRN > M9 Chemical Detection Paper / M9 Chemical Detection Paper Strip

Usage is discussed in M9 Chemical Detection Paper in the VBS4 Trainee Manual.

## 12.8.9 SCBA Mask

The SCBA (Self-contained Breathing Apparatus) Mask is part of a kit which contains the mask, a high-pressure tank, and a pressure regulator. The kit is contained in a bag which Trainees can carry.

### (F8) Objects > Object - CBRN > Air-Pak 75 SCBA

Usage is discussed in SCBA Mask in the VBS4 Trainee Manual.

## 12.8.10 CBRN1 and CBRN3 Forms

Two CBRN Form types can be sent and received by Administrators / Trainees in VBS4:

Form	Sent By	Description
CBRN1	Trainees	Observer initial report form.
CBRN3	Administrator / Instructor	Immediate warning of expected contamination or Hazardous Area.

For more information, see CBRN1 / CBRN3 Forms in the VBS4 Trainee Manual.

## 12.9 Drone Munitions

You can attach munitions to UAVs (usually, quadcopter drones) using the **Improvised Drone Munitions** Editor Object (EO). Munitions can be dropped on enemy targets or detonated on impact by flying a drone (with munitions attached) directly at a target.

For information about how to fire munitions from a drone, see Drone Munitions Simulation in the VBS4 Trainee Manual.

The following procedure explains how to setup a drone to use munitions.

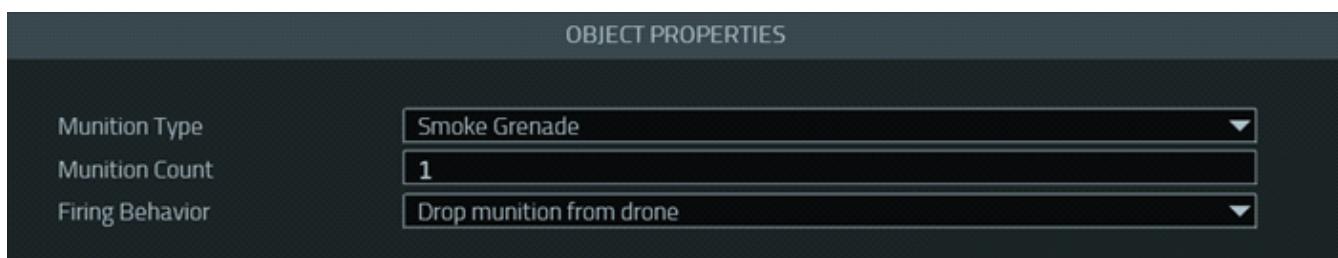
### Follow these steps:

1. Place a **drone** and a **Control Link** on the map (see [Adding Unmanned Vehicles \(on page 614\)](#) and [Control Links \(on page 618\)](#)).

**NOTE**

The Control Link allows you to access the **UAV Controller** (see [Using UAVs in the VBS4 Trainee Manual](#)), which enables the drone operator to fly drones and drop munitions.

2. In the Editor Objects List, select **Improvised Drone Munitions**, and double-click on the map.



3. Configure the settings.

Setting	Description
<b>Munition Type</b>	Use the drop-down to select from the following munition options: <ul style="list-style-type: none"><li>• Fragmentation Grenade</li><li>• Smoke Grenade</li><li>• C4 Explosive</li><li>• RPG Warhead</li><li>• 60mm HE Shell</li></ul>
<b>Munition Count</b>	Enter the number of munitions you want.
<b>Firing Behavior</b>	Use the drop-down to select from the following firing behavior options: <ul style="list-style-type: none"><li>• Drop munition from drone</li><li>• Detonate munition when drone hits target</li></ul> <p>For more information, see <a href="#">Drone Munitions Simulation in the VBS4 Trainee Manual</a>.</p>

4. Click **OK**.

The Improvised Drone Munitions EO is placed on the map.



## 12.9.1 Linking

The Improvised Drone Munitions EO must be linked to the drone you want to equip with munitions.

**Follow these steps:**

1. Right-click the **Improvised Drone Munitions EO**.
2. In the context menu, select **Link Vehicle**.

A **black** arrow is attached to your cursor.

3. Click the **drone** that you want to attach the munitions to.

The arrow changes to a **red** line.

The munitions are attached to the drone.



## 12.10 Electronic Warfare

The Electronic Warfare Editor Object (EO) enables scenario designers to equip units or vehicles with devices that detect non-visible wavelengths of the Electromagnetic (EM) Spectrum, such as those used by Radar, Signal Detectors, or Counter-Battery Sensors (CBS), or functions, such as the Ground Moving Target Indicator (GMTI), for UAVs, and other aircraft.

How Electronic Warfare devices are used by Trainees is discussed in Electronic Warfare Simulation in the VBS4 Trainee Manual.

The following aspects are discussed:

- [Editor Object Settings \(below\)](#)
- [Linking to a Unit or Vehicle \(on page 711\)](#)

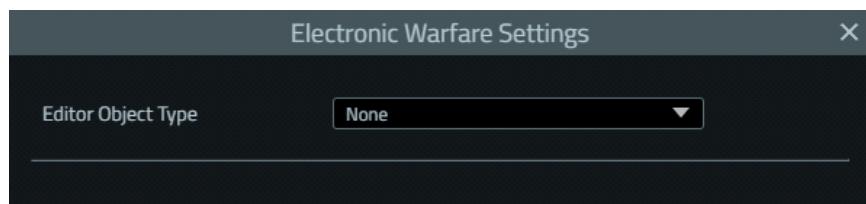
### 12.10.1 Editor Object Settings

When placing the Electronic Warfare EO on the map, the Electronic Warfare Settings dialog opens, where you can select the device / function you want to link to a unit or vehicle, and adjust various settings.

**Follow these steps:**

1. In the Editor Objects List, select **Electronic Warfare**, and double-click the map.

The Electronic Warfare Settings dialog opens.



2. Use the **Editor Object Type** drop-down to select from the following options:

Option	Description
Radar	Detects various vehicle types.
Signal Detector	Detects entities with a linked Radar or with VBS Pitch Radio radio channels.
GMTI	Function that shows Ground Moving Target Indicator symbology above a moving vehicle for UAVs and other aircraft.
CBS	Counter-Battery Sensor, which detects artillery projectiles and the location of the weapon that fired them.

3. Depending on the device you select in step 2, the Electronic Warfare Settings dialog expands to show the settings discussed in the following sections:

- [Radar \(on the next page\)](#)
- [Signal Detector \(on page 704\)](#)
- [GMTI \(Ground Moving Target Indicator\) \(on page 705\)](#)
- [CBS \(Counter-Battery Sensor\) \(on page 707\)](#)

4. Click **OK**.

The Electronic Warfare EO is placed on the map.



If the Electronic Warfare EO has been configured, text indicating the type of Electronic Warfare device is shown: **Radar**, **GMTI**, **Signal Detector**, **CBS**.



Similar text is also shown in the Scenario Objects tab.

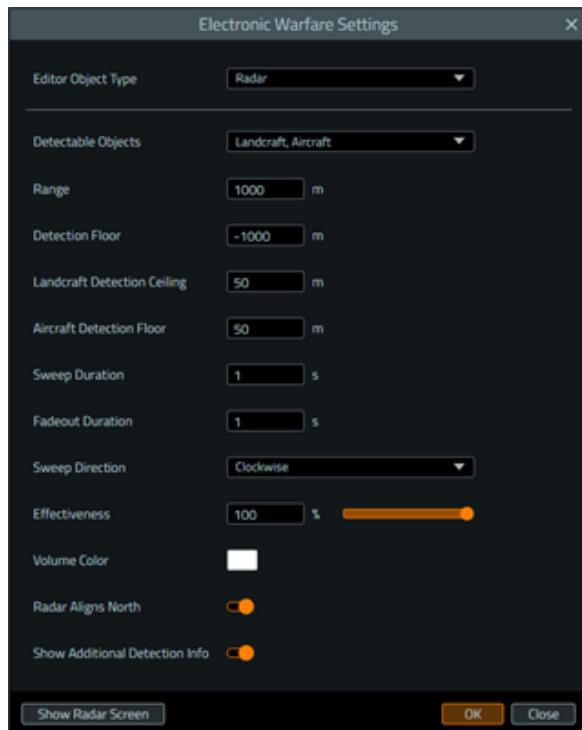
Scenario Objects	
ORBAT	Scenario Objects
Search	Filter
<b>VEHICLE</b>	
	M1114 HMMWV
<b>UNIT</b>	
	Automatic Rifleman - M249
	M1114 HMMWV Driver
<b>OBJECT</b>	
	Electronic Warfare - Signal Detector
	Electronic Warfare - Radar

**TIP**

Double-click the **Electronic Warfare EO icon** at any time to reopen the Electronic Warfare Settings dialog to make adjustments.

### 12.10.1.1 Radar

The Electronic Warfare Settings dialog shows the following settings if **Radar** is the selected Editor Object Type.



If a vehicle is within the ranges set in this dialog, it appears on the Radar HUD as a colored icon. For more information, see Radar HUD in the VBS4 Trainee Manual.

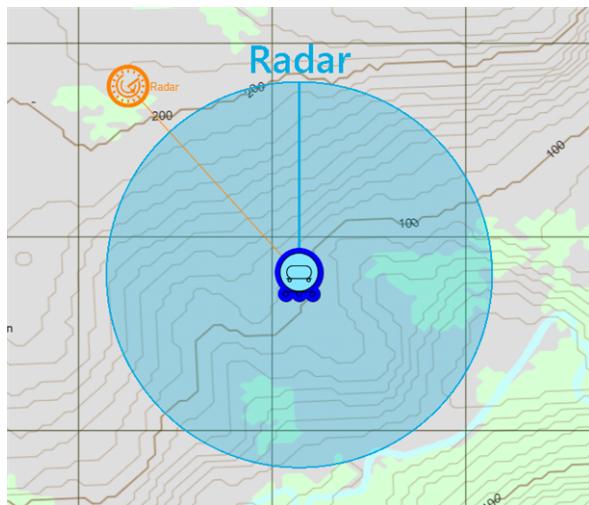
Radar Setting	Description
<b>Detectable Objects</b>	<p>Use the drop-down to select the type of vehicles that you want to be detectable by the Radar. Click the boxes next to the vehicle types to include them:</p> <ul style="list-style-type: none"><li>• Landcraft</li><li>• Aircraft</li><li>• Watercraft</li></ul>
	<div style="border: 1px solid #0070C0; padding: 5px; margin-bottom: 10px;"><p> <b>NOTE</b></p><p>Wrecks of vehicles are also detected.</p></div> <div style="border: 2px solid #E00000; padding: 10px; background-color: #FFF; margin-bottom: 10px;"><p> <b>WARNING</b></p><p>The detection of vehicles can be blocked by the terrain or objects (including trees).</p></div>
<b>Range</b>	<p>Enter a value or use the arrows to set the maximum Radar detection range, in meters (1000 meters by default).</p> <div style="border: 2px solid #E00000; padding: 10px; background-color: #FFF; margin-bottom: 10px;"><p> <b>WARNING</b></p><p>Extreme ranges affect the performance of VBS.</p></div> <p>See also <a href="#">Radar Range Visualization (on page 703)</a>.</p>
<b>Detection Floor</b>	<p>Enter a value or use the arrows to set the height (above ground level) below which the Radar does not detect any vehicles, in meters.</p> <div style="border: 1px solid #0070C0; padding: 5px; margin-bottom: 10px;"><p> <b>NOTE</b></p><p>This includes vehicles below the surface of water.</p></div>
<b>Landcraft Detection Ceiling</b>	<p>Enter a value or use the arrows to set the height (above ground level) above which the Radar does not detect Landcraft, in meters.</p>
<b>Aircraft Detection Floor</b>	<p>Enter a value or use the arrows to set the height (above ground level) below which the Radar does not detect Aircraft, in meters.</p>
<b>Sweep Duration</b>	<p>Enter a value or use the arrows to set the sweep duration, in seconds. Defines the duration of one sweep.</p> <div style="border: 1px solid #0070C0; padding: 5px; margin-top: 10px;"><p> <b>NOTE</b></p><p>If set to 0, the sweep is disabled and does not appear on the Radar.</p></div>

Radar Setting	Description
<b>Fadeout Duration</b>	Enter a value or use the arrows to control the time after which detected entities fade from view once the sweep passes over them.
<b>Sweep Direction</b>	Use the drop-down to set the direction of the sweep: <ul style="list-style-type: none"> <li>Clockwise</li> <li>Counter-Clockwise</li> </ul>
<b>Effectiveness</b>	Do one of the following: <ul style="list-style-type: none"> <li>Enter a value or use the arrows to set the Effectiveness of the Radar, as a percentage (%).</li> <li>Use the slider to set the Effectiveness of the Radar, as a percentage (%).</li> </ul>
	<b>NOTE</b>
Effectiveness means that the Radar has a <i>N</i> % chance to detect an object at each detection interval.	
<b>Volume Color</b>	Click the <b>colored box</b> to open the Volume Color dialog, and select a color for the <a href="#">Radar Range Visualization (on the next page)</a> . Click <b>OK</b> to confirm the color.
<b>Radar Aligns North</b>	Enable to have the Radar HUD align so that North is at the top of the HUD when Trainees open it. If disabled (default), the Radar HUD aligns relative to the rotation of the linked entity.
<b>Show Additional Detection Info</b>	Enable to show the speed of detected Landcraft and Watercraft, and the speed and altitude of Aircraft on the Radar HUD.
<b>Show Radar Screen</b>	Click to open the Radar HUD (see Radar in the VBS4 Trainee Manual). See also <a href="#">Radar Over VBS Gateway (on page 713)</a> .

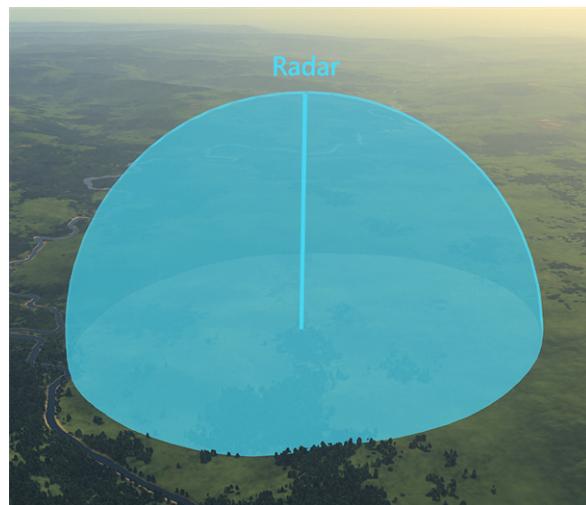
## Radar Range Visualization

The range of the Radar can be visualized in VBS4, using the color set in the [Volume Color \(on the previous page\)](#) dialog.

**Image-180: 2D range visualization**



**Image-181: 3D range visualization**



### **NOTE**

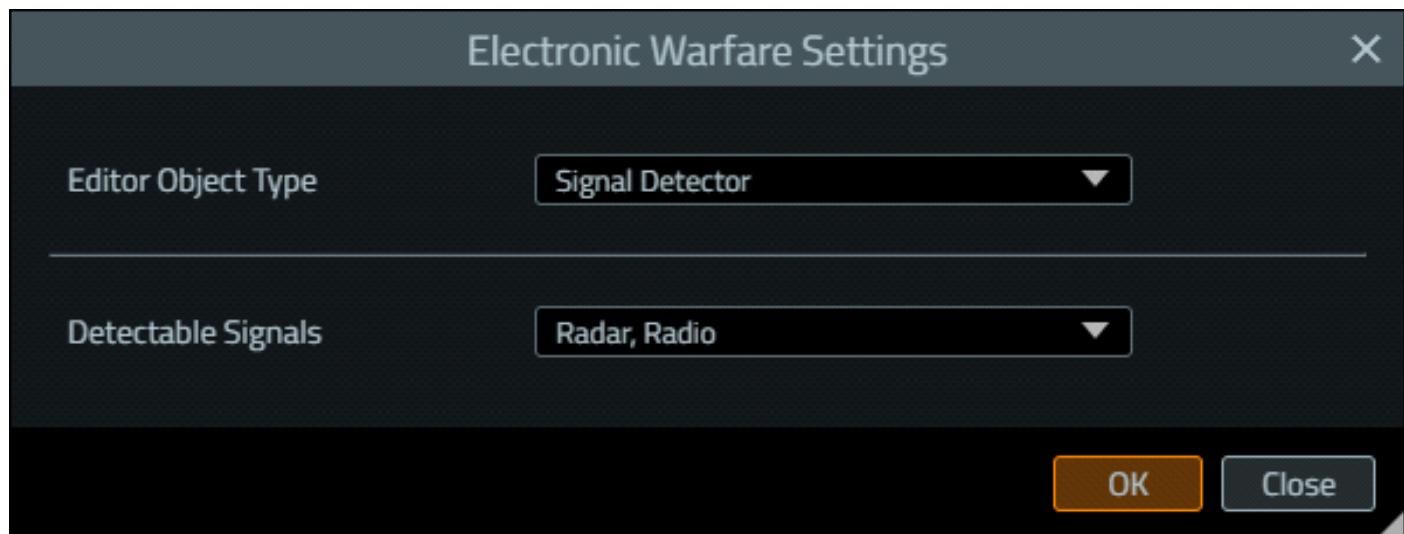
Use the Range Visibility Settings in the VBS4 Administrator Manual to enable / disable the individual elements of range visualizations.

Range visualizations can only be seen:

- By scenario Administrators / Instructors, not Trainees.
- If the Electronic Warfare EO is linked to a unit / vehicle (see [Linking to a Unit or Vehicle \(on page 711\)](#)).

## 12.10.1.2 Signal Detector

The Electronic Warfare Settings dialog shows the following settings if **Signal Detector** is the selected Editor Object Type:



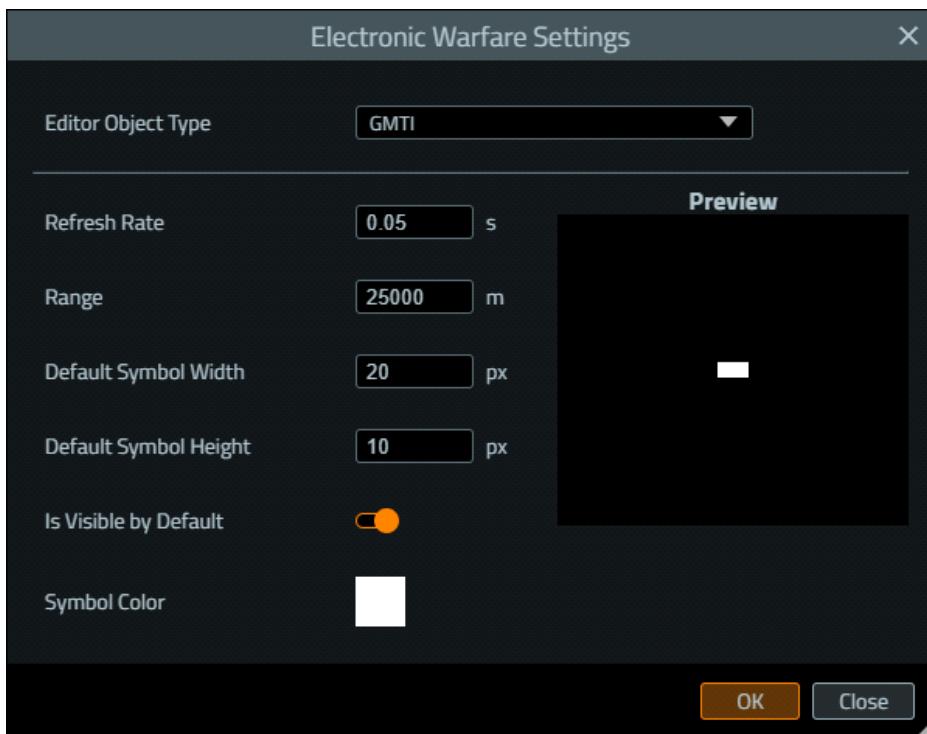
Signal Detector Setting	Description
<b>Detectable Signals</b>	<p>Use the drop-down to select the type of signals that you want to be detectable by the Signal Detector. Check the <b>boxes</b> next to the signal types to include them:</p> <ul style="list-style-type: none"><li>• <b>Radar</b> - Detects entities with a linked Radar.</li><li>• <b>Radio</b> - Detects entities using VBS Pitch Radio channels.</li></ul> <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><p><b>NOTE</b></p><p>The Signal Detector for radio only works with VBS Radio Communication Channels. For more information, see VBS Radio Concepts in the VBS Radio Manual.</p></div>

<b>NOTE</b>
Entities equipped with the Signal Detector must be in the range of the signal source to detect it.

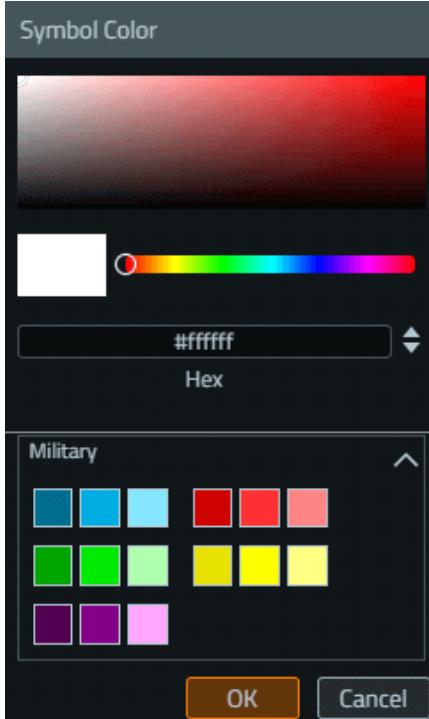
Detected signals are shown on the Signal Detector HUD. For more information, see Signal Detector HUD in the VBS4 Trainee Manual.

### 12.10.1.3 GMTI (Ground Moving Target Indicator)

The Electronic Warfare Settings dialog shows the following settings if **GMTI** is the selected Editor Object Type:



GMTI Setting	Description
<b>Refresh Rate</b>	Refresh rate of the GMTI symbology on screen, in seconds.
<b>Range</b>	Enter a value, use the arrows, or your scroll wheel to set the maximum range of the symbol visualization, in meters (25000 meters by default).  <div style="border: 2px solid red; padding: 10px; margin-left: 20px;"><span style="color: red;">⚠️</span> <b>WARNING</b> Extreme ranges affect the performance of VBS.</div>
<b>Default Symbol Width</b>	Enter a value, use the arrows to specify the width of the GMTI symbology in pixels (minimum 2 pixels, maximum 200 pixels).
<b>Default Symbol Height</b>	Enter a value or use the arrows to specify the height of the GMTI symbology in pixels (minimum 2 pixels, maximum 200 pixels).
<b>Is Visible by Default</b>	Click to show / hide the GMTI symbology. Set to show by default.

GMTI Setting	Description
<b>Symbol Color</b>	 <p>Click the colored box to open the Symbol Color dialog, select a color for the GMTI symbology, and click <b>OK</b>.</p>
<b>Preview</b>	Shows what the GMTI symbol looks in-game.

Some of the GMTI settings can be adjusted by Trainees during a scenario using key bindings, such as those described in the following table.

#### **NOTE**

These key bindings are not set by default, meaning that you should set them. For more information about how to set key bindings, see Controls Settings in the VBS4 Administrator Manual.

Key Binding	Description
<b>Toggle GMTI</b>	Toggles the visibility of symbols on / off.
<b>Decrease GMTI Symbol Size</b>	Scale down. Each key press scales the GMTI symbol size down by 5-pixel decrements.
<b>Increase GMTI Symbol Size</b>	Scale up. Each key press scales the GMTI symbol size up by 5-pixel increments.

GMTI symbology is shown above moving vehicles when viewed from an aircraft / UAV. For more information, see Ground Moving Target Indicator (GMTI) in the VBS4 Trainee Manual.

### 12.10.1.4 CBS (Counter-Battery Sensor)

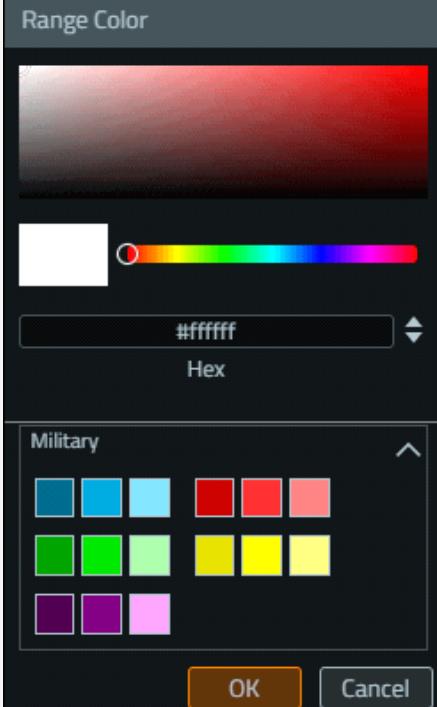
The Electronic Warfare Settings dialog shows the following settings if **CBS** is the selected Editor Object Type.



#### WARNING

If you make any changes to the settings in this dialog during runtime, any detections that were previously shown in the Counter-Battery Sensor dialog are deleted and can no longer be seen.

CBS Setting	Description
<b>Detection Range</b>	<p>Enter a value or use the arrows to set the maximum CBS Detection Range (15,000 meters by default), in meters.</p> <div style="border: 2px solid red; padding: 10px;"> <p><b>⚠️ WARNING</b></p> <ul style="list-style-type: none"> <li>• Higher Detection Ranges (above 50 km) have a significant impact on how fast the map shown in the Counter-Battery Sensor dialog is loaded.</li> <li>• The combination of a higher Detection Range and a player viewing the Counter Battery Sensor dialog from a fast moving vehicle results in low performance.</li> </ul> <p>Both of these limitations apply only to the local machine where a specific CBS dialog is opened.</p> </div> <p>See also <a href="#">CBS Range Visualization (on page 710)</a>.</p>
<b>Detection Ceiling</b>	Enter a value or use the arrows to set the height relative to the CBS above which the CBS does not detect projectiles, in meters.
<b>Detection Floor</b>	Enter a value or use the arrows to set the height relative to the CBS below which the CBS does not detect projectiles, in meters.
<b>Detection Probability</b>	<p>Do one of the following:</p> <ul style="list-style-type: none"> <li>• Enter a value or use the arrows to set the Detection Probability of the CBS, as a percentage (%).</li> <li>• Use the slider to set the Detection Probability of the CBS, as a percentage (%).</li> </ul> <p>Detection Probability means that the CBS has a <i>N</i>% chance of detecting a projectile.</p>
<b>Detection Delay</b>	Enter a value or use the arrows to set how long it takes the CBS to calculate the Point-Of-Impact (POI) and Point-Of-Origin (POO), in seconds.
<b>Max Detection Speed</b>	Enter a value or use the arrows to set the maximum speed at which projectiles can be detected, in meters per second (m/s).
<b>Min Detection TTI</b>	<div style="border: 1px solid #0070C0; padding: 10px;"> <p><b>ℹ️ NOTE</b></p> <p>Projectiles with a velocity above this value are not detected.</p> </div>
	<div style="border: 1px solid #0070C0; padding: 10px;"> <p><b>ℹ️ NOTE</b></p> <p>Projectiles with a TTI below this value are not detected.</p> </div>

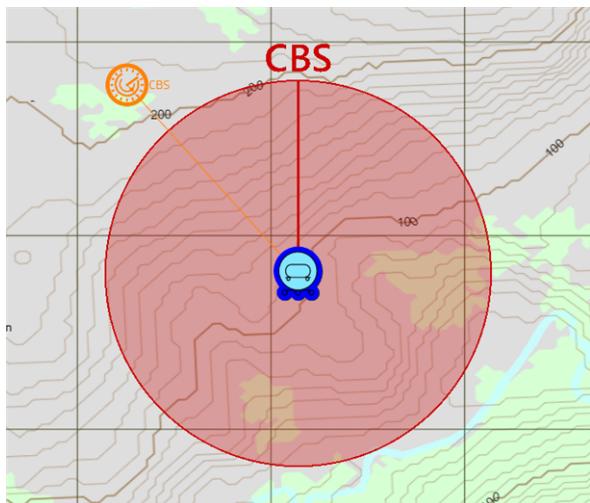
CBS Setting	Description
<b>POO Accuracy</b>	Enter a value or use the arrows to set the radius around the actual Point-Of-Origin (POO) where the CBS reports a POO, in meters.
<b>POI Accuracy</b>	Enter a value or use the arrows to set the radius around the actual Point-Of-Impact (POI) where the CBS reports a POI, in meters.
<b>TTI Accuracy</b>	Enter a value or use the arrows to set the Time-To-Impact accuracy, in seconds.
<b>ID Prefix</b>	Enter the ID prefix of the POO. <div style="border: 1px solid #800080; padding: 10px; margin-top: 10px;"> <b>EXAMPLE</b> <p>Every POO and POI has an ID assigned to it. IDs follow the format "AA 1234", where "AA" is a prefix, and "1234" is the index number.</p> </div>
<b>ID Initial Index</b>	Enter a value or use the arrows to specify the starting index. <div style="border: 1px solid #800080; padding: 10px; margin-top: 10px;"> <b>EXAMPLE</b> <p>If the ID prefix is set to "LH" and the ID Initial Index is set to "1200", the first detection gets an ID of "LH 1200". The next one gets an ID of "LH 1201", and so on.</p> </div>
<b>Range Color</b>	 Click the <b>colored box</b> to open the Range Color dialog, and select a color for the <a href="#">CBS Range Visualization (on the next page)</a> . Click <b>OK</b> to confirm the color.

Detected projectiles are shown in the CBS dialog / HUD. For more information, see Counter-Battery Sensor (CBS) in the VBS4 Trainee Manual.

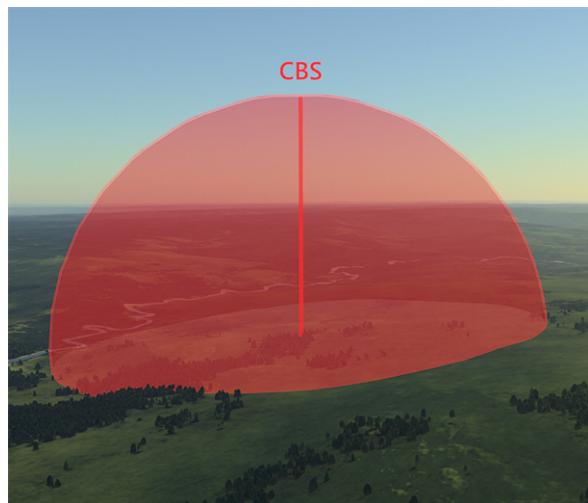
## CBS Range Visualization

The detection range of the CBS can be visualized in VBS4, using the color set in the [Range Color \(on the previous page\)](#) dialog.

**Image-182: 2D range visualization**



**Image-183: 3D range visualization**



### **NOTE**

Use the Range Visibility Settings in the VBS4 Administrator Manual to enable / disable the individual elements of range visualizations.

Range visualizations can only be seen:

- By scenario Administrators / Instructors, not Trainees.
- If the Electronic Warfare EO is linked to a unit / vehicle (see [Linking to a Unit or Vehicle \(on the next page\)](#)).



### **WARNING**

For valid detection, both the POO and the POI of the projectile must be in range of the CBS.

**TIP**

If preferred, you can disable the texture on the map.

**Follow these steps:**

1. In the VBS Editor, go to **View > Map Settings** to open the Map Settings dialog.
2. Click **Layers**.
3. Scroll down to the **satelliteTexture** setting, and click the **switch** to turn it **off**.

In addition, you can resize the dialog during runtime.

## Limitations

- Join in Progress (JIP) users cannot use CBS.
- CBS does not support or detect the following:
  - Artillery Strikes (see Artillery Strike in the VBS4 Editor Manual).
  - Close Air Support (CAS) (see [Close Air Support \(on page 835\)](#) in the VBS4 Editor Manual).
  - Rocket ammunition.
- CBS does not detect incoming shells from beyond the defined CBS [Detection Range \(on page 708\)](#).

### 12.10.2 Linking to a Unit or Vehicle

For an entity (unit or vehicle) to be equipped with any of the devices mentioned, the Electronic Warfare EO must be linked to the entity you want to equip the device with.

**NOTE**

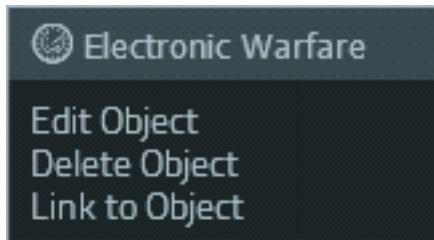
Only one Electronic Warfare EO can be linked to an entity. They cannot be shared between entities.

**WARNING**

The GMTI should be linked to a vehicle.

**Follow these steps:**

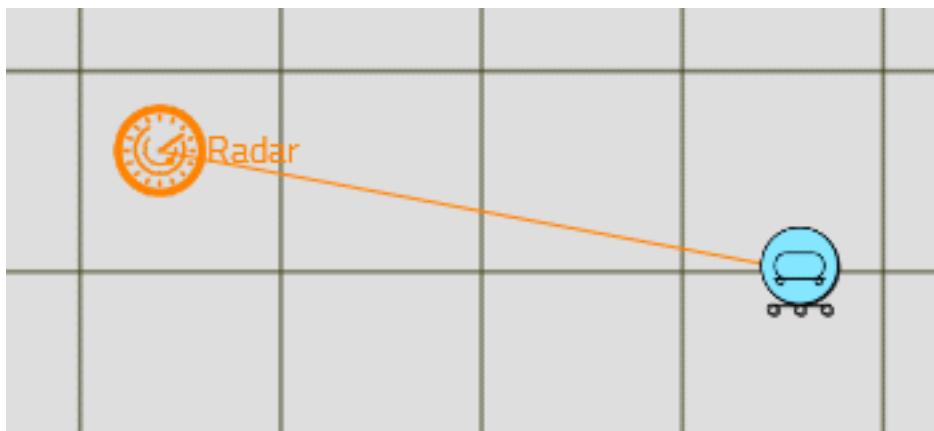
1. Right-click the **Electronic Warfare EO** on the map.
2. In the context menu, select **Link to Object**.



A **black** line is attached to your cursor.

3. Click the **entity** you want to link the device to.

The **black** line changes to **orange**, indicating that the Electronic Warfare EO is linked to the entity.



## 12.10.3 Radar Over VBS Gateway

Administrators / Instructors can access the Electronic Warfare Radar (on page 700) over VBS Gateway, and open the Radar HUD (see Radar HUD in the VBS4 Trainee Manual) in **Execute Mode**. Entities can be detected both locally and externally.

### NOTE

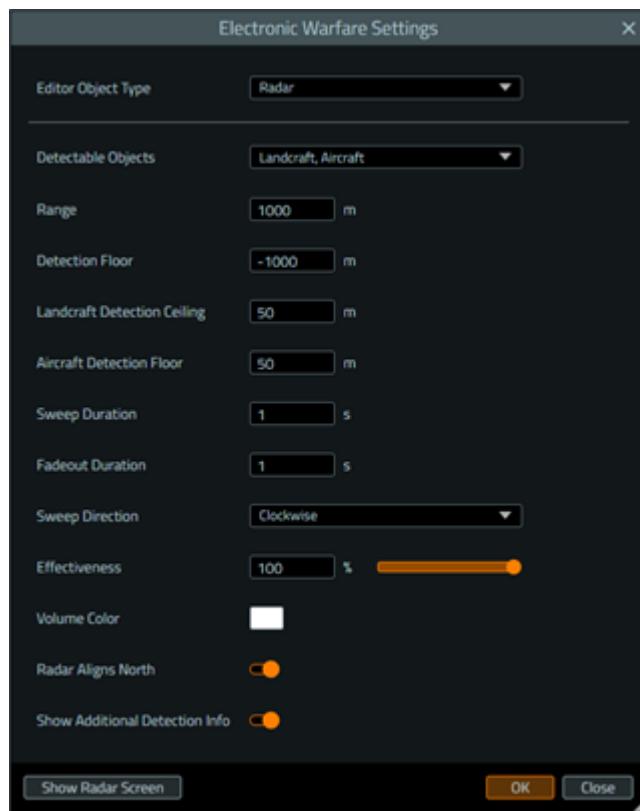
The Electronic Warfare Radar Editor Object (EO) (see [Editor Object Settings \(on page 698\)](#)) is not a standalone object. It is an embedded system, which means that it must be linked to a vehicle in order to be propagated using VBS Gateway.

Radar over VBS Gateway uses Electromagnetic Emission (EE) Distributed Interactive Simulation (DIS) Protocol Data Units (PDUs). The **Publish** and **Subscribe** options are enabled for Radar in the VBS Gateway Entity Filtering of the DIS Adapter (see Entity Filtering in the VBS Gateway Manual).

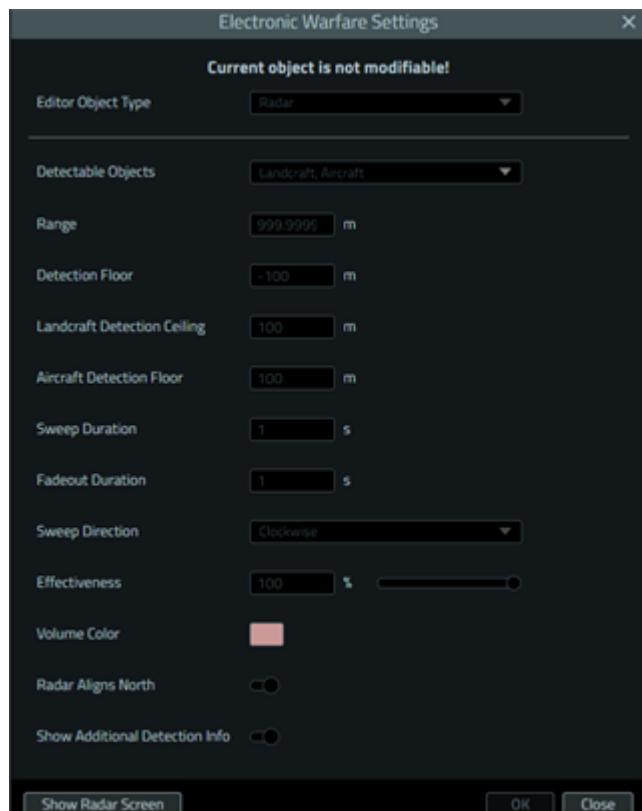
The Electronic Warfare Settings dialog for Radar (see [Radar \(on page 700\)](#)) has two states in **Execute Mode**:

- **Local** - The settings can be edited.
- **External** - The settings cannot be edited ("read-only" state).

**Dialog in VBS Gateway (Local)**



**Dialog in VBS Gateway (External)**



### 12.10.3.1 Radar HUD

For both the local and the external Radar, Administrators / Instructors can open the Radar HUD (see Radar HUD in the VBS4 Trainee Manual) in **Execute Mode**.

**Follow these steps:**

1. During a VBS Gateway simulation, double-click the **Electronic Warfare EO** of a Radar linked to an external entity.
2. In the Electronic Warfare Settings dialog, click **Show Radar Screen**.

**Show Radar Screen**



#### NOTE

This button is only available in Execute Mode.

The Radar HUD opens.

### 12.10.3.2 Radar Over Gateway External Radar

The following procedure provides an example of how an external Radar is created and functions over VBS Gateway since the start of a VBS4 DIS-linked simulation. The example has Mission 1 with a Radar linked to a vehicle, and Mission 2 with no Radar.

1. When a VBS Gateway connection is established, an Electronic Warfare Radar EO is generated in Mission 2 next to the linked vehicle.
2. Broadcast Electromagnetic Emission (EE) PDU parameters from Mission 1 are used to set the Radar settings in Mission 2.



#### NOTE

The following parameters from the incoming EE PDUs are used:

- The VBS4 **Radar Range** is calculated from the EE PDU **Effective Radiated Power**.
- The VBS4 **Sweep Duration** is set according to the EE PDU **Beam Sweep Sync**.

For a full list of supported EE PDUs, see Electromagnetic Emission in the VBS Gateway Manual.

The remaining Radar parameters are not supported by EE PDUs, and are set to default values.



#### WARNING

These values are hardcoded and cannot be changed.

3. The Administrator / Instructor can see all of the settings when they open the Electronic Warfare Settings dialog in Mission 2, but cannot adjust them.

From this point forward, the Electronic Warfare Radar EO in Mission 2 detects local and external entities, according to its settings.

#### NOTE

Based on the settings used and currently supported, there may be a difference in parameters between the local Radar in Mission 1, and the external Radar in Mission 2. For example, if the Radar in Mission 1 has Detectable Objects showing as Ships and the Sweep Direction showing as Counterclockwise, the Radar in Mission 2 has Detectable Objects showing as Landcraft, Aircraft; and the Sweep Direction showing as Clockwise.

Both Radars function and detect entities according to their local settings.

The following default settings are used for external Radars.

Setting	Value
<b>Detectable Objects</b>	Landcraft, Aircraft
<b>Detection Floor</b>	-100 m
<b>Landcraft Detection Ceiling</b>	100 m
<b>Aircraft Detection Floor</b>	100 m
<b>Sweep Direction</b>	Clockwise
<b>Effectiveness</b>	100%
<b>Volume Color</b>	Pink
<b>Radar Aligns North</b>	Enabled
<b>Show Additional Detection Info</b>	Enabled

#### 12.10.3.3 Limitations

The following limitations apply when using the Electronic Warfare Radar over VBS Gateway:

- Functionality is supported using only VBS Gateway DIS protocol.
- Not all EE PDU parameters are supported by the Electronic Warfare Radar EO.
- Not all Radar settings are represented in the EE PDU parameters. External Radars function with some settings set to default values.
- Re-linking / deleting / moving of an external Electronic Warfare Radar EO is not supported.

- Electronic Warfare Radar is not shown in the VBS Gateway GUI Active Entities Page (see [Active Entities Page \(on page 140\)](#) in the VBS Gateway Manual).
- The appearance (establishing a VBS Gateway connection) and disappearance (closing of a VBS Gateway connection) of external Electronic Warfare Radar EO<sub>s</sub> can take up to 15 seconds.

## 12.11 Enabling CREW

The CREW jamming device, known in the military as Counter Radio-Controlled Improvised Explosive Device (RCIED), is a vehicle mounted or portable electronic jamming system designed to prevent the detonation of IEDs.

This topic discusses the following:

- [CREW Link Editor Object \(below\)](#)
- [CREW Link Options \(on the next page\)](#)
- [Entity Capability \(on page 719\)](#)
- [Line of Sight \(LOS\) \(on page 722\)](#)
- [Range Visualization \(on page 723\)](#)
- [Limitations \(on page 724\)](#)

For information about using CREW as a trainee, see [Using CREW in the VBS4 Trainee Manual](#).

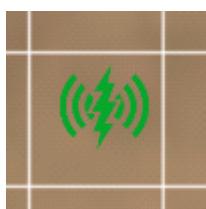
### 12.11.1 CREW Link Editor Object

To equip an entity with CREW capability, the **CREW Link Editor Object (EO)** is required.

**Follow these steps:**

1. In the Editor Objects List, select **CREW Link** and click the map, where you want to place the CREW Link EO.
2. In the **Object Properties** dialog, set the [CREW Link Options \(on the next page\)](#).
3. Click **OK**.

The CREW Link EO is placed on the map.



The CREW Link EO must be linked to an entity, see [Linking Editor Objects \(on page 69\)](#) and [Entity Capability \(on page 719\)](#).

## 12.11.1.1 CREW Link Options

The CREW Link EO has the following options in its Object Properties dialog.



Option	Description
<b>Crew Radius</b>	Defines the jamming radius, in meters. This setting can be visualized on the 2D Map / in 3D Camera View (see <a href="#">Range Visualization (on page 723)</a> ).
<b>Crew Strength</b>	Use the slider to set the jamming strength, which defines how far the CREW can penetrate a solid object.
<b>Show CREW LOS?</b>	If set to <b>true</b> , occlusion of the jamming effect by objects / terrain is shown in Execute mode / C2 (see <a href="#">Line of Sight (LOS) (on page 722)</a> ).
<b>CREW Device</b>	Use the drop-down to select the model CREW device you want to use. The default is <b>No visual device</b> , meaning that a "device" is present but it cannot be seen in the scenario. To select a specific device that units can see / handle in-game, choose one of the following options: <b>For vehicles:</b> <ul style="list-style-type: none"><li>• Chameleon (Desert / Woodland variants)</li><li>• Duke (Desert / Woodland variants)</li><li>• Rhino</li></ul> <b>For units:</b> <ul style="list-style-type: none"><li>• Guardian Manpack</li><li>• Thor Manpack (Low / Mid / High Band variants)</li></ul> For more information about CREW devices, see <a href="#">Vehicle Devices (on the next page)</a> and <a href="#">Portable Manpacks (on page 720)</a> .
<b>Show Control Device</b>	If set to <b>false</b> , Chameleon or Duke is selected.

## 12.11.2 Entity Capability

You can equip either vehicles (see [Vehicle Devices \(below\)](#)) or units (see [Portable Manpacks \(on the next page\)](#)) with CREW capability by linking the CREW Link EO to either entity type.

### 12.11.2.1 Vehicle Devices

Linking the CREW Link EO to a **vehicle** causes it to be automatically equipped with the device selected using the [CREW Device \(on the previous page\)](#) option.

If you select **No Visual Device**, no physical CREW device is present. However, trainees can still access the CREW controls in the Quick Menu (see Using CREW in the VBS4 Trainee Manual).

If you select **Chameleon / Duke / Rhino**, a physical CREW antenna is attached to the vehicle.

Vehicle with a Chameleon CREW antenna attached.



## 12.11.2.2 Portable Manpacks

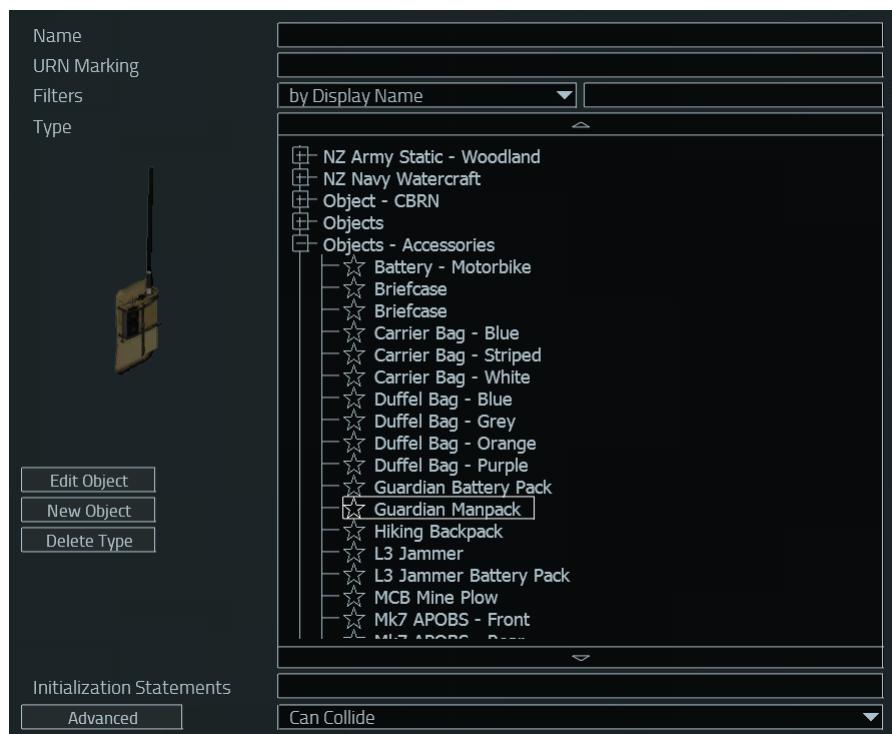
Linking the CREW Link EO to a **unit** causes them to be automatically equipped with the physical manpack device selected using the [CREW Device \(on page 718\)](#) option.

Alternatively, Guardian and Thor manpacks and their corresponding spare battery packs are available as objects. These objects can be added to a scenario in the VBS Editor, and retrieved by trainees during runtime.

### NOTE

Manpacks retrieved by trainees do not require the CREW Link EO. The [CREW Link Options \(on page 718\)](#) are hardcoded for retrieved manpacks. [Line of Sight \(LOS\) \(on page 722\)](#) and [Range Visualization \(on page 723\)](#) functionality is available for retrieved manpacks.

**Image-184: Guardian manpack selection**



### Follow these steps:

1. In the Editor Objects List, select (**F8**) **Objects** and double-click on the map where to want to place the manpack / battery pack.

2. In the Object Properties dialog, go to **Objects - Accessories** and select one of the following:

- **Guardian Battery Pack**
- **Guardian Manpack**
- **Thor Battery Pack**
- **Thor Manpack (High, Low, Mid-Band)**

3. Click **OK**.

The manpack / battery pack is placed on the map.

#### **NOTE**

While visually identical, Guardian battery packs only work with Guardian manpacks, and Thor battery packs only work with Thor manpacks. The difference between the three types of Thor manpacks (High, Low, Mid-Band) is purely visual.

## Object Variables

The following object variables are assigned to manpacks, and can be used to customize a scenario:

- **VBS\_CREW\_BATTERY\_LIFETIME** - Modifies the number of seconds required for a battery pack to go from a full charge of 100% to 0% (default is 3600 seconds).

For example, the following `setVariable`, "VBS\_CREW\_BATTERY\_LIFETIME", 300, depletes a battery pack with 100% charge to 0% charge in 5 minutes.

- **VBS\_CREW\_BATTERY\_CHARGE** - Modifies the battery pack charge as a percentage (0 = empty, 100 = fully charged).
- **VBS\_CREW\_BATTERY\_DISCHARGE\_RATE** - Modifies the multiplier of power consumption (default = 1).

### To implement an object variable, follow these steps:

1. Double-click the **manpack** to open the Object Properties dialog.

2. Type or paste the following in the Initialization Statements field:

```
this setVariable ["x", y]
```

3. Replace `x` with the desired object variable (for example: VBS\_CREW\_BATTERY\_LIFETIME).

4. Replace `y` with the desired numerical modifier (for example: 300).

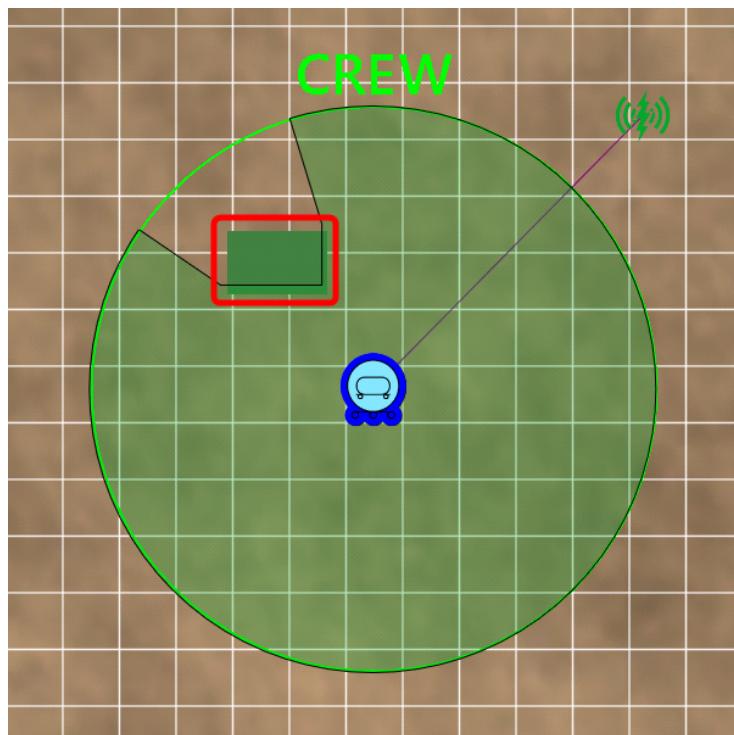
5. Click **OK**.

### 12.11.3 Line of Sight (LOS)

Occlusion of the jamming effect by objects / terrain is shown in Execute Mode / C2 on the 2D Map, blocking the LOS. The following image shows the LOS obstructed by a building (marked by a red rectangle).

**NOTE**

The Range Visualization (on the next page) setting **2D Fill** must be disabled in order to see the obstructed LOS effect.



## 12.11.4 Range Visualization

In VBS4, the [Crew Radius \(on page 718\)](#) of the CREW jamming device 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-185: 2D and 3D range visualization**



### 12.11.4.1 Portable Manpack Battery

The range visualization of units with [Portable Manpacks \(on page 720\)](#) changes color to indicate the remaining percentage (%) power of the battery pack.

Color	%	Color	%
Green	100	Orange	50
Yellow	75	Red	25

No color indicates that the battery pack is completely empty and must be replaced.

## 12.11.5 Limitations

The CREW system has the following limitations:

- CREW does not affect pressure plate triggered IEDs, or administrator detonated ones (for more information, see [Placing Improvised Explosive Devices \(on page 249\)](#)).
- Adding / deleting the CREW Link EO during a multiplayer scenario may not be reflected on other clients.
- Manpacks added to the inventory of a unit using the functions mentioned in [Edit Equipment Loadout \(on page 662\)](#) cannot be activated.

## 12.12 Fast Rope

This module enables you to deploy ropes from a helicopter, and have units fast-rope down them to the ground, or on to a building, ship deck, or other object. Once units have descended, the ropes are either dropped, or winched back up to the helicopter.

### ★ FEATURE NOTICE

Temporarily disabled for AI. See One AI in the VBS4 Release Notes.

### NOTE

Fast-roping works for both AI units and player units. The action happens automatically when the Fast Rope module is used, and all the necessary conditions are met.

**Image-186: Fast-Roping on to a building**



### Follow these steps:

1. In VBS Editor, click **Module** in the Editor Objects list.
2. Double-click a location on the map, to open the Object Properties dialog.
3. In the **Module** drop-down, select **Fast Rope**, and click **OK**.

Another Object Properties dialog opens, with the following settings:

Hover Height (15m)	<input type="range"/>
Fast Rope Units	<input type="button" value="All"/>
Rope Recovery	<input type="button" value="Jettison Ropes"/>
Trigger Type	<input type="button" value="Scripted"/>
Condition	<input type="text" value="true"/>

4. Adjust the settings, as described in the following table.

Field	Description
<b>Hover Height</b>	<p>Use the slider to set the hover height of the helicopter, which is the height above the helipad from which the units descend.</p> <p>The maximum hover height is 30 meters from the Fast Rope Module icon. If the helicopter approaches the icon at too low an altitude, it automatically adjusts itself to the height set here.</p>
<b>Fast Rope Units</b>	<p>Expand the drop-down to select which units fast-rope:</p> <ul style="list-style-type: none"> <li>• <b>All</b> - All cargo units of the linked helicopter.</li> <li>• <b>Scripted</b> - A specific array of units, listed in the <b>Units</b> field.</li> </ul>
<b>Units</b>	<p>This field becomes visible if <b>Fast Rope Units</b> is set to <b>Scripted</b>.</p> <p>If selected, enter an array of units that you want to place in the cargo of the linked helicopter.</p>
<b>Rope Recovery</b>	<p>Expand the drop-down to specify what happens to the rope after fast-roping is complete, the options are:</p> <ul style="list-style-type: none"> <li>• <b>Jettisoned</b> - The rope is dropped to the ground.</li> <li>• <b>Recovered</b> - The rope is winched back up to the helicopter.</li> </ul>
<b>Trigger Type</b>	<p>Expand the drop-down to specify the trigger type to activate fast-roping. The options are:</p> <ul style="list-style-type: none"> <li>• <b>Scripted</b> - Trigger is set in the <b>Condition</b> field.</li> <li>• <b>Proximity</b> - Helicopter proximity to the Fast Rope Module icon is considered as part of the primary condition to trigger fast-roping.</li> </ul>
<b>Trigger Radius</b>	<p>This field becomes visible if the <b>Proximity</b> option is selected in <b>Trigger Type</b>. Enter a trigger radius (in meters).</p>
<b>Condition</b>	<p>This is the main condition to determine whether the linked helicopter performs the fast-rope maneuver.</p> <p>If the <b>Trigger Type</b> is set as <b>Scripted</b> and <b>Condition</b> is set to <b>true</b> (default), the linked helicopter flies to the Fast Rope Module icon location and initiates the fast-rope maneuver. The helicopter then follows any waypoints it has been given.</p>

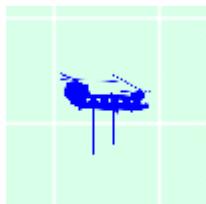
5. Once all the settings are configured, click **OK** to save them.

The Fast Rope module icon is placed on the map.

**NOTE**

In 2D, it shows as blue transport helicopter. In 3D, it shows as a red helipad.

### Image-187: Fast Rope Module icon



#### 12.12.1 Linking

To make the fast-rope animation work, you must link the Fast Rope module icon to a helicopter, and add units to it as cargo. The following example has the Fast Rope module **Trigger Type** set to **Scripted, Rope Recovery** set to **Jettison Ropes**, and the **Condition** field set to **true**. This is the simplest fast-rope animation to configure.

##### Follow these steps:

1. Place the Fast Rope module on the map where you want the fast-rope animation to occur (if necessary, it is easiest to adjust this position in 3D Camera View).
2. Select a helicopter, and in the Object Properties dialog, expand the **Special** drop-down, set it to **Flying**, and click **OK**.

**NOTE**

All transport helicopters should be compatible, but the rope positions are mapped best for the CH-47, MH-60, UH-60, MH-6 variants.

3. Place units on the map, and in each of their Object Properties dialogs, expand the **Special** drop-down, and set it to **In Cargo** (alternatively, you can use the script command [moveInCargo](https://sqf.bisimulations.com/display/SQF/moveInCargo) (<https://sqf.bisimulations.com/display/SQF/moveInCargo>)), and click **OK**.
4. Add the units to the helicopter:
  - a. Press and hold **LShift**.
  - b. Left-click a **unit**.  
A black arrow is attached to your cursor.
  - c. Left-click the **helicopter**.  
The arrow and the unit disappear, meaning that the unit is inside the helicopter.
5. Press and hold **Shift** and left-click on the **Fast Rope module icon**.  
A black arrow is attached to the cursor.

## 7. Click the **helicopter**.

The arrow turns green, meaning that the Fast Rope Module is linked to the helicopter.

## 8. Release the **Shift** key.

## 9. Preview the mission.

The helicopter flies to the position of the Fast Rope module icon (which appears as a helipad in the scenario) and hovers above it. Ropes descend from the helicopter, and the units fast-rope down them. Once all units have descended, the ropes are jettisoned.

## 12.12.2 Fast-Roping on to Objects

When fast-roping on to objects, such as ships and buildings, there are additional considerations, and it is usually necessary to adjust the position of the Fast Rope module helipad in the 3D Camera View.

Usually, when you first place the Fast Rope module on the map, it appears in the scenario as a helipad at ground level (or on the sea / river bed, if placed on water). Therefore, it must be moved to sit on top of the object you want units to fast-roping on to.

### Follow these steps:

#### 1. To raise / lower the helipad:

- a. Press and hold **LAlt**.
- b. With your cursor over the helipad, press and hold the **RMB**.
- c. Drag your mouse forwards / backwards to raise / lower the helipad.

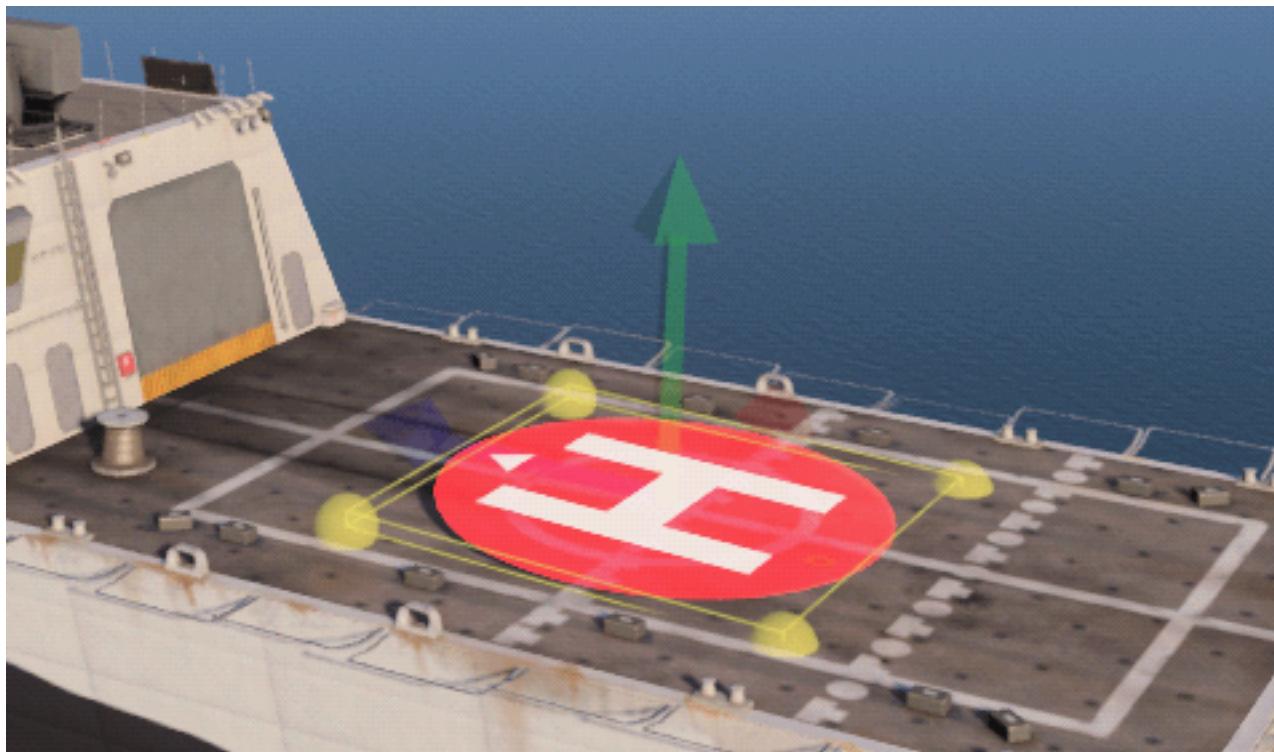
#### 2. To move the helipad horizontally:

- a. Click the **helipad**, and drag your mouse left / right / forwards / backwards.

#### 3. When the helipad is in the correct position, right-click it, and select **Snap to Surface** in the context menu.

The helipad is correctly placed, and ready for use. See [Linking \(on the previous page\)](#) for an example scenario setup.

### Image-188: Helipad on the deck of a ship



#### 12.12.2.1 AI Controlled Helicopters

When using AI controlled helicopters, the following points must be borne in mind:

- Once the fast-rope maneuver is triggered, the helicopter moves towards the helipad, and initially descends to the height set for the [Hover Height \(on page 726\)](#) parameter, above the terrain / sea bed. However, when it reaches close proximity to the helipad, it automatically adjusts its position so that it is at the [Hover Height \(on page 726\)](#) setting above the helipad.
- When units finish fast-rope, the helicopter moves upwards, away from the helipad. If there are no further instructions or a waypoint to move away, it hovers directly above the helipad.
- Closing in on an area with low height may either lead to a collision with objects higher than the set height, or with the ship / building the helicopter is dropping units on to. This can be avoided by using waypoints with enough height close to and at the helipad location.
- If the helicopter should drop down after fast-rope is completed, units on the ground or in the helicopter may be endangered. This is avoided by having a waypoint after the fast-rope action that sets sufficient height and leads the helicopter away from the helipad.

## 12.13 HHMD / AN/PSS-14 Mine Detector

The Hand Held Metal Detector (HHMD) and the AN/PSS-14 Mine Detector allow the detection of IEDs (see [Placing Improvised Explosive Devices \(on page 249\)](#)) and mines (see [Placing Mines \(on page 263\)](#)).

The HHMD / AN/PSS-14 kit consists of:

- HHMD / AN/PSS-14 device.
- HHMD battery (used for both devices).

To use the HHMD / AN/PSS-14 in a simulation, see HHMD / AN/PSS-14 Mine Detector in the VBS4 Trainee Manual.

The following is described:

- [Adding the HHMD / AN/PSS-14 Kit to a Unit Inventory \(below\)](#)
- [Placing the HHMD / AN/PSS-14 Kit in a Scenario \(on page 732\)](#)

### 12.13.1 Adding the HHMD / AN/PSS-14 Kit to a Unit Inventory

You can equip units with the HHMD / AN/PSS-14 kit to use it directly in the simulation.

**Follow these steps:**

1. In the Editor Objects List, add a unit that you want to equip with the HHMD / AN/PSS-14 kit.

For more information, see [Adding Units \(on page 344\)](#).



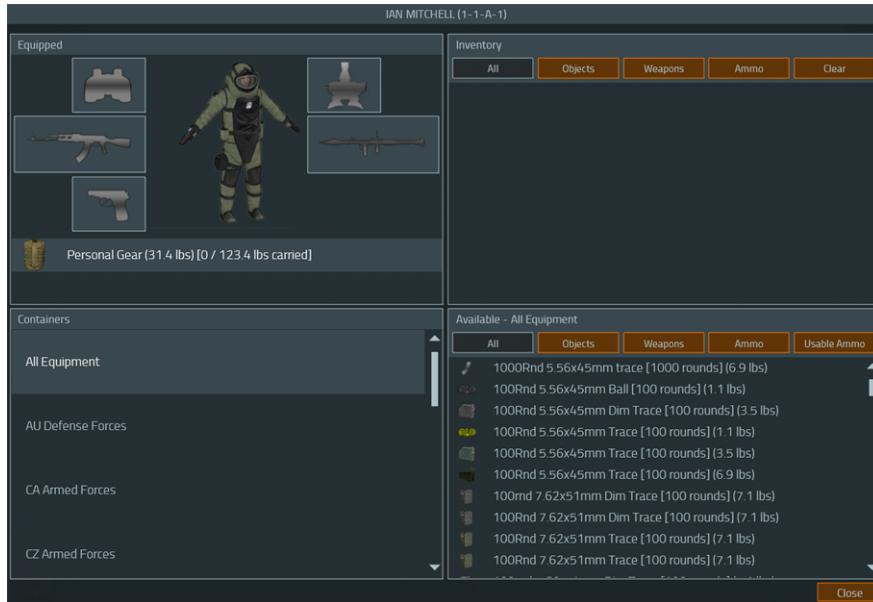
#### TIP

You can use specific bomb technician / sapper unit types, such as:

- **US USMC Desert > EOD - Bombsuit Technician / US USMC Woodland > EOD - Bombsuit Technician**
- Any of the **Sapper** units in the **US Army ACU - OCP** unit category.

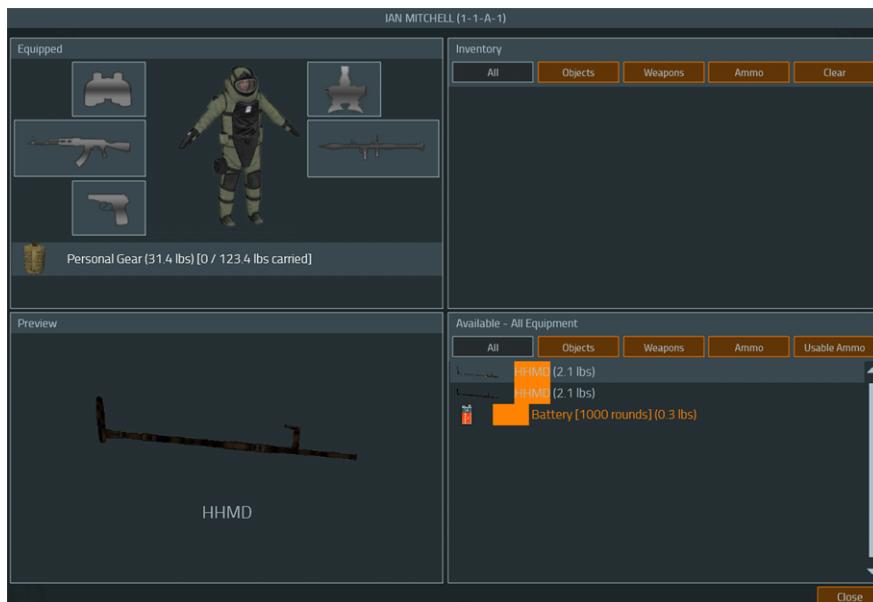
2. Right-click the unit and select **More... > Customize Starting Loadout**.

The unit inventory opens.



3. Click any item in the bottom-right panel, and type **HHMD** or **AN/PSS-14**.

The HHMD or AN/PSS-14 kit items are filtered.



4. Drag any of the available HHMD / AN/PSS-14 devices to the upper-right panel.

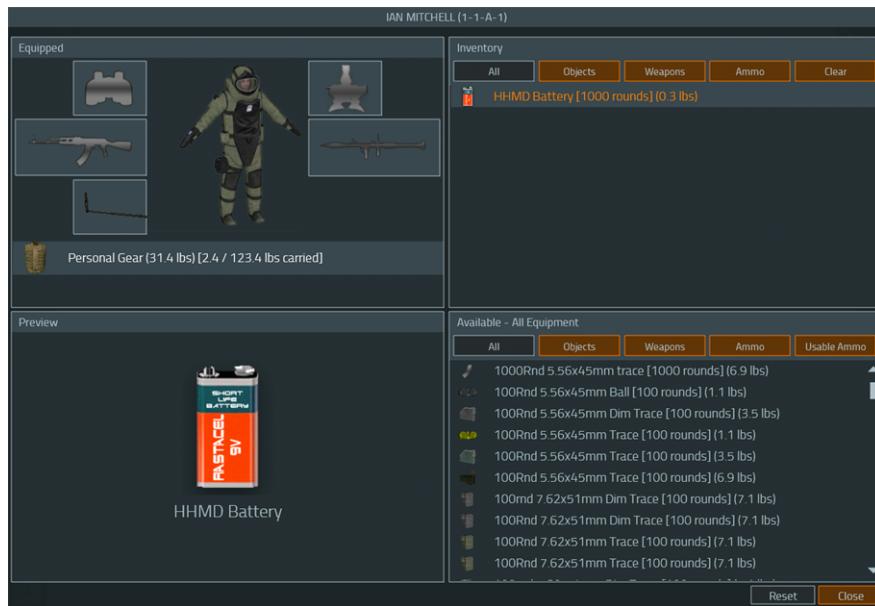
The unit is equipped with the HHMD / AN/PSS-14 device.

**NOTE**

If the pistol slot is empty, the device is placed there.

- Drag the HHMD battery to the upper-right panel, and in the **How many?** dialog select 1 and click **OK**.

The unit is equipped with the HHMD / AN/PSS-14 kit.



## 12.13.2 Placing the HHMD / AN/PSS-14 Kit in a Scenario

Place the HHMD / AN/PSS-14 kit in a scenario, so that trainees in the simulation can pick it up before using it.

### Follow these steps:

- In the Editor Objects List, select **Weapon/Ammo** and double-click a location on the map, where you want to place the HHMD / AN/PSS-14 kit.

The Weapon / Ammo dialog opens.

Select Category	<input type="text" value="Weapon"/>
Weapon Type	<input type="text" value="None Selected"/>
Loaded	<input type="text" value="false"/>

- In the **Select Category** drop-down, select **Weapon**.
- In the **Loaded** drop-down, select **true**.

#### **NOTE**

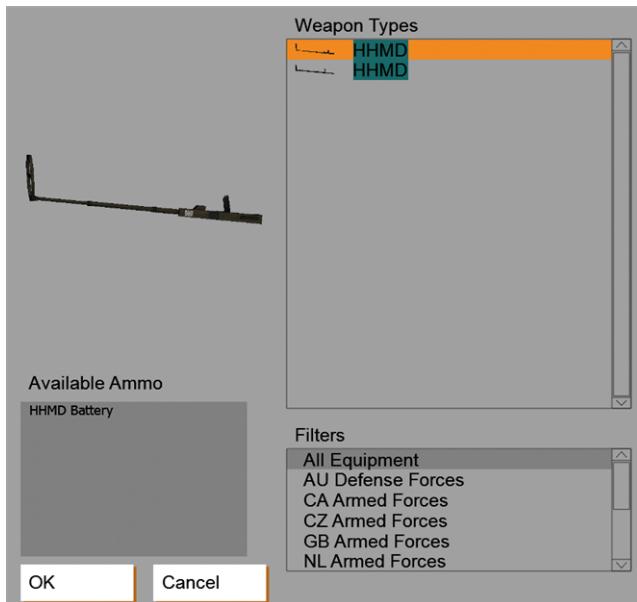
This adds an HHMD battery to the HHMD / AN/PSS-14 device.

#### 4. Click **Select Type**.

The Weapon Selection dialog opens.



#### 5. Click anywhere in the **Weapon Types** panel, and type **HHMD** or **AN/PSS-14** to filter the available HHMD / AN/PSS-14 devices.



#### 6. In **Weapon Types**, select any of the HHMD / AN/PSS-14 devices and click **OK**.

#### 7. Click **OK**.

The HHMD / AN/PSS-14 kit is placed in the scenario, allowing trainees to pick it up during the simulation using the Equipment Inventory in the VBS4 Trainee Manual.

## 12.14 Infantry Assault Bridge

The Infantry Assault Bridge (IAB) is a modular, lightweight, portable footbridge. In VBS4, the IAB components consist of aluminium bridge sections or "modules" (weighing 100 Kg each) and an assembly / disassembly trestle. One set of a maximum of eight modules can produce a clear-span bridge of approximately 36 m in length. The IAB is manually assembled / disassembled and can be transported by hand, truck, or fixed / rotary wing aircraft.

### NOTE

Transportation by vehicle depends on the capacity and weight tolerance of the vehicle. For example, the **GB Army Wheeled - Desert / Woodland > Support Vehicle 9T** would be suitable.

For information about how to use the components to assemble the IAB, see Infantry Assault Bridge Simulation in the VBS4 Trainee Manual.

The following subjects are discussed in this topic:

- [Adding IAB Components to a Scenario \(below\)](#)
- [Adding IAB Components to a Vehicle \(on the next page\)](#)

### 12.14.1 Adding IAB Components to a Scenario

The IAB components are usually added to a scenario using the Editor Objects List.

### NOTE

There is a 50m search radius from the Trestle that checks for IAB modules not being used by someone else. Therefore, IAB modules should be placed within the 50m radius to enable assembly.

Use the instructions in [Adding Objects \(on page 46\)](#) to place the following components in your scenario:

- **GB Objects > Infantry Bridge - Bridge Section** (as many as you require).
- **GB Objects > Infantry Bridge - Launch Trestle** (one is sufficient).

### NOTE

**GB Objects > Infantry Bridge - Pontoon** while available as an object, is currently non-functional.

### Image-189: Placed IAB components



#### 12.14.2 Adding IAB Components to a Vehicle

To add IAB components to a vehicle in your scenario currently requires the use of the following script command (a generic inventory function), in the **Initialization Statements** field of the Object Properties dialog:



##### EXAMPLE

Here *object* is the item to want to add to the vehicle inventory and *cargo* is the vehicle that can carry objects.

```
[object, cargo] call fn_vbs_objectCargo_add
```

For more information, see Using Basic Scripts in the VBS4 Scripting Manual.

## 12.15 Laser Warning Receiver

The Laser Warning Receiver (LWR) alerts the occupants of a vehicle that their vehicle has been lased, allowing them to take action to counteract the threat, by launching smoke charges.

The LWR is added to a scenario as an Editor Object (EO), which is then linked to the vehicle that requires LWR functionality.

Occupants of vehicles equipped with the LWR see the [Vehicle Countermeasures HUD \(on page 738\)](#) (VCM HUD), which shows if the vehicle has been lased, the direction the laser is coming from, and how many smoke charges are available.

### NOTE

One LWR Editor Object can be linked to several vehicles, which equips all of them with the VCM HUD simultaneously.

### Follow these steps:

1. Select **Laser Warning Receiver** in the EO list.
2. Double-click anywhere on the map.

The Object Properties dialog opens.

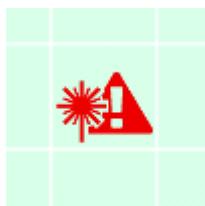
Detect these Lasers:	<input type="text" value="Rangefinders, Designators and Pointers"/>
Detect Lasers from:	<input type="text" value="All sides"/>
Auto-deploy Smoke	<input type="text" value="false"/>
Auto-Align VC Turret	<input type="text" value="false"/>

3. Configure the following settings, using the drop-downs:

Setting	Description
<b>Detect these lasers</b>	Select the type of laser you want the vehicle occupants to be warned about: <ul style="list-style-type: none"> <li>• Rangefinders</li> <li>• Designators</li> <li>• Pointers</li> <li>• Rangefinders &amp; Designators</li> <li>• Rangefinders &amp; Pointers</li> <li>• Designators &amp; Pointers</li> <li>• Rangefinders, Designators &amp; Pointers</li> </ul>
<b>Detect lasers from</b>	Select which side you want to detect lasers from. <ul style="list-style-type: none"> <li>• Only OPFOR</li> <li>• Only BLUFOR</li> <li>• All sides</li> </ul>
<b>Auto-deploy Smoke</b>	Automatically deploys smoke as a counter measure of being lased: <ul style="list-style-type: none"> <li>• false</li> <li>• true</li> </ul> <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"> <b>i</b> <b>NOTE</b>            If the vehicle has smoke dischargers mounted on the turret, and this setting is enabled, it may automatically rotate the turret so that the smoke dischargers face towards the direction of the threat.         </div>
<b>Auto-align VC Turret</b>	When enabled (true), the optic of the Commander automatically aligns to face the threat: <ul style="list-style-type: none"> <li>• false</li> <li>• true</li> </ul>

4. Click **OK**.

The LWR EO icon appears on the map.



The LWR EO must be linked to the vehicle that you want to have LWR functionality.

## Follow these steps:

1. Right-click the **LWR EO**.
2. Select **Link Vehicle** in the context menu.  
A black arrow is attached to your cursor.
3. Click the **vehicle** that you want to have LWR functionality.  
The arrow becomes a green line, linking the EO to the vehicle.
4. If required, repeat steps 1 to 3 to apply the LWR to other vehicles.

The vehicle has LWR functionality.

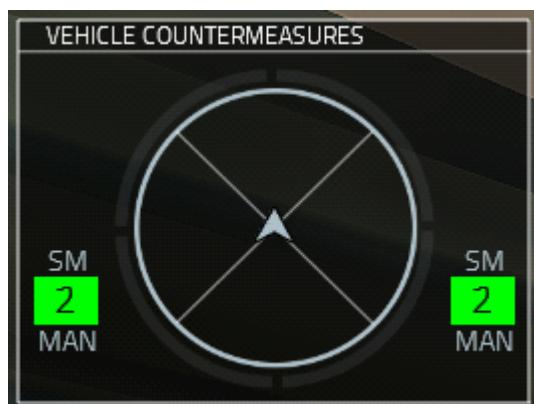
### 12.15.1 Vehicle Countermeasures HUD

All occupants of vehicles equipped with the LWR can see the Vehicle Countermeasures HUD (VCM HUD).

**NOTE**

If the is also applied to the vehicle, the HUD also shows APS information, see .

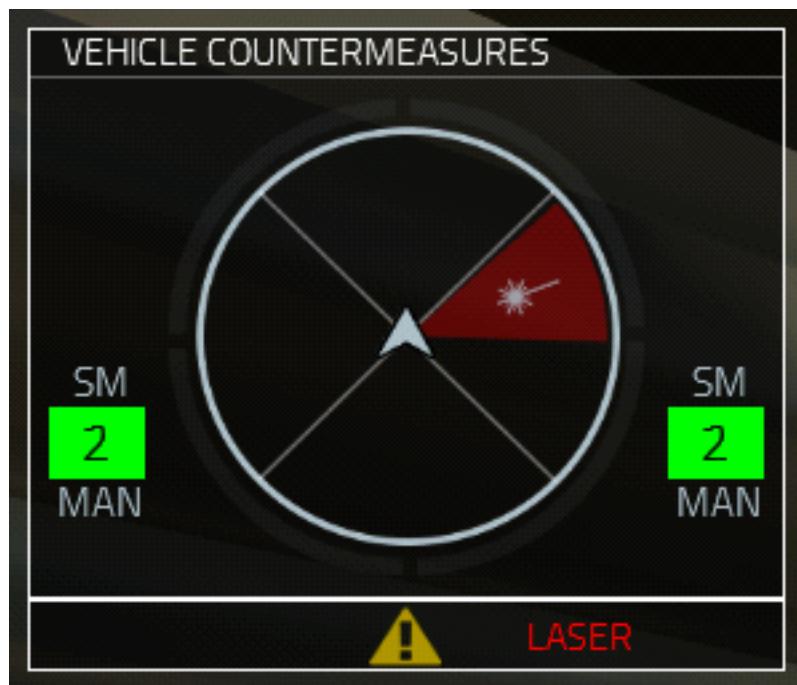
**Image-190: LWR VCM HUD**



The following information is displayed:

- **Compass** - Used to show the direction a laser is coming from, and the approximate direction in which the smoke charge countermeasures are fired.
- **SM** - Shows the number of smoke charges available.
- **MAN / AUT** - Shows the smoke discharger mode (manual / auto).

When the vehicle is lased, the compass indicates where the laser is coming from (laser symbol), and a warning triangle and the word LASER are displayed. The coverage arc of the smoke discharge countermeasure is indicated by a red segment on the compass.

**Image-191: Detected threat and smoke deployed**

If the target vehicle has the correct smoke launchers (for example, the M1127), and **Auto-deploy Smoke** in the Object Properties dialog is set to **true**, the smoke automatically deploys.

## 12.16 Light Beacon

A light beacon can be attached to a vehicle, using the Light Beacon Editor Object. A light beacon has several parameters that can be set (for example, the length and color of the pintle, the color of the emitted light, and revolutions per second).

### **NOTE**

The color of the beacon model is not determined by the light color, but by the beacon visual model.

### Image-192: Light Beacon parameters

Beacon Model	Beacon, Short, Woodland
Light Color	Red
Start With Beacon On?	false
Revolutions Per Second	1

After the object is created in VBS Editor, it can be attached to vehicles that have the correct memory points configured for light beacons.

### **NOTE**

Only some GB vehicles have memory points configured for light beacons. For example, FV103 Spartan, FV106 Samson, AS90, and CRARRV Rhino.

### To attach the beacon to the vehicle, follow these steps:

1. Right-click the beacon and select **Link to Vehicle**.
2. Drag the arrow to the vehicle you wish to attach the beacon to and click it.

### **NOTE**

A single Light Beacon Editor Object can be linked to multiple vehicles.

The beacon is attached to the vehicle.

### **NOTE**

The HET, LET, and Support Vehicle Recovery GB base models already have light beacons attached, so you cannot link another beacon to them.

If you try to link a light beacon to a vehicle without proper memory points, then a warning message is displayed and the connection is not created. A warning message is also displayed when you try to link a light beacon to the HET, LET, and Support Vehicle Recovery.

See [Linking Editor Objects \(on page 69\)](#) for further information on linking the Light Beacon Editor Object to entities.

### Image-193: Light Beacon on vehicle



## 12.17 Military Road Signs - Scenario Design

VBS4 includes temporary military road signs used to guide vehicle convoys. Road sign equipment can be added to a scenario for assembly by player units in-game. Alternatively, pre-assembled road signs can be placed in a scenario by an Administrator / Instructor.

### **WARNING**

Using large numbers of road signs in a scenario may significantly impact graphical performance.

This topic discusses the following:

- [Road Sign Equipment \(below\)](#)
- [Road Sign Equipment in Vehicles \(on the next page\)](#)
- [Pre-Assembled Road Signs \(on page 744\)](#)
- [Customize Road Sign Crates \(on page 746\)](#)

How military road sign equipment is used by Trainees is discussed in Military Road Signs in the VBS4 Trainee Manual.

### 12.17.1 Road Sign Equipment

The following road sign equipment is available:

- [Road Signs and Signposts \(below\)](#)
- [Road Sign Crates \(on the next page\)](#)

Road sign equipment can also be placed in vehicles, see [Road Sign Equipment in Vehicles \(on the next page\)](#).

#### 12.17.1.1 Road Signs and Signposts

Road signs and signposts are usually added to the Equipment Inventory of a unit like any other equipment (see [Edit Equipment Loadout \(on page 662\)](#)), and are found in the **Ammo** tab of the **Available** window. Click in the window and type **Sign** to search for them.

### **TIP**

Units can carry as many signposts and road signs as their total weight allowance permits.

## 12.17.1.2 Road Sign Crates

VBS4 provides crates that contain road signs and signposts that are accessed by player units in-game. They are too heavy for units to carry, so they are usually placed on the ground or in vehicles. For placement in vehicles, see [Road Sign Equipment in Vehicles \(below\)](#). For placement on the ground, you can find them in the Editor Objects List under **(F8) Objects > VBS Ammo**. The following crate types are available:

Crate Type	Description
<b>Crate, Basic Signs</b>	Contains 150 arrow signs, and 100 signposts.
<b>Crate, Basic Signs, Small</b>	Contains 30 arrow signs, and 30 signposts.
<b>Crate, Signs</b>	Contains a selection of standard and customizable road signs, and 50 signposts.

If necessary, you can customize your own crates, see [Customize Road Sign Crates \(on page 746\)](#).

## 12.17.2 Road Sign Equipment in Vehicles

Road signs, signposts, and crates are added to vehicles by creating a customized version of the vehicle you want to use. For the procedure that explains how to do this, see [Customize Vehicle Cargo \(on page 611\)](#).

### **WARNING**

Loadouts configured for new vehicles in Execute Mode (RTE) are not retained. Configure new vehicle loadouts during in Prepare Mode (OME).

Search for road sign equipment in the **Available** window of the Vehicle Template dialog:

- **Objects** - Pre-configured road sign crates:
  - **Crate, Signs**
  - **Crate, Basic Signs**
  - **Crate, Basic Signs, Small**
- **Ammo** - Individual road signs and signposts:
  - **Sign - Sign Name**
  - **Signpost**

### **WARNING**

Player units must first transfer signposts and road signs to their own inventories before they can assemble them.

### 12.17.3 Pre-Assembled Road Signs

Road sign assembly is normally done by player units in a scenario (see Using Military Road Signs in the VBS4 Trainee Manual), with road signs assembled using the road signs and signposts they have in their inventory.

However, if required, Administrators / Instructors can place pre-assembled road signs on the map in Prepare Mode.

#### Follow these steps:

1. In the Editor Objects List, click **Road Signs**.

 **WARNING**

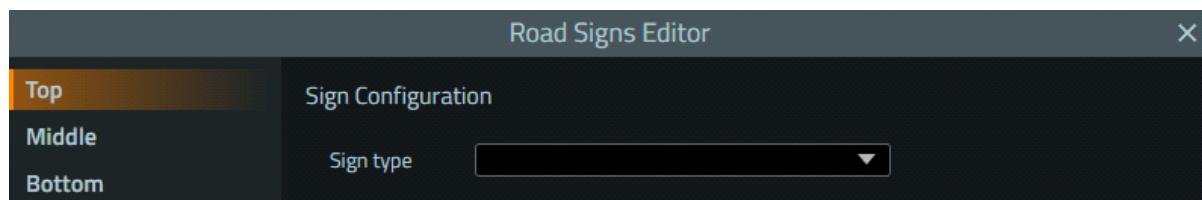
Adding / deleting this Editor Object in the VBS Editor during a multiplayer scenario may not be reflected on other clients.

2. Double-click the **map** where you want to place the road sign.

The Road Sign icon is placed on the map and a signpost is placed in the ground at the same time.



3. Double-click the **Road Sign** icon to open the Road Signs Editor dialog.



4. Select the **slot** you want to add a road sign to using the tabs (**Top / Middle / Bottom**). The following Sign Configuration options are available.

Slot	Sign Type	Facing (Front / Back)	Orientation (%)	Text
Top Middle Bottom	Arrow	One-sided, front facing only.	Use the slider to adjust.	Add up to 4 alphanumeric characters.
Top Middle	Direction	Double-sided	Use the slider to adjust.	Add 1 alphanumeric character.
Top	Sign - Square Shape	One-sided, front facing only.	Cannot be adjusted.	Add up to 15 alphanumeric characters (using the Text sticker). This road sign is customizable, see Stickers on Customizable Road Signs in the VBS4 Trainee Manual.
Top	Sign - Rectangular Shape	One-sided, front facing only.	Cannot be adjusted.	Add up to 15 alphanumeric characters (using the Text sticker). This road sign is customizable, see Stickers on Customizable Road Signs in the VBS4 Trainee Manual.
Middle	Standard Road Signs (below)	One-sided and double-sided road signs available.	Some can be adjusted, some cannot.	Add up to 1 alphanumeric character to the Direction road sign. Add up to 4 alphanumeric characters to the Deviation Direction, Arrow, and Deviation road signs.
Bottom	Label - Blank sign you can add text to.	One-sided, front facing only.	Cannot be adjusted.	Add up to 10 alphanumeric characters.

5. Once you have configured the slots and road signs, click **OK**.

When the scenario starts, your pre-assembled road sign appears in the scenario where you placed the Road Sign icon.

### Standard Road Signs

Include the following: Direction, No Way, Deviation Direction, Narrow Passage, Crossing, Danger, Curve, Bifurcation T / Y, Stop, Arrow, Deviation, Deviation End.

## 12.17.4 Customize Road Sign Crates

VBS4 enables you to create customized road sign crates. You can add your own choice of signposts and signs to a crate, and save them for use in other scenarios. Customized road sign crates can be created in Prepare Mode or Execute Mode.

### Follow these steps:

1. In the Editor Objects List, select (**F8**) **Objects**.
2. Right-click a position on the map, and select **New Object** in the context menu.
3. In the Object Properties dialog, select **VBS Ammo > Crate, Signs**, and click **New Object**.  
The Vehicle Template dialog opens (see [Customize Vehicle Weapon Loadouts \(on page 609\)](#)).
4. In the **Available** window of the dialog, click the **Ammo** tab, click in the window and type **Sign** to search for the available road signs and signposts.
5. Left-click and drag road signs and signposts from the **Available** window to the **Inventory** window, to add them to the crate. Type an amount in the **How Many?** dialog, and click **OK**.
6. When you have placed all the road signs and signposts you want into the crate, click **OK**.  
The Save Object dialog opens.
7. In the Save Object dialog, enter a name for your new crate in the **Object Name** field, and click **OK**.

The Save Object dialog closes returning you to the Object Properties dialog, where you can see your new crate in the list, marked by an asterisk (\*).



8. In the Object Properties dialog, click **OK**.

Your new crate is placed on the map, and is added to VBS4 as a custom Editor Object for use on the same computer. To transfer the customized crate to another computer, see [Export Custom Object Variants \(on page 98\)](#).

## 12.18 Mixed Reality Helmet

The Mixed Reality Helmet (MRH) is a holographic Augmented Reality device that enhances the situational awareness of units on the battlefield. While wearing the MRH, dismounted infantry can detect all friendly and enemy forces in the vicinity, and can see symbolic markers placed by an Instructor.

When units, vehicles, or markers are detected, they are visualized as symbols projected on to the visor of the helmet, even if there is no direct line-of-sight between the player and the other entity / marker. In addition, the distance of each entity / marker from the player is displayed below the corresponding symbol.

The following aspects of Mixed Reality Helmet use are discussed:

- [Add the Helmet to a Scenario \(below\)](#)
- [Mixed Reality Symbol Editor Object \(on page 750\)](#)

### 12.18.1 Add the Helmet to a Scenario

In VBS4, the helmet visor and projected symbols are simulated using an HUD, which is added to a scenario using the **Mixed Reality HUD** Editor Object (EO). The symbology used is **APP6 NATO**, and the following items are distinguished:

- Tracked vehicles
- Wheeled vehicles
- Rotary aircraft
- Fixed-wing aircraft
- Infantry
- Ships
- Sides (factions)

 **NOTE**

Static weapons symbology is omitted.

## Image-194: Mixed Reality HUD



### **NOTE**

Symbols shown with a dotted border indicate that there is no direct line-of-sight between the player and the entity.

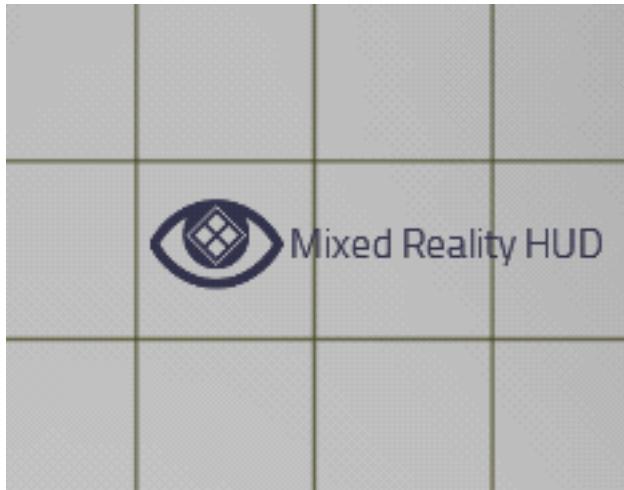
### Follow these steps:

1. In the Editor Objects list, select **Mixed Reality HUD**, and double-click anywhere on the map.  
The Object Properties dialog opens.
2. Use the drop-downs to adjust the following settings:

Setting	Description
<b>Selection</b>	Choose who is equipped with the MRH: <ul style="list-style-type: none"><li>• <b>All</b> - All entities in the scenario are equipped with the helmet.</li><li>• <b>Linked</b> - Only entities linked to the EO are equipped with the helmet.</li></ul>
<b>Sides</b>	Select the side you want to equip with the MRH: <ul style="list-style-type: none"><li>• <b>All</b> - All entities in the scenario.</li><li>• <b>BLUFOR</b> - Only BLUFOR entities.</li><li>• <b>OPFOR</b> - Only OPFOR entities.</li><li>• <b>Independent</b> - Only independent entities.</li><li>• <b>Civilian</b> - Only civilian entities.</li></ul>
<b>Scale (1.00)</b>	<b>Optional:</b> Adjusts the size of all the displayed symbols.
<b>Opacity (0.50)</b>	<b>Optional:</b> Adjusts the transparency of all the displayed symbols.

### 3. Click **OK**.

The Mixed Reality HUD EO appears on the map.



The entities specified in step 2 (**Selection**) are equipped with the MRH.

### 4. To equip specific entities with the MRH, ensure that **Selection** in the Object Properties dialog is set to **Linked**, and do the following:

- Right-click the **Mixed Reality HUD** EO.

- In the context menu, select **Link to**.

A black arrow is attached to your cursor.

- Click the **entity** you want to equip with the MRH.

The black arrow changes to a green line, and the EO is linked to the entity.

- Repeat steps 1 and 2 to link further entities.

The entity is equipped with the MRH, and sees the [Mixed Reality HUD \(on the previous page\)](#) view.

#### **NOTE**

Units inside vehicles that are linked to the Mixed Reality HUD EO have access to the Mixed Reality HUD. Once these units leave the vehicle, they still have access to the HUD.

However, they are not shown as being linked to the HUD EO on the 2D Map. The vehicle itself does not have to be linked to the icon.

UGVs must be linked to the EO to enable access to the [Mixed Reality HUD \(on the previous page\)](#).

You can toggle the Mixed Reality HUD on / off. To do this, open the **Quick Menu** and select **TOGGLE MRHD** (see Quick Menu Actions in the VBS4 Trainee Manual).

## 12.18.2 Mixed Reality Symbol Editor Object

Use this EO to place APP6 symbols into a scenario as markers. For example, you might want to indicate suspected OPFOR locations and dispositions, anticipated BLUFOR / Civilian arrivals, or timed / random events, such as localized contamination to Trainees. Such symbology is not linked to any entity, it simply appears to Mixed Reality Helmet wearers at the location on the map where the Mixed Reality Symbol EO is placed.

### Follow these steps:

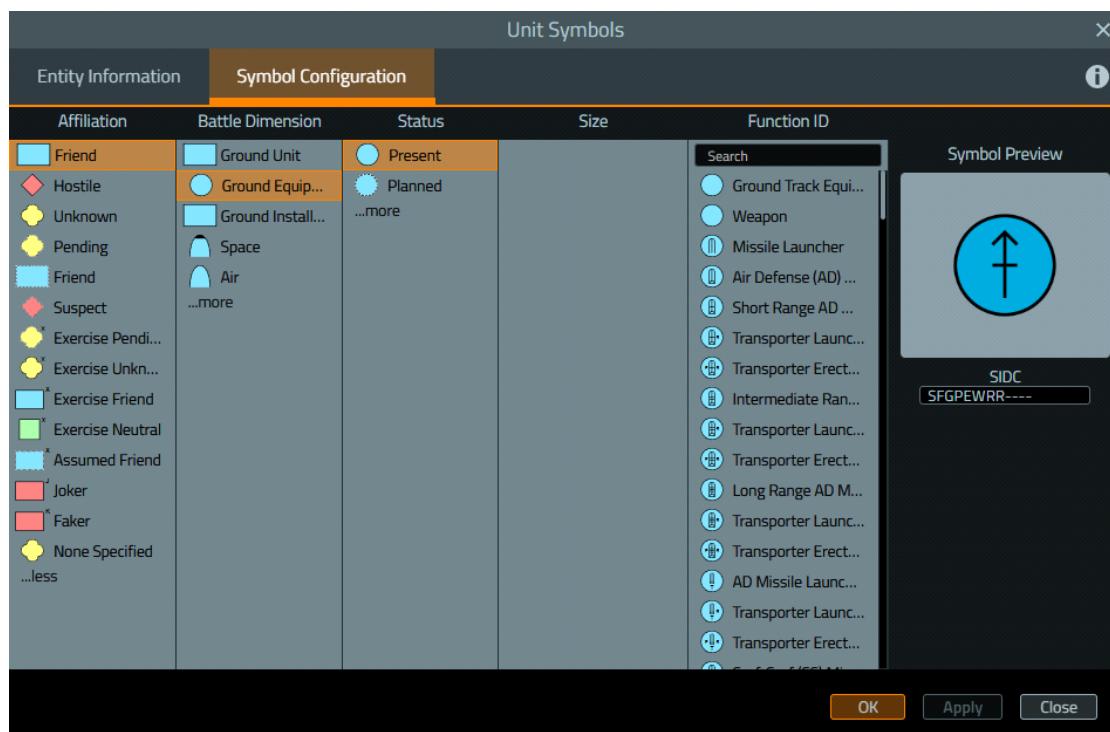
1. In the Editor Objects list, select **Mixed Reality Symbol**, and double-click anywhere on the map.

The Object Properties dialog opens.



2. Enter a **Name** and a **Description**.
3. Click **Select** next to the SIDC (Symbol Identification Code) field.

The Unit Symbols dialog opens.



**Follow these steps:**

1. Click a setting in each of the following columns, so that it is highlighted, to create your customized symbol, or enter an SIDC (Symbol Identification Code) in the **SIDC** field. An invalid SIDC results in the object defaulting to **S-----**, if its a new object. If you change a previously valid SIDC to something invalid, it does not apply the change.

Column	Description	Column	Description
<b>Affiliation</b>	Side for the entity, such as Hostile, Unknown, Exercise Neutral.	<b>Size</b>	Size of the entity, such as Squad, Section, Platoon.
<b>Battle Dimension</b>	Battle dimension, such as Ground Unit, Air, Sea Surface.	<b>Function ID</b>	Function ID of the entity, such as Air Defense, Gun Unit, Infantry. If necessary, use the <b>Search</b> field to find a specific function.
<b>Status</b>	Status for the entity, such as Present, Planned, Destroyed.	<b>Symbol Preview</b>	Shows what your customized symbol looks like.

2. Click **Apply**, then click **OK**.

**NOTE**

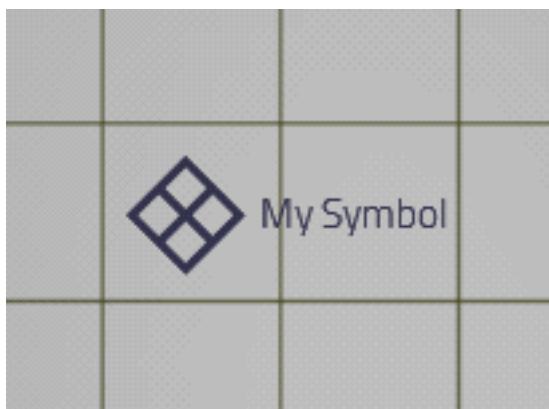
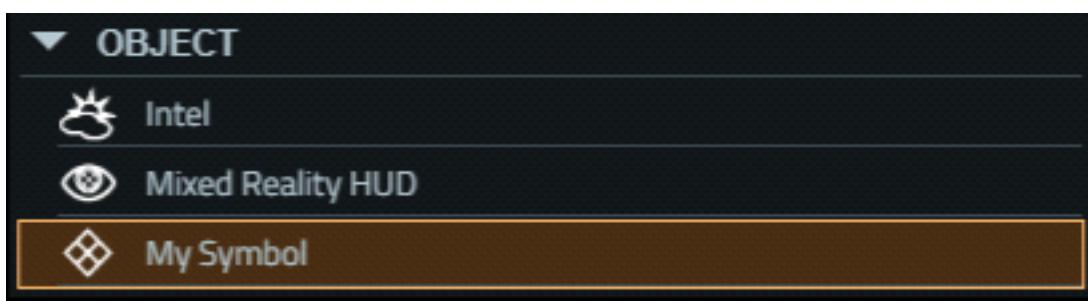
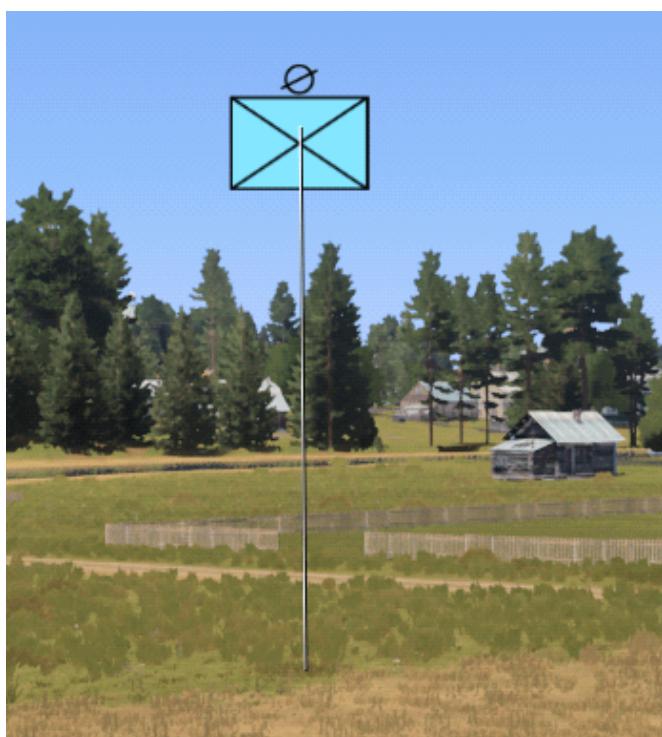
The **Apply** button applies the configured settings simultaneously in both the Entity Information and Symbol Configuration tabs.

3. Click **Close** or **X** to close the dialog.
4. In the Mixed Reality Symbol Object Properties dialog, click **OK**.

Your new symbol is added to the map and the Scenario Objects panel.

**NOTE**

Scenario Administrators / Instructors can see the symbols in **Prepare** mode, **Execute** mode, and **AAR**.

**Image-195: Mixed Reality EO in 2D View****Image-196: Mixed Reality EO in the Scenario Objects panel****Image-197: Mixed Reality EO in 3D View**

## 12.18.2.1 Scripting

Alternatively, you can create Mixed Reality Symbology using scripting. For more information, see the following script commands:

- [fn\\_vbs\\_mixedReality\\_createSymbol](https://sqf.bisimulations.com/display/SQF/fn_vbs_mixedReality_createSymbol) ([https://sqf.bisimulations.com/display/SQF/fn\\_vbs\\_mixedReality\\_createSymbol](https://sqf.bisimulations.com/display/SQF/fn_vbs_mixedReality_createSymbol))
- [fn\\_vbs\\_mixedReality\\_updateSymbol](https://sqf.bisimulations.com/display/SQF/fn_vbs_mixedReality_updateSymbol) ([https://sqf.bisimulations.com/display/SQF/fn\\_vbs\\_mixedReality\\_updateSymbol](https://sqf.bisimulations.com/display/SQF/fn_vbs_mixedReality_updateSymbol))
- [fn\\_vbs\\_mixedReality\\_getAllSymbols](https://sqf.bisimulations.com/display/SQF/fn_vbs_mixedReality_getAllSymbols) ([https://sqf.bisimulations.com/display/SQF/fn\\_vbs\\_mixedReality\\_getAllSymbols](https://sqf.bisimulations.com/display/SQF/fn_vbs_mixedReality_getAllSymbols))

## 12.19 Advanced Mortars

VBS4 includes an Advanced Mortar simulation, which is available for the following mortar types:

- L16
- M19, M120, M224, M252
- 2B14

The following subjects are discussed in this topic:

- [Adding Mortars to a Scenario \(below\)](#) - The different ways mortars are added to a scenario.
- [Ammunition \(on the next page\)](#) - How to add ammunition to a scenario.
- [Mortar Location and Targeting \(on page 756\)](#) - How to achieve accurate targeting.

For information about how to operate mortars from a Trainee perspective, see Advanced Mortar Simulation in the VBS4 Trainee Manual.

### **WARNING**

Any unit can operate any mortar, provided that they have the correct mortar rounds in their inventory (or nearby ammunition crate, vehicle, or other unit). Advanced Mortars are designed to be operated by two units. However, single units can aim, load, and fire the listed mortars, if necessary.

Mortars manned by AI Gunners operate as any other VBS static weapon. AI Gunners engage hostile targets of their own free will. In addition, Fire Support options for AI are available in VBS Editor during Scenario Execution. For more information, see Fire Support in the VBS4 Instructor Manual.

### 12.19.1 Adding Mortars to a Scenario

Mortars are added to scenarios as Objects or Vehicles / Empty Vehicles, depending on the scenario.

#### **Objects**

Mortars that are added to a mission as Objects require assembly by units in the scenario. Two components are required, a **Tube** and a **Baseplate**, which are placed on the ground near to each other, or added to unit loadouts (see [Edit Equipment Loadout \(on page 662\)](#)).

### **NOTE**

Tube and Baseplate numbers should correspond to enable correct assembly.

## Follow these steps:

1. In the Editor Objects list, select **(F8) Objects**.
2. Double-click on the **map**.
3. In the Object Properties dialog, select the mortar parts by typing the following in the filter:
  - **Tube**, to see the list of available mortar tubes.
  - **Baseplate**, to see the list of available baseplates.
4. Select the required Tube / Baseplate, and click **OK**.

The mortar components are placed on the map.

## Vehicles or Empty Vehicles

Mortars that are added to a scenario as a Vehicle / Empty Vehicle are pre-assembled and ready to use.

### NOTE

Mortars added as an Empty Vehicle require at least one unit and the correct [Ammunition \(below\)](#) in the scenario to operate them.

## Follow these steps:

1. Select one of the following in the Editor Objects list:
  - **(F4) Vehicle**
  - **(F5) Empty Vehicle**
2. Double-click on the **map**.
3. In the Object Properties dialog filter, type **Mortar** and select one of the available mortars from the list.
4. Click **OK**.

The mortar appears on the map, and is pre-assembled when the scenario starts.

## 12.19.2 Ammunition

All units can use mortar ammunition, which is usually added to their Equipment Inventory in the VBS4 Trainee Manual.

The following units are already equipped with mortar shells by default (**Editor Objects List > (F1) Unit**):

- **Mortar Ammo Bearer - M4 CCO / M224, M225, M327**
- **Mortar Gunner - M4 CCO / M224, M252, M327**
- **Mortar Squad Leader - M4 RCO / M224, M252, M327**

Alternatively, ammunition boxes can be placed on the ground near the mortar for units to access the ammunition themselves.

### NOTE

Ammunition should be placed within 5 meters of the mortar to make it available to units.

Ammunition boxes are added to missions as Objects.

#### Follow these steps:

1. In the Editor Object list, select **(F8) Objects**.
2. Double-click on the **map** near the mortar (within 5 meters).
3. In the Object Properties dialog, select **VBS Ammo > Mortar Ammo Crate - USMC** (contains all compatible USMC ammunition).
4. Click **OK**.

The ammunition box appears on the ground near the mortar.

### 12.19.3 Mortar Location and Targeting

Players can use the Handheld Mortar Ballistics Computer (LHMBC) to record their mortar location and target data coordinates. This device enables them to accurately aim at target objects. See [Ballistics Computer \(on page 685\)](#) for more information.

If required, during a mission you can use the following script commands to establish the location of the mortar and target coordinates using the Debug Console (see [Debug Console Plugin](#) in the VBS4 Scripting Manual):

Command	Description
<code>posToCoord [getPos vehicle or player, 'MGRS']</code>	Gets the MGRS position coordinates of the mortar.
<code>Round (getPosASL2 vehicle or player select 2)</code>	Height of the mortar above sea level.
<code>getDir vehicle or player * 17.77777777778</code>	Gets the orientation of the mortar (aiming direction).
<code>posToCoord [getPos TARGET01, 'MGRS']</code>	Gets the target object coordinates ( <b>TARGET01</b> is used in the example). Alternatively, use the coordinates of your current mouse pointer in Execute mode (displayed at the bottom of your screen).
<code>Round (getPosASL2 TARGET01 select 2)</code>	Gets the height of the target object ( <b>TARGET01</b> ) above sea level.

Aiming the mortar is the primary responsibility of the unit in the gunner position. When in the gunner position, the player is presented with elevation and deflection scales, operated using key controls (see Mortar Aiming in the VBS4 Trainee Manual).

 **NOTE**

Administrators are able to add presets to the Ballistics Computer without overwriting existing registered Mortar Crews, Forward Observers, or Targets.

## 12.20 Radio Jamming Device

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

### ★ FEATURE NOTICE

This feature is part of VBS Radio Pro, a licensed product. For more information, contact [sales@bisimulations.com](mailto:sales@bisimulations.com).

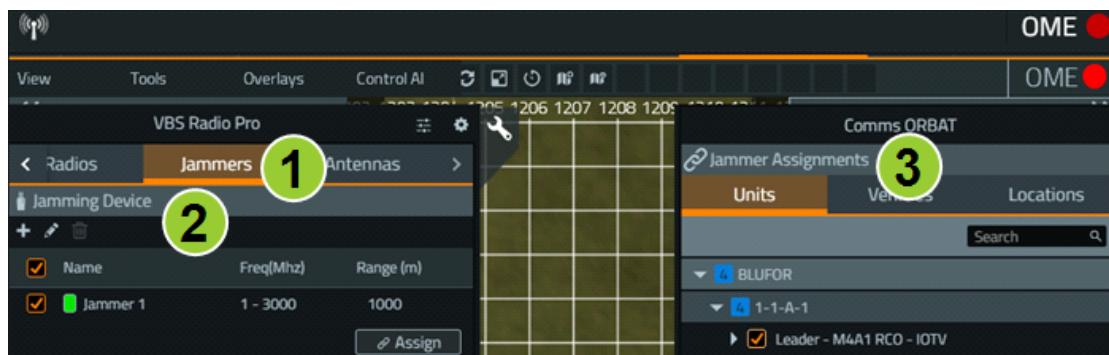
### NOTE

Jammers affect only Radio Types, see VBS Radio Concepts in the VBS Radio Manual.

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

- [Create a Jammer \(on the next page\)](#)
- [Define a Location \(on page 761\)](#)
- [Assign Jammers \(on page 762\)](#)
- [Edit Jammers \(on page 763\)](#)
- [Delete Jammers \(on page 764\)](#)

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



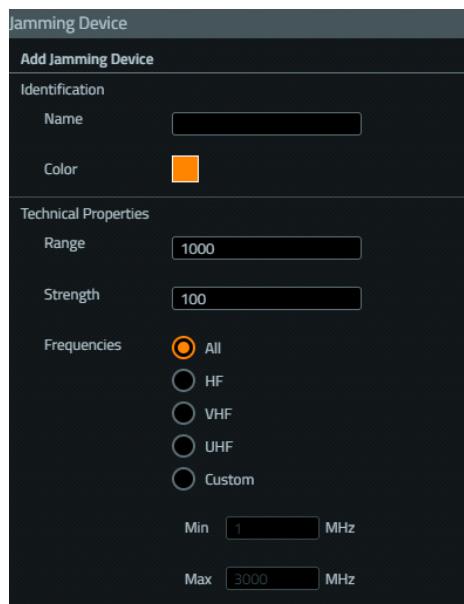
The Jammers UI has the following features:

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

## 12.20.1 Create a Jammer

Jammers are created in the Jamming Device panel.

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

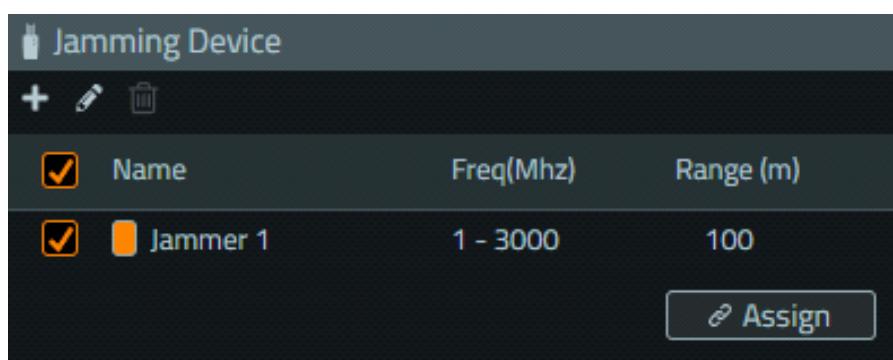


Adjust the following settings, and click **Save**.

Setting	Description
Name	Enter a name for the Jammer. <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><span style="color: #0070C0; font-size: 1.5em;">i</span> <b>NOTE</b><p>Each Jammer must have a unique name.</p></div>
Color	 <p>Click the <b>color</b> icon to open the color picker, select a predefined color (Military, APP6, User Defined), or create a customized color for Jammer identification, and click <b>OK</b>. The color you select is also used for the <a href="#">Jammer Range Visualization (on the next page)</a>.</p>
Range	Enter the range (in meters) of the area that the Jammer affects the radio of the sender / receiver (see also <a href="#">Jammer Range Visualization (on the next page)</a> ).

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

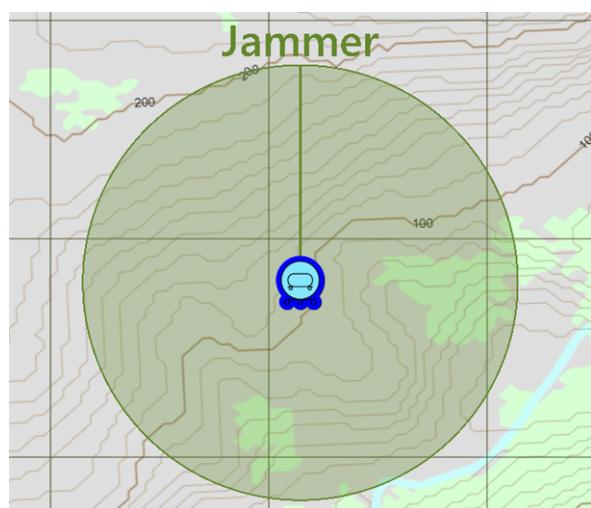
Your new Jammer is added to the Jamming Device panel, and can be assigned to entities, see [Assign Jammers \(on page 762\)](#).



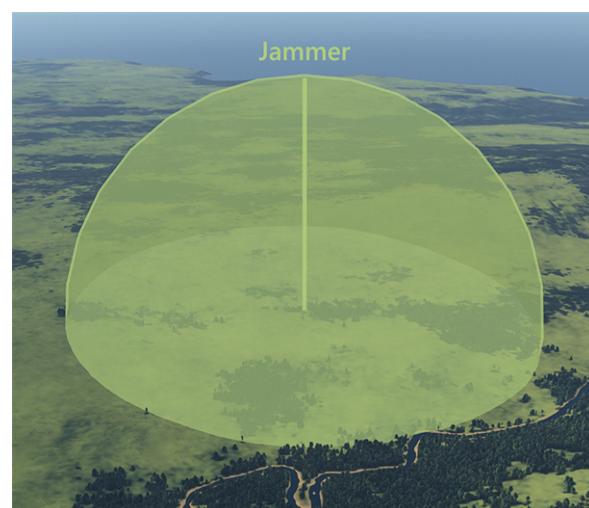
### Jammer Range Visualization

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

**Image-198: 2D range visualization**



**Image-199: 3D range visualization**



**NOTE**

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

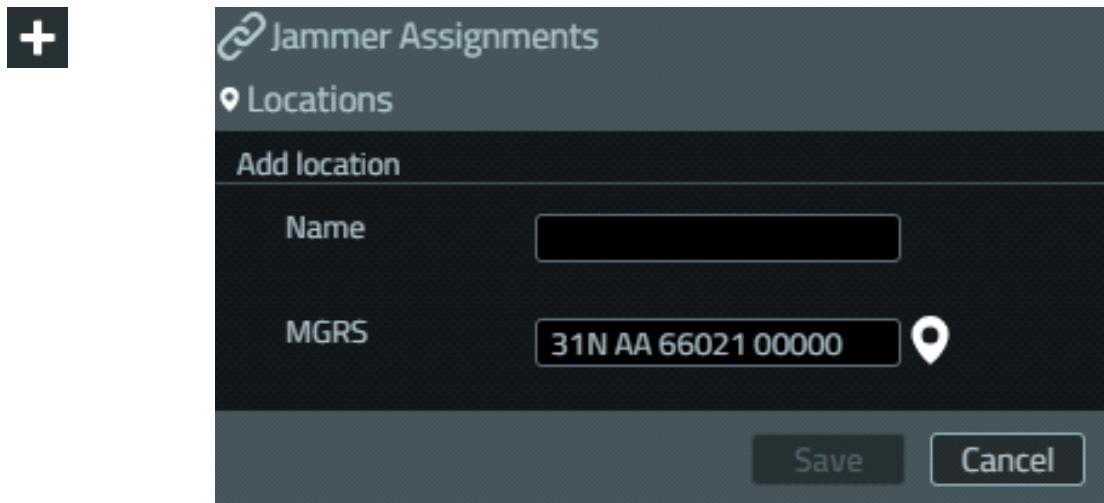
Range visualizations can only be seen by scenario Administrators and Instructors, not Trainees.

## 12.20.2 Define a Location

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

**Follow these steps:**

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



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



The coordinates are automatically entered into the MGRS field.

5. Click **Save**.

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

Name	Location
Location 1	35T NG 12092 07225

#### To edit a location, follow these steps:

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



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

#### To delete a location, follow these steps:

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



### 12.20.3 Assign Jammers

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

#### Follow these steps:

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

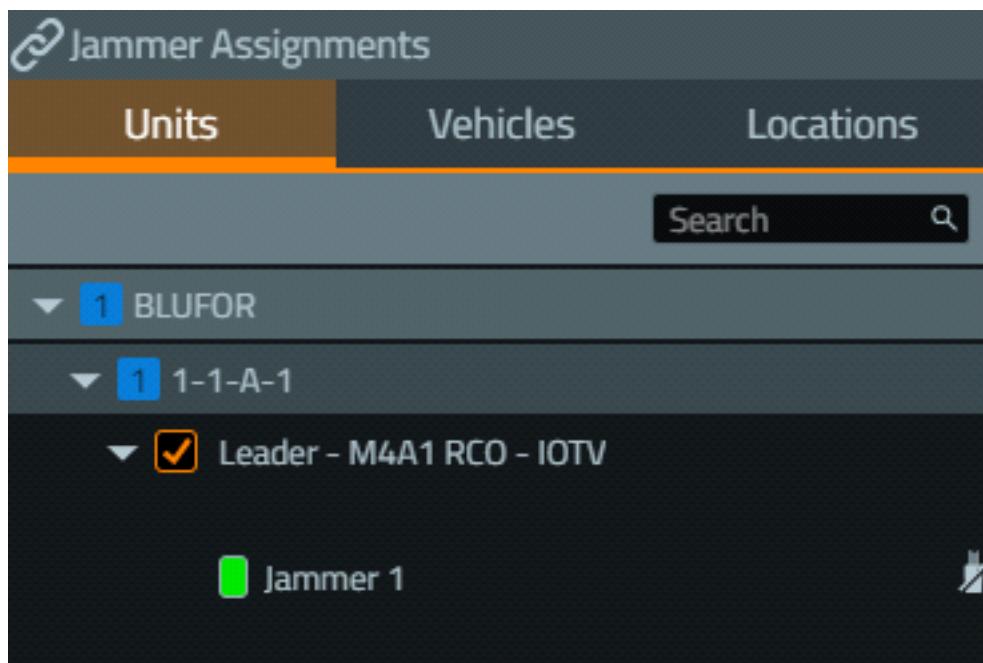
**NOTE**

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

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



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



## 12.20.4 Edit Jammers

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

**Follow these steps:**

1. Click the **box** next to the Jammer you want to edit.
2. Click the **edit** icon at the top of the list, to open the Add Jamming Device dialog.
3. Make your adjustments, and click **Save**.



## 12.20.5 Delete Jammers

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

### **WARNING**

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

**Follow these steps:**

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



The Jammer is shown.

3. Click the **unassign** icon.



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



The selected Jamming Device is deleted.

## 12.21 Reference Documents

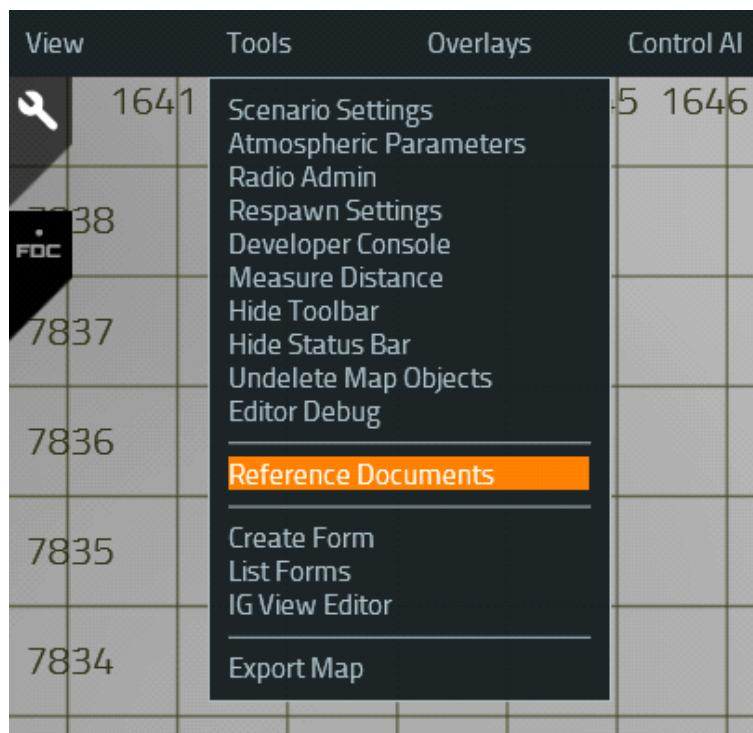
Displays pre-made HTML files in VBS4 as in-game reference material. The Reference Documents option is present in the VBS Editor Tools menu, available in Prepare, Execute, C2, and AAR modes.

The HTML files can be stored in any of the following locations:

- `\VBS_Installation\ReferenceDocs\`
- `\VBS_Installation\myData\ReferenceDocs\`
- `\Documents\VBS4\ReferenceDocs\`

**Follow these steps:**

1. Select **Reference Documents** in the VBS Editor Tools menu.



2. Select a form listed under **Documents** to display its content in the right panel.

REFERENCE DOCUMENTS		
DOCUMENTS:	Conversion Reference	
Multiply	By	To Obtain
Acres	4.047	Square Meters
Atmospheres	14.7	Pounds per sq inch
Centimeters	0.3937	Inches
Centimeters of mercury	0.01316	Atmospheres
Centimeters of mercury	0.1934	Pounds per sq inch
Cubic Feet	7.481	Gallons
Cubit meters	264.2	Gallons
Degrees (angle)	0.01745	Radians
Feet	0.3048	Meters
Feet per min	0.508	Centimeters per sec
Feet per min	0.01136	Miles per hour
Feet per sec	1.097	Kilometers per hour
Gallons	3.785 x 1000	Cubic Meters
Grams	0.03527	Ounces
Grams	2.205 x 1000	Pounds
Grams-calories	3.968 x 1000	BTUs
Horsepower	42.44	BTUs per min
Horsepower	745.7	Watts
Inches	2.54	Centimeters
Inches of Water	0.002458	Atmospheres
Joules	9.486 x 10.000	BTUs
Kilograms	2.2046	Pounds
Kilograms	1.102 x 1000	Tons (short)
Kilogram-calories	3.968	BTUs

Close

### **i** NOTE

The Reference Documents displayed in the above image are customer specific and are not available in baseline VBS4.

### **Limitations:**

- HTML files must have the full **\*.html** extension to be processed - **\*.htm** files are not processed.
- Not every HTML tag works. The available tags are listed here: [HTML File](https://sqf.bisimulations.com/display/SQF/HTML+file) (<https://sqf.bisimulations.com/display/SQF/HTML+file>)

## 12.22 Retractable Radio Mast

The Retractable Radio Mast (RRM) is a type of Antenna which can be assigned to any vehicle using the VBS Radio UI (see [Setting Up VBS Radio \(on page 112\)](#)). When such an Antenna is assigned to a vehicle, both transmitters and receivers of radio signals within the range of the Antenna are able to communicate.

### NOTE

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

### FEATURE NOTICE

This feature is part of VBS Radio Pro, a licensed product. For more information, contact [sales@bisimulations.com](mailto:sales@bisimulations.com).

### NOTE

The following considerations apply when using RRM Antennas:

- Vehicles with an assigned Antenna have them automatically set as fully "raised" at mission start by default. Trainees inside the Land Rover Wolf - FFR must fully raise the RRM Antenna from within the vehicle for it to be functional (see [Raising / Lowering the RRM](#)).
- The Land Rover Wolf - FFR can also have a customized Antenna assigned to it, which then overrides the existing default Antenna. However, the physical RRM Antenna must still be fully raised for it to be functional. For more information, see [Land Rover Wolf - FFR Antenna \(on page 774\)](#) in the VBS4 Editor Manual.
- Antennas affect only Radio Types, see [VBS Radio Concepts](#) in the [Introduction to VBS4 Guide](#).
- Antenna signals are affected by Jammers, see [Radio Jamming Device](#) in the [VBS4 Editor Manual](#).
- Antenna signals are affected by Degradation, see [Degradation \(on page 133\)](#) in the [VBS4 Editor Manual](#).
- The range of RRM Antenna overrides the range of all the Radio Channels (except VOIPs) of player units who are inside the vehicle.

How the RRM Antenna is used by Trainees is discussed in [Retractable Radio Mast Simulation](#) in the [VBS4 Trainee Manual](#).

## 12.22.1 Configuring Antennas

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

### **WARNING**

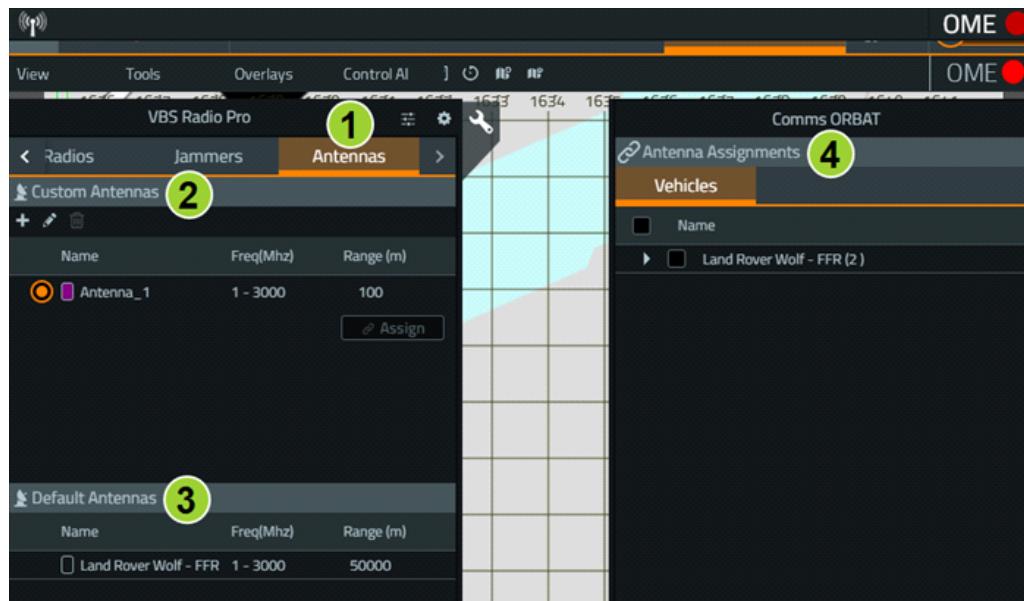
Antennas can only be configured in **Prepare Mode**.

#### Follow these steps:

1. In the VBS Editor, go to **Tools > Radio Admin** to open the Radio UI.  
The Radio UI opens.
2. If necessary, click the **right arrow** icon next to the Jammers tab to expose the Antennas tab.



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



The Antennas UI has the following features:

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

## 12.22.1.1 Creating Antennas

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

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



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

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

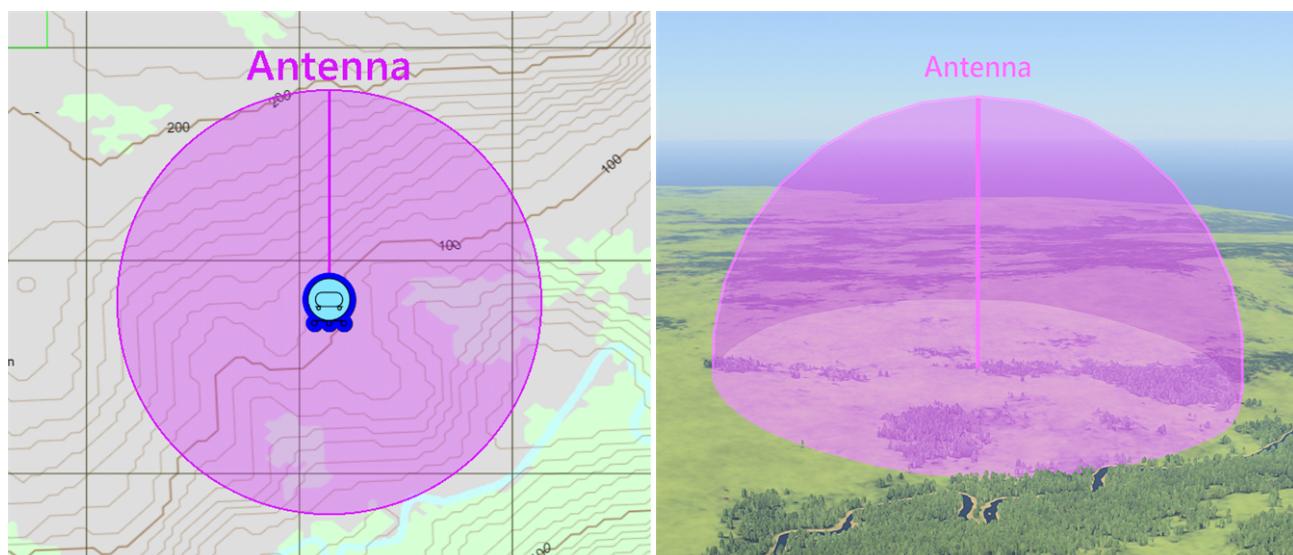
Your new Antenna is added to the Custom Antennas panel, and can now be assigned to a vehicle (see [Assigning Antennas \(on the next page\)](#)).



### Antenna Range Visualization

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

**Image-200: 2D and 3D range visualization**



#### **NOTE**

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

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

## 12.22.1.2 Assigning Antennas

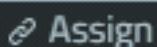
Antennas are assigned to Vehicles (manned or unmanned) in the **Antenna Assignments** panel.

### **WARNING**

Antennas can only be assigned to Vehicles.

### Follow these steps:

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



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



### **TIP**

To unassign Antennas, see [Deleting Antennas \(on page 773\)](#).

## 12.22.2 Editing Antennas

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

**Follow these steps:**

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



**Image-201: Edit Antenna Device dialog**



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

## 12.22.3 Deleting Antennas

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

### **WARNING**

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

Follow these steps:

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



The Antenna is shown.

2. Click the **unassign** icon.



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



The selected Antenna is deleted.

## 12.22.4 Land Rover Wolf - FFR Antenna

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

Default Antennas		
Name	Freq(Mhz)	Range (m)
<input type="checkbox"/> Land Rover Wolf - FFR	1 - 3000	50000

### **WARNING**

This Antenna cannot be modified or deleted.

The range of the Land Rover Wolf - FFR RRM Antenna is set as 5000 meters by default and is visualized on the 2D Map as a colored circle, similar to the [Range \(on page 769\)](#) of other assigned Antennas. However, the color of the circle cannot be changed and is color-coded depending on the side of the vehicle, or the side of the occupants of the vehicle, as follows:

Side	Circle Color
BLUFOR	Blue
OPFOR	Red
Civilian / Independent	Black

### **TIP**

If you require a different colored circle / range for the Land Rover Wolf - FFR RRM Antenna, you can assign a customized Antenna to the vehicle, which then overrides the default Antenna. How to do this is discussed in [Configuring Antennas \(on page 768\)](#).

## 12.23 Spike LR

VBS4 includes the Spike LR (Long-Range) portable missile system, which can be added to a scenario in the following ways:

- As two units, each with a backpack containing either the Command and Launcher Unit (CLU) and Tripod, or the Spike Rounds (two Missile Tubes).
- As a pre-assembled "vehicle".

The following subjects are discussed in this topic:

- [Adding the Spike to a Scenario \(below\)](#)
- [Administrator Object Properties Dialog \(on page 777\)](#)

For information about how to use the Spike from a Trainee perspective, see Spike LR Simulation and Spike LR Operation in the VBS4 Trainee Manual.

### 12.23.1 Adding the Spike to a Scenario

Use the instructions in [Adding Units \(on page 344\)](#) to add the following specific Spike units to your scenario:

- **BE Army Woodland > AT Ammo Bearer - SCAR L / Spike**
- **BE Army Woodland > AT Soldier - Spike**

These units are already equipped with the necessary backpacks for Spike assembly and operation. However, any unit type can retrieve and use the backpacks if they are stowed in a vehicle or placed on the ground.

Alternatively, ready-assembled Spikes can be added to a scenario as vehicles.

Spikes that are placed in a scenario by an Administrator as an **(F5) Empty Vehicle** require a player unit to get in to the Gunner position to operate them.

Spikes that are placed in a scenario by an Administrator as an **(F4) Vehicle** already have a unit in the Gunner position.

Use the instructions in [Adding Vehicles \(on page 599\)](#) to add the following static vehicles to your scenario:

#### NOTE

The **BE** versions of the Spike can be operated from the shoulder of a Trainee. For more information, see Shoulder Operation in the VBS4 Trainee Manual.

- BE Army Static - Woodland > Spike LR
- BE Army Static - Woodland > Spike LR Prone

**i** **NOTE**

This version of the Spike has a lowered Tripod, enabling Trainees to operate the Spike in a prone position. If necessary, Trainees can raise the Tripod to the normal position during a scenario, see in the VBS4 Trainee Manual.

- Generic OPFOR Static - Woodland > Spike LR
- NL Army Static - Desert / Snow / Woodland > Spike LR

Two vehicles in VBS contain spare Missile Tubes (one tube in each vehicle). Use the instructions in [Adding Vehicles \(on page 599\)](#) to add the following wheeled vehicles to your scenario:

- BE Army Wheeled - Woodland > Dingo 2 FUS - ROSS FN Mag
- BE Army Wheeled - Woodland > Dingo 2 FUS - ROSS M2

## 12.23.2 Key Bindings

The CLU unit of the Spike has the following specific key bindings by default.

**i** **NOTE**

Administrators can change these settings. For more information, see Controls Settings in the VBS4 Administrator Manual, and select the **SPIKE LR Specific** category filter for Spike specific controls.

Default	Description	Control Name
V	Enter the <a href="#">Spike LR (on the previous page)</a> .	Toggle Optics
A	Enter the <a href="#">Spike LR (on the previous page)</a> (CCD (gray-scale) and Infra-Red (IR) only).	Missile Seeker / Launcher View Switch
N	Cycle through the available IR modes: <b>White Hot</b> , <b>Black Hot</b> in the <a href="#">Spike LR (on the previous page)</a> .	Cycle Optics (All Modes)
	<p><b>i</b> <b>NOTE</b></p> <p>Only available in the Launcher Electro-Optical View. It is not possible to cycle through these modes in Missile Seeker View.</p>	
Num + / Num -	Zoom in / out in the <a href="#">Spike LR (on the previous page)</a> / <a href="#">Spike LR (on the previous page)</a> (Digital Zoom).	Digital Zoom In / Digital Zoom Out

Default	Description	Control Name
W / S	Zoom in / out in the <a href="#">Spike LR (on page 775)</a> (Optical Zoom).	Optical Zoom In / Optical Zoom Out
Arrow Keys	Move the <b>Lock Indicator</b> when locked-on to a target.	Shift Missile Lock - Direction
Spacebar	Enter <b>MANUAL</b> mode.	Manual Mode

## 12.23.3 Administrator Object Properties Dialog

Administrators / Instructors can adjust some of the Spike simulation settings, including:

- Timings for actions.
- Enabling infinite ammunition for the Launcher.
- Enabling / disabling two-man actions.

**NOTE**

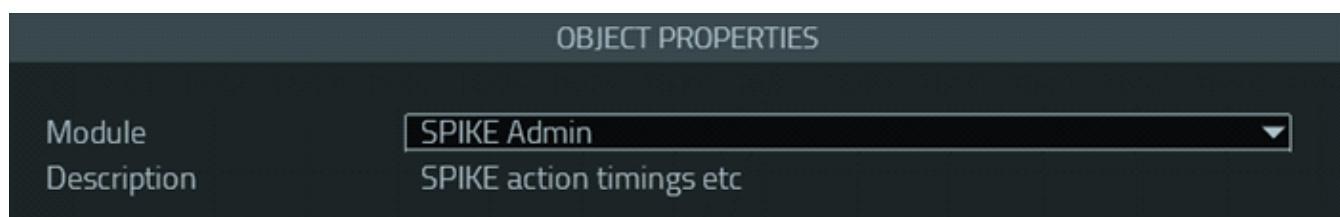
The assembled Spike is primarily intended to be manipulated by two player units. However, if this option is disabled, the Spike can be manipulated by one player unit.

- Missile sensitivity.
- Image degradation.

The dialog is accessed at any time from the **Module** Editor Object (EO), which should be placed on the map in the scenario.

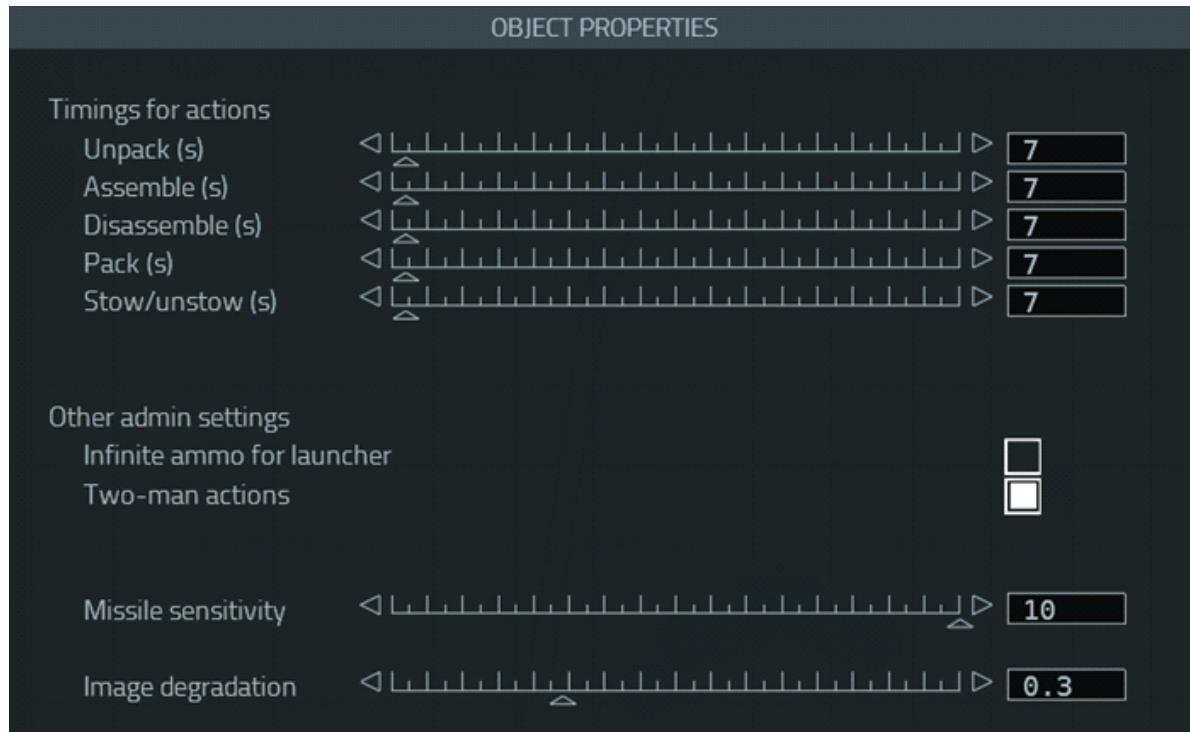
**Follow these steps:**

1. In the Editor Objects list, select **Module**.
2. Double-click anywhere on the map.  
The Object Properties dialog opens.
3. Click the **Module** drop-down, and select **SPIKE Admin** from the list (**Description** automatically updates to **SPIKE action timings etc**).



#### 4. Click OK.

A second Object Properties dialog opens with the following settings:



The settings have the following functions:

Setting	Default	Description
<b>Unpack (s)</b>	7 seconds	Use this slider to adjust the time it takes to unpack the backpacks (up to a maximum of 300 seconds).
<b>Assemble (s)</b>	7 seconds	Use this slider to adjust the time it takes to assemble the Spike missile launcher (up to a maximum of 300 seconds).
<b>Disassemble (s)</b>	7 seconds	Use this slider to adjust the time it takes to disassemble the Spike missile launcher (up to a maximum of 300 seconds).
<b>Pack (s)</b>	7 seconds	Use this slider to adjust the time it takes to pack the backpacks (up to a maximum of 300 seconds).
<b>Stow / Unstow (s)</b>	7 seconds	Use this slider to adjust the time it takes to stow / retrieve the backpacks from a vehicle (up to a maximum of 300 seconds).
<b>Infinite Ammo for Launcher</b>	Disabled	Select to enable infinite ammunition. Doing this means that the Spike does not require reloading when it runs out of ammunition.

Setting	Default	Description
<b>Two-Man Actions</b>	Enabled	Deselect to change all two-user actions (move, assemble, missile reload, and disassemble) to single-user actions.
<b>Missile Sensitivity</b>	10 degrees per second	Adjusts the sensitivity of the control inputs when the Gunner is adjusting (steering) the current aimpoint of an unlocked missile.
<b>Image Degradation</b>	0.3	Move the slider to the right to degrade the image quality of the Missile Seeker View. 1 is maximum degradation.

5. Click **OK** to save the settings.

The **SPIKE Admin EO** appears on the map.



 **TIP**

You can double-click the **SPIKE Admin EO** at any time to reopen the dialog and adjust the settings.

## 12.24 Swedish Body Armor

VBS4 simulates protective equipment worn by Swedish units.

### 12.24.1 Ballistic Helmet

The ballistic helmet provides complete protection from pistol bullets. Larger caliber bullets penetrate the helmet and possibly kill the unit. Non-penetrating bullets dizzy the unit and momentarily reduce its combat effectiveness. Powerful impacts may knock the unit to the ground.

### 12.24.2 Body Armor

Several configurations of Swedish body armor are available. Each configuration provides different levels of protection. Non-penetrating hits dizzy the unit, momentarily reduce its combat effectiveness, and may knock the unit to the ground.

#### NOTE

Shots fired from oblique angles or from a distance may require more hits to penetrate the armor than stated for each configuration.

#### **FMV 1 Configuration**

Provides protection from HE splinter. Does not stop bullets.

#### **FMV 3 Configuration**

In addition to the HE splinter protection from FMV 1, the FMV 3 configuration stops up to two regular 7.62 mm bullets. Armor piercing bullets of the same caliber penetrate the armor.

#### **FMV 5 Configuration**

In addition to the protection from FMV 3, the FMV 5 configuration stops up to two 7.62 mm AP bullets.

### 12.24.3 Equipping a Unit with Body Armor

Units are automatically equipped with body armor when they are placed in VBS Editor. The unit name indicates which armor configuration the unit is going to use. Once placed, the unit armor configuration cannot be changed.

# 13. Objectives Tools and Objects

Enhance VBS4 scenarios by including mission objectives. Objectives may be presented at the start of the mission, during the mission as waypoints, or as triggered events.

- [Adding Markers \(on the next page\)](#)
- [Mission Briefings \(on page 789\)](#)
- [Intelligence Reports \(on page 800\)](#)
- [Add Reference Marks to Missions \(on page 807\)](#)
- [Placing Hidden Objects \(on page 808\)](#)
- [Triggers \(on page 810\)](#)
- [Game Logic \(on page 821\)](#)

## 13.1 Adding Markers

Markers are graphical symbols that can be placed on the 2D map.

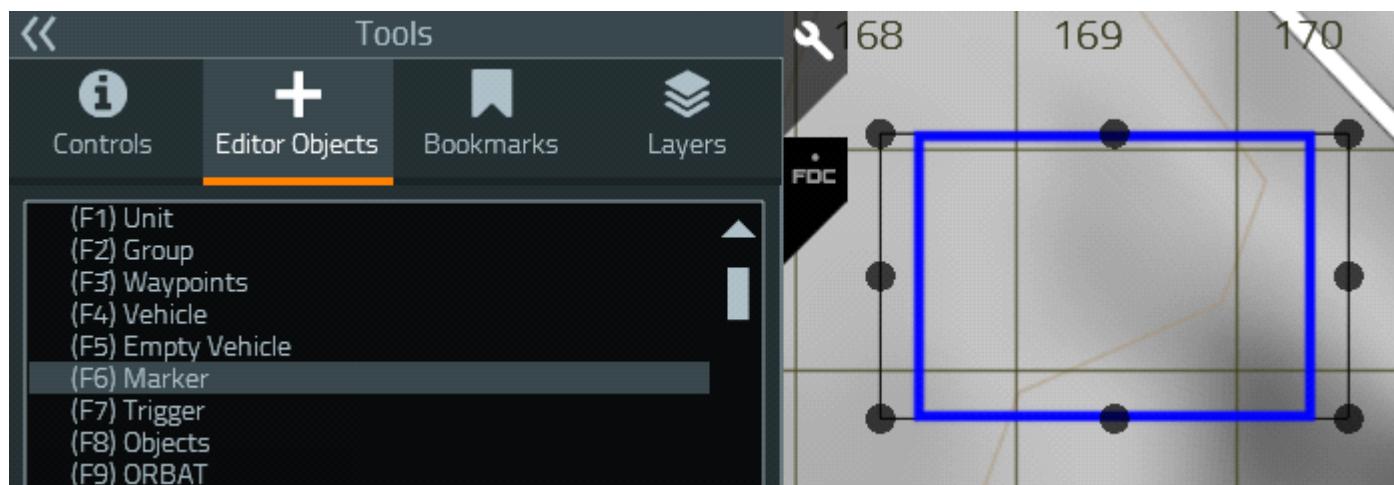
The following considerations apply to markers:

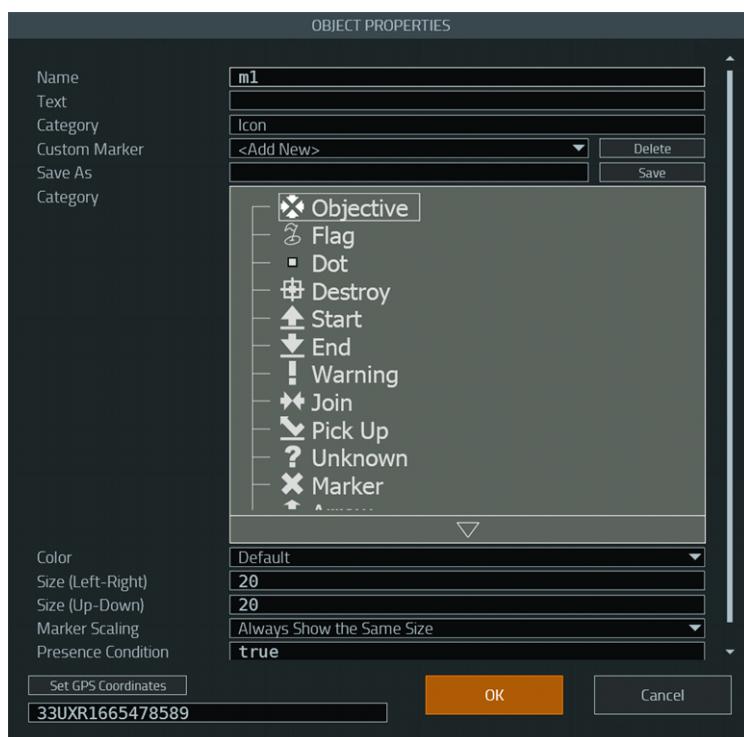
- You can create markers using VBS Editor.
- You can group markers into Marker Overlays, and reuse them across different missions.
- Users and administrators can view markers in 2D.

Markers have three types:

- **Tactical Marker** – These are NATO standard military symbols (based on the APP-6C doctrine), with additional size and type modifiers, depending on the use case.
- **Icon** – This marker type includes military / non-military graphics.
- **Rectangle and Ellipse** – Non-military rectangular and circular area markers, that shade an area of the 2D map.

**Image-202: Configuring a marker**





The following marker aspects are discussed:

- [Create Markers \(below\)](#)
- [Edit Markers \(on page 785\)](#)
- [Marker Overlays \(on page 786\)](#)

### 13.1.1 Create Markers

You can place markers on the map using VBS Editor.

**Follow these steps:**

1. In the Editor Objects panel, select **(F6) Marker**.
2. Double-click on the map where you want to place the marker.

The Object Properties dialog for markers opens.

### 3. Set the marker-specific properties.

The Object Properties dialog defaults to Tactical Marker in the **Category** field. Use the **Category** drop-down to select a different marker type. Choose one of the following:

- If adding a tactical marker (Tactical Marker is selected in the **Category** field), set the following properties:

 **NOTE**

The properties and their values are based on the NATO APP-6C doctrine.

Field	Description
<b>Side Icon</b>	Defines the unit side (for example, friendly, hostile, neutral).
<b>Unit Icon</b>	Defines the unit type (for example, air defense, anti-tank, artillery).
<b>Size Icon</b>	Defines the group size (for example, team, platoon, company).
<b>Modifier Icon</b>	Defines the additional miscellaneous modification options for the Tactical Marker.

- If adding an icon (Icon is selected in the **Category** property), set the following properties:

Field	Description
<b>Category</b>	The graphic icon that is placed on the map (the icon options are visualized in the dialog).

 **NOTE**

This is the second **Category** property in the dialog.

- If adding a rectangle or ellipse (either Rectangle or Ellipse is selected in the **Category** property), set the following properties:

Field	Description
<b>Fill</b>	Defines the fill color for the rectangle / ellipse.
<b>Opacity</b>	Defines the color opacity for the rectangle / ellipse.

4. Set the common marker properties (common to all marker types):

Field	Description
<b>Name</b>	(Advanced) This field is used with scripting, or when referring to the marker in a Waypoint (in the <b>Condition to Complete</b> or <b>Code on Completion</b> fields) or Trigger (in the <b>On Activation</b> or <b>Condition</b> fields).  It can generally be left blank.
<b>Text</b>	This text is displayed alongside the marker on the 2D map.
<b>Custom Marker / Save As</b>	Use these controls to save the currently specified marker to the hard disk, or load a previously saved marker.
<b>Color</b>	Use the drop-down to change the color of the marker on the 2D map, usually to <b>Default</b> (blue).
<b>Size (Left-Right), Size (Up-Down)</b>	These values specify the width and height of the marker. Generally, you can leave these settings at the default value ( <b>20</b> ). You can also change the marker size on the map screen using a marker shortcut (see <a href="#">Edit Markers (below)</a> ).
<b>Marker Scaling</b>	There are two options for this setting: <ul style="list-style-type: none"> <li>• <b>Always Show the Same Size</b> - Default setting. The marker and any added text maintain their same size, regardless of the map zoom.</li> <li>• <b>Scale with Map</b> - The marker and text change size in accordance with the map zoom. They grow / shrink as the map is zoomed in / out.</li> </ul>
<b>Presence Condition</b>	(Advanced) This text box allows you to define a scripted condition that specifies which players are able to see the marker on their 2D map. Computers where the condition field evaluates to <b>true</b> are able to see the marker. Common conditions include: <b>side player == WEST</b> or <b>side player == EAST</b> , meaning that the marker is only visible to human players of the respective side.

5. Click **OK**.

The marker is placed on the map.

### 13.1.2 Edit Markers

Once a marker is placed on the map, you can edit it.

**Copy marker:** Press **Ctrl + C > Ctrl + V**.

**Rotate marker:** Press and hold **LShift**, click and hold the **RMB**, and move the mouse from left to right to rotate the marker.

**Change marker size:**

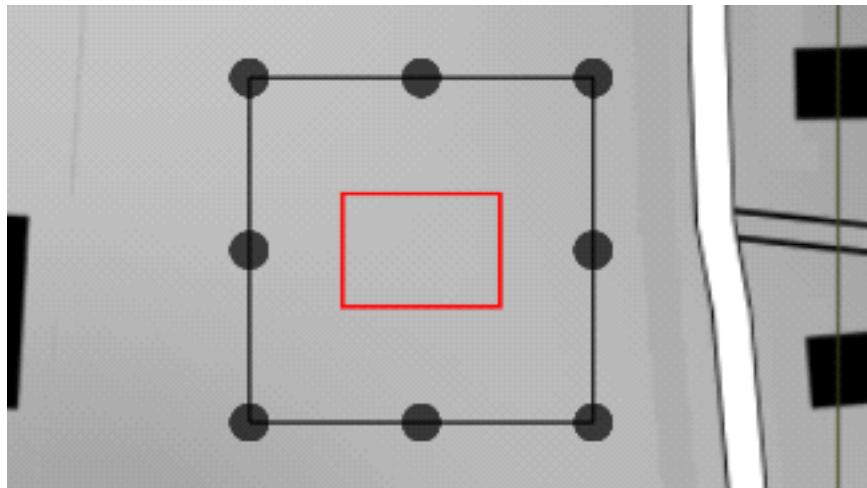
Choose one of the following options:

- Press and hold **LAlt**, click and hold the **RMB**, and move the mouse forwards and backwards to change the marker size in-game.
- Click a bounding-box resize point, and drag it to resize the marker.

**i** **NOTE**

By default, markers resize proportionally.

**Image-203: Marker bounding box**



### 13.1.3 Marker Overlays

Marker Overlays allow you to group markers and reuse them across different missions.

**To create a Marker Overlay, follow these steps:**

1. In the VBS Editor menu, select **Overlays > New Marker Overlay**.
2. Specify the **Overlay Name** and click **OK**.

3. Add markers to the Marker Overlay, using the [Create Markers \(on page 783\)](#) procedure.

 **TIP**

To delete all the markers from the Marker Overlay:

- a. Click **CLEAR**.

The Clear Markers confirmation dialog appears.

- b. Click **YES**.

The Overlay Cleared confirmation dialog appears.

- c. Click **OK**.

All the markers are deleted from the Marker Overlay.



**WARNING**

Use the **CLEAR** option with caution - if you click **SAVE**, the Marker Overlay changes cannot be reversed.

4. Click **SAVE**.

The Layer Saved confirmation dialog appears.

5. Click **OK**.

6. Click **CLOSE**.

The Marker Overlay is saved as a *Marker Overlay Name.marker.biedi* file to:

*\Documents\VBS4\Overlays\* or

*\Documents\VBS4 Other Profiles\Profile Name\Overlays\*

 **NOTE**

Marker Overlays cannot be deleted, using the VBS4 UI. To delete a Marker Overlay, delete its *Marker Overlay Name.marker.biedi* file.

Once the Marker Overlay is created, it can be loaded and committed to any mission.

**To load and commit an existing Marker Overlay, follow these steps:**

1. In the VBS Editor menu, select **Overlays > Load Mission Marker Overlay**.
2. In the **Overlay Name** drop-down, select the Marker Overlay you want to load for your mission.
3. Click **OK**.
4. To commit the Marker Overlay to your mission, click **COMMIT**.

The Commit Markers confirmation dialog appears.

5. Click **YES**.

The Overlay Committed confirmation dialog appears.

6. Click **OK**.

The Marker Overlay markers become Marker Editor Objects in your mission.

## 13.2 Mission Briefings

Mission designers are able to create scenario overviews / instructions in the form of Mission Briefings, which can either be configured to include text and images, or imported to a scenario as pre-made PDFs.

### ★ FEATURE NOTICE

The Mission Briefing temporarily does not display waypoints. For more information, see One AI in the VBS4 Release Notes.



When the scenario starts, everyone sees the Mission Briefing in the Mission Briefing Screen (see Network Lobby in the VBS4 Instructor Manual, and can also access it at any time during the scenario in **Execute / C2 Mode** (see Hide / Show Briefing in the VBS4 Trainee Manual).

### ⚠ WARNING

The Mission Briefing is stored in an HTML file called `language_side_briefing_name.html` (with the naming convention: *two-letter language code\_side\_name*), in your **Battlespaces** folder (see Battlespaces Folder in the Introduction to VBS4 Guide).

You can edit this file, provided you keep the proper HTML / Mission Briefing formatting, and do it when VBS4 is **not** running. Otherwise, any changes are discarded, and an older version of the HTML file is restored.

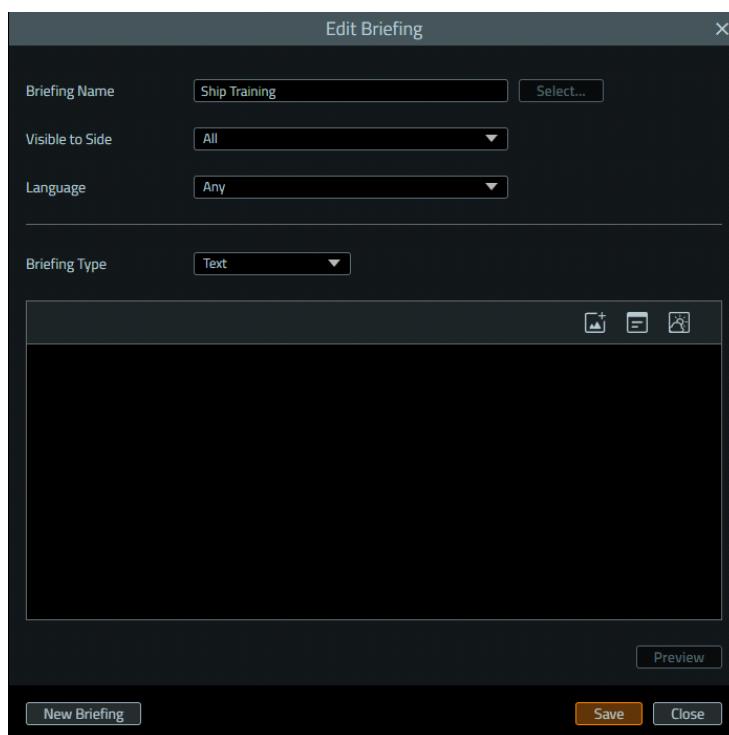
The following is discussed in this topic:

- [Edit Briefing Dialog \(below\)](#)
- [Create Mission Briefings \(below\)](#)
- [Edit Mission Briefings \(on page 797\)](#)
- [Import a Mission Briefing PDF \(on page 798\)](#)
- [Show / Hide the Mission Briefing \(on page 799\)](#)

### 13.2.1 Edit Briefing Dialog

Use the Edit Briefing dialog to create, edit, or preview Mission Briefings.

In **Prepare Mode**, go to the [VBS4 Main Menu for Mission Design \(on page 30\)](#) and select **Edit Briefing** to open the dialog (**Briefing Type** set to **Text** by default).



### 13.2.2 Create Mission Briefings

Use the Edit Briefing dialog to create new Mission Briefings.

**Follow these steps:**

1. In the **Briefing Name** field, input a name for the Mission Briefing.



#### WARNING

Leaving this field blank (or if you do not have the necessary permissions), may result in your Mission Briefing not being saved.

2. Use the **Visible to Side** drop-down to select the side that you want the Mission Briefing to be available to.



3. Use the **Language** drop-down to select the language for the Mission Briefing.



**NOTE**

This only indicates the language of the Mission Briefing you are creating, meaning that you can have multiple languages in one Mission Briefing. It does not translate automatically.

4. Use the **Briefing Type** drop-down to select the format for the Mission Briefing:

Format	Description
Text	<p>Use to create an HTML Mission Briefing, enabling free text input with text formatting, weather data input, and images.</p> <p>For more information, see <a href="#">Add Text (on the next page)</a>, <a href="#">Format the Text (on page 793)</a>, <a href="#">Add Images (on page 794)</a>, and <a href="#">Add Weather Data (on page 795)</a>.</p>
PDF	<p>Use to import a pre-made Mission Briefing PDF to the scenario.</p> <p>For more information, see <a href="#">Import a Mission Briefing PDF (on page 798)</a>.</p>

5. In the Edit Briefing dialog, click **Preview** to see how the completed Mission Briefing looks in the scenario. Click **X** to close the preview.
6. Do one of the following:
  - Click **New Briefing** to clear the Edit Briefing dialog and start again.
  - Click **Save** to save the Mission Briefing.
  - Click **Close** to close the Edit Briefing dialog without saving your changes.

VBS Editor saves the completed Mission Briefing to the following location in the Battlespaces Folder:

\Battlespaces\BattleSpace\_Name\Missions\BattleSpace\_Name\briefings\

### WARNING

There are limitations to the size of Mission Briefings. Large Mission Briefings may take a long time to transfer to other clients, so it is advisable to keep Mission Briefing sizes to a minimum.

### NOTE

Images and PDF files are saved to:

\Battlespaces\BattleSpace\_Name\Missions\BattleSpace\_Name\briefings\data\

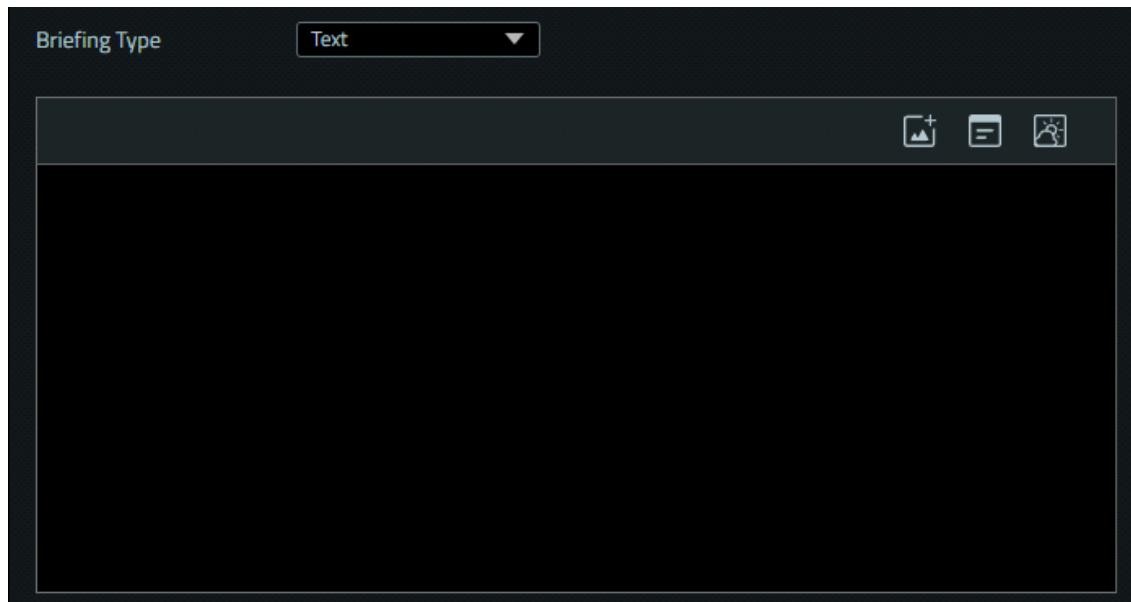
For more information, see Battlespaces Folder in the Introduction to VBS4 Guide.

Image / PDF sizes are automatically adjusted according to the Mission Briefing size (the image / PDF is saved as its original size).

#### 13.2.2.1 Add Text

To add text to your Mission Briefing, click the **Down Arrow** in the **Briefing Text** drop-down, and select **Text**.

Click inside the **Text Box** and type.



### TIP

Since the Mission Briefing is stored in HTML format, use of HTML tags is allowed. For reserved HTML characters (such as `<br>`, ampersand (`&`), greater-than (`>`), or less-than (`<`)), use the respective HTML entities instead.

## Format the Text

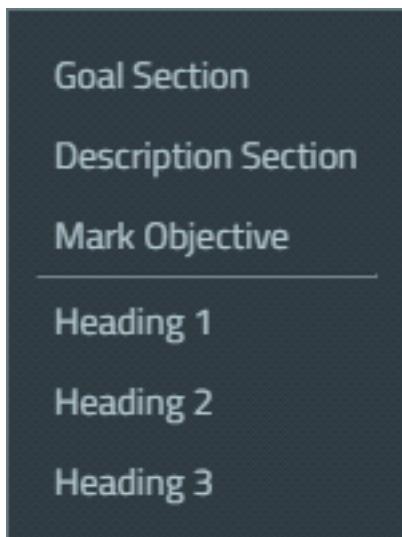
Format any text, as required.

### Follow these steps:

1. Select the **text** you want to apply formatting to, so that it is highlighted.
2. Click the **Format** icon.



3. In the context menu, select the **section / text** style you want to use.



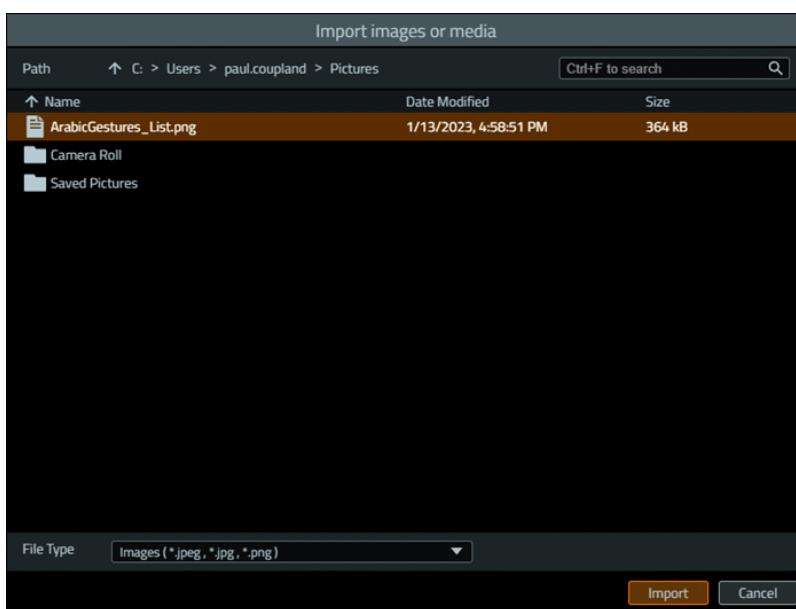
The context menu closes and the selected style is applied to the text.

### 13.2.2.2 Add Images

Add images as required.

**Follow these steps:**

1. Click the location in the **Text Box** where you want to place an image file.
2. Click the **Image** icon to open the **Import Images or Media** dialog.



#### **NOTE**

If you have no previously saved / created Mission Briefing in your mission, the Import Images or Media dialog opens with the **Path** set automatically as:

**C:\Users\your.name\Pictures\**

Once the whole **\briefings\** folder is present on your computer, the default folder for images in the **Path** field becomes **\briefings\data\**.

3. Do one of the following:

- In the **main panel**, navigate through the folder structure (as you would when using Windows Explorer) to find the image file you want.
- Click in the **Search** field at the top-right of the dialog, scroll to the image folder / file you are looking for, and select it.

The selected image folder / file is highlighted in the main panel.

**i** **NOTE**

If you select a folder, you still need to navigate to the image file you want to use.

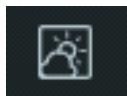
4. When you find the image file you want, and it is highlighted, click **Import**.

### 13.2.2.3 Add Weather Data

Add weather data as required.

**Follow these steps:**

1. Click inside the **Text Box** where you want to place weather data.
2. Click the **Weather** icon.



3. In the context menu, select from the following options:

**NOTE**

- To enable Advanced Ballistics, see Simulation Settings in the VBS4 Administrator Manual.
- For specific vehicles, Gunners are expected to use the values of the following settings with their Fire Control System (FCS) to control turret aiming.

Option	Description
<b>Wind Strength</b>	Can affect Advanced Ballistics. Type a value in meters per second (m/s). For more information, see <a href="#">Wind Speed (on page 290)</a> .
<b>Wind Direction</b>	Can impact Advanced Ballistics. Type a value of N, S, E, W, or combinations of these values. For more information, see <a href="#">Wind Direction (on page 290)</a> .
<b>Air Temperature</b>	Affects air friction, which can impact Advanced Ballistics. Type a value in degrees Celsius (°C). For more information see <a href="#">Air Temperature (on page 295)</a> .
<b>Air Pressure</b>	Barometric Pressure. Affects air friction, which can impact Advanced Ballistics. Type a value in hectoPascals (hPa). For more information, see <a href="#">Atmospheric Parameters (on page 295)</a> .

**NOTE**

These values may change during the scenario. The Mission Briefing only displays the initial values.

**EXAMPLE**

Air Pressure tag added to the [Edit Briefing Dialog \(on page 790\)](#):

```
<x-AirPressure />
```

How Air Pressure appears in the Mission Briefing:

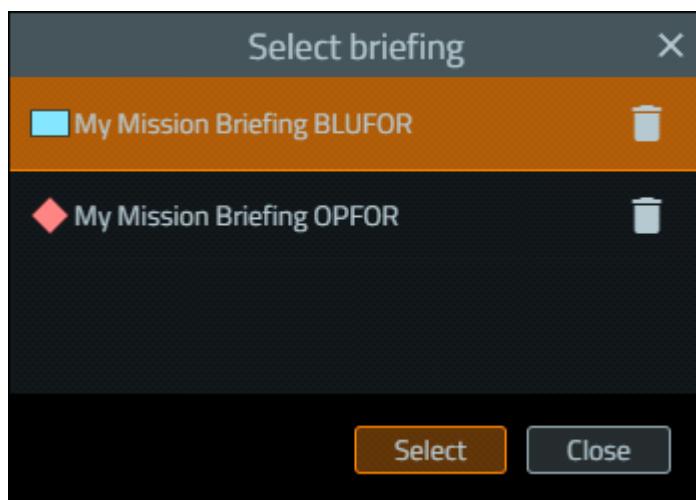
```
1013 hPa
```

**NOTE**

If you change any of the [Weather Settings \(on page 285\)](#) during a scenario, they are automatically updated in the Mission Briefing. However, you must refresh the Mission Briefing (collapse and expand / close and open / switch to a different Mission Briefing and switch back again) to see them.

### 13.2.3 Edit Mission Briefings

In the Edit Briefing Dialog, click **Select** next to the **Briefing Name** field to access existing Mission Briefings.

**TIP**

To delete a previously created Mission Briefing from the list, click the **Trash** icon.



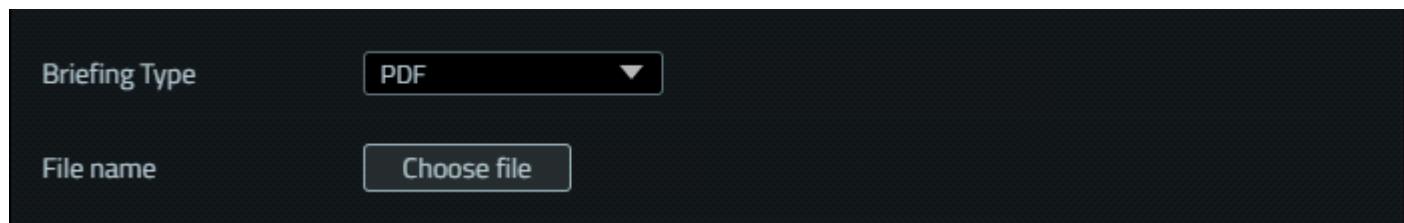
Edit a previously saved Mission Briefing.

**Follow these steps:**

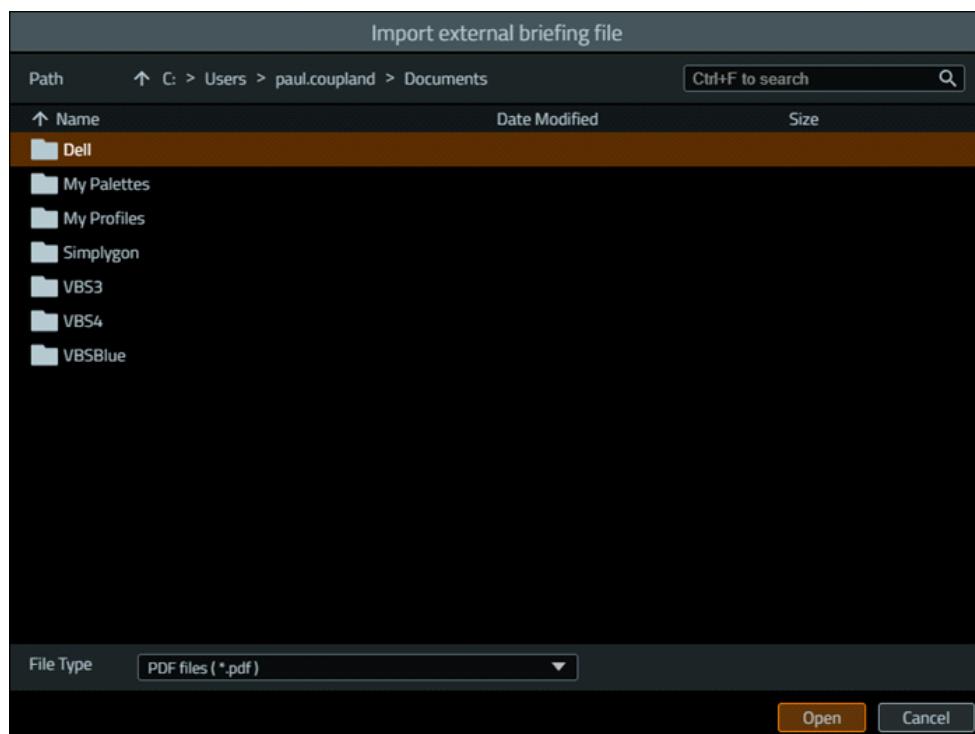
1. Click the **name** of the Mission Briefing you want to edit, so that it is highlighted.
  2. Click **Select**.
- The selected Mission Briefing is loaded into the Edit Briefing dialog.
3. Edit the Mission Briefing as necessary by following steps 2 to 6 in [Create Mission Briefings \(on page 790\)](#).

## 13.2.4 Import a Mission Briefing PDF

To import a pre-made Mission Briefing in PDF format, click the **Down Arrow** in the **Briefing Text** drop-down and select **PDF**.



Click **Choose File** to open the **Import External Briefing File** dialog.



### NOTE

By default, the Import External Briefing File dialog opens with the **Path** set to your **\Documents\** folder:

**C:\Users\your.name\Documents\**

### Follow these steps:

1. Do one of the following:
  - In the **main panel**, navigate through the folder structure (as you would when using Windows Explorer) to find the PDF file you want.
  - Click in the **Search** field at the top-right of the dialog. In the context menu, scroll to the folder you are looking for, and select it.

The selected folder is highlighted in the main panel. Navigate to the PDF file you want to use there.
2. When you find the PDF file you want, and it is highlighted, click **Import**.

The Import External Briefing File dialog closes and the PDF file is added to the Edit Briefing dialog (complete with the file path for reference).
3. Click **Preview** to see how the PDF appears in the Mission Briefing.

### 13.2.5 Show / Hide the Mission Briefing

Provided that **Skip Briefing** is left unchecked (see Network Lobby in the VBS4 Instructor Manual), Mission Briefings appear in the Mission Briefing Screen when you enter a multiplayer session from the Network Lobby. However, they can also be accessed by anyone during scenario runtime.

### Follow these steps:

1. In **Execute / C2 Mode**, go to the **View** menu and select **Show Briefing**.
2. Use the **Select Briefing** drop-down to select the Mission Briefing you want to view.

Select briefing:

(EN) Rescue

The selected Mission Briefing is shown.



#### TIP

To resize the Mission Briefing dialog, drag the bottom-right corner.

3. To hide the Mission Briefing, repeat step 1 and select **Hide Briefing**, or click **X**.



#### TIP

You can also click the **Up Arrow** at the top of the Mission Briefing to collapse it and show only the header.



Click the **Down Arrow** to expand the Mission Briefing.

## 13.3 Intelligence Reports

The Intelligence Reports Editor Object enables selected units to provide intelligence reports to players when questioned, and is configured and linked to units by administrators.

The following are discussed in this topic:

- [Intelligence Reports Configuration \(on page 802\)](#)
- [Linking Intelligence Reports \(on page 804\)](#)
- [Show Conversations Dialog \(on page 805\)](#)

Units that can potentially offer intelligence to a player have an **i** symbol above their heads. The symbol means that a player can talk to them to see if they have any intelligence to provide. There is no guarantee that they actually have any intelligence to provide at that moment in time.

**Image-204: The i symbol indicates that the unit may have intelligence to offer**



To obtain intelligence, player units approach a unit with the **i** symbol above their head, and select the **Ask for intel** 3D World Action (see 3D World Actions in the VBS4 Trainee Manual).

This initiates a conversation with the unit. The administrator can either control the AI unit during the conversation or let the unit respond using a pre-scripted conversation system.

The scripted reports come in the form of simple statements such as:

**"I have seen an OPFOR T-72 500m west from here roughly 1h ago".**

The fidelity of time and distance decreases with greater values (for example, the unit distinguishes between 30min ago and 10min ago, but not between 6h 10min and 6h 30min - in the latter case, the AI simply says "Roughly 6h ago").

### Image-205: Intelligence report



For more information about creating custom conversations for the Intelligence Reports Editor Object, see Conversation System in the VBS4 Scripting Manual.

### 13.3.1 Intelligence Reports Configuration

In VBS Editor, select the **Intelligence Reports** Editor Object in the Editor Objects List, and click the map to create the object.

In the Object Properties dialog, the following properties are used to control intelligence reporting behavior:

Property	Description
<b>Admin control</b>	Controls if the administrator can take control of the specific intelligence conversation. Several options are available: <ul style="list-style-type: none"> <li><b>With timeout</b> - The player requesting intelligence has to wait a certain amount of time before an AI conversation starts. The administrator can take control of the conversation during that timeout, or when the conversation is in progress (see Show Conversations Dialog).</li> <li><b>Never</b> - Administrators do not receive notification about conversations coming from the Intelligence Reports Editor Object, and thus cannot take control of the AI.</li> <li><b>Admin conversation only</b> - The conversation does not start after the timeout elapses, the player has to wait until an administrator either takes control of the AI unit or declines the request.</li> </ul>
<b>Admin control timeout</b>	The timeout for administrator control (can be <code>0</code> ).
<b>Custom conversation</b>	Used to add a customized conversation to the scenario. If set to <code>true</code> , a field is made available to enter the class name of a customized conversation. Customized conversations are configured in a <code>description.ext</code> file in the mission folder.
<b>Units offering intel</b>	This setting controls which units can offer intelligence to the player. The user can either select a side (so that all the units of the selected side can offer intelligence) or the <b>Linked only</b> option, so that only linked units can offer intelligence (see <a href="#">Linking Intelligence Reports (on page 804)</a> ).
<b>Talk to action condition</b>	A scripted condition that can further narrow down which units offer intelligence. The <code>this</code> variable can be used to refer to the unit offering the intelligence. The condition is evaluated every 3-4 seconds.
<b>Look at Player</b>	Set to true to interrupt AI animations and force the AI character to look at the player throughout the conversation.
<b>Gather intel side</b>	Units / vehicles of this side are reported on.

Property	Description
Gather intel on	Units of this type are reported on, including: <ul style="list-style-type: none"> <li>• All</li> <li>• Dismounted</li> <li>• Wheeled</li> <li>• Tracked</li> <li>• Land vehicles</li> <li>• Aircraft</li> <li>• Ship</li> </ul>
Gather intel condition	A scripted condition to further narrow down which unit / vehicles are reported. The <code>this</code> variable refers to the vehicle being considered for report. The condition always runs on the server only.
Chance	Chance that units can offer intelligence. Can have values from 0% (no units) to 100% (all units). Any value in between is treated as a percentage of units that have intelligence to provide. <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <b>EXAMPLE</b> <ul style="list-style-type: none"> <li>• 10 linked units</li> <li>• <b>Chance</b> is set as <code>0.4</code> (40%)</li> </ul> <p>The result is that 4 randomly picked units out of the 10 linked have intelligence to provide.</p> <ul style="list-style-type: none"> <li>• As long as <b>Chance</b> is <math>&gt; 0</math> and there are some affected units, at least one has intelligence to provide. For example, if the chance is set to 0.1 (10%) but there are only two linked units, one unit has intelligence to provide, even though they represent more than 10% of the available units.</li> <li>• When linking additional units, it is guaranteed that the units that had intelligence to provide do not lose it.</li> <li>• Updating <b>Chance</b> during the mission updates the number of units having intelligence to provide according to the following rules:               <ul style="list-style-type: none"> <li>◦ If <b>Chance</b> is increased, the proportional number of units that do not have intelligence to provide, gain it. The units that already have intelligence to provide are not affected.</li> <li>◦ If <b>Chance</b> is decreased, the proportional number of units that have intelligence lose it.</li> </ul> </li> </ul> </div>
Intel range (m)	Units offering intelligence detect units to report on within this distance radius (there is no line of sight check). Range is measured in meters.

Property	Description
<b>Intel accuracy</b>	Allows you to specify the form in which the intelligence report is presented: <ul style="list-style-type: none"> <li><b>Accurate description</b> - The full unit display name is reported (such as <b>Rifleman M16A4</b> or <b>T-72 Modern Loadout</b>).</li> <li><b>Vehicle class only</b> - Only the rough type of the unit / vehicle is reported (such as <b>tank</b> or <b>car</b> or <b>man</b>).</li> </ul>
<b>Max intel count</b>	Every unit offering intelligence can only hold this many sightings in memory at one given time (a value of <b>-1</b> means infinite).
<b>Max intel age (h)</b>	Sightings older than this are discarded from memory (in-game time). A value of <b>-1</b> means all entries are kept. Age is measured in hours.

### NOTE

Changing any of the **Gather intel** settings (side / on / condition) filters the current memory of all Intelligence units.

For example, the following sequence occurs:

- Unit is set to report on BLUFOR.
- A BLUFOR tank passes by, then an OPFOR truck.
- Unit remembers the BLUFOR tank.
- **Gather intel side** gets changed to OPFOR.
- Unit forgets about the BLUFOR tank as it no longer matches the settings (it does not, however, remember the OPFOR truck from before the side was changed).
- An OPFOR truck passes by again and the unit remembers it.

## 13.3.2 Linking Intelligence Reports

Once the Intelligence Reports settings are finalized, you should ideally link the Intelligence Editor Object to a specific unit(s) that you want to be able to provide intelligence.

**Follow these steps:**

1. Right-click the **Intelligence Reports Editor Object**, and select **Link to Unit**.
2. Click the **unit** you want to link to (multiple units need to be added one at a time).

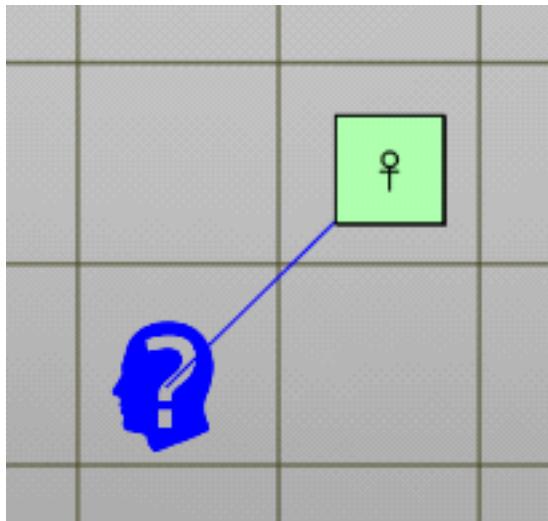
The unit is linked and can provide intelligence.

### NOTE

Depending on the **Chance** setting, not all units that are linked provide intelligence.

**⚠️ WARNING**

Unlinking a unit from the Intelligence Reports Editor Object causes that unit to forget any acquired intelligence. Subsequent re-linking of that unit does not retrieve any of the forgotten intelligence.

**Image-206: Intelligence Reports Editor Object linked to a civilian unit**

### 13.3.3 Show Conversations Dialog

This dialog allows administrators to intervene in a scenario and take over the role of the Intelligence AI unit.

When a player unit selects the **Ask For Intel** 3D World Action, an administrator can view the conversation between the player and the Intelligence AI unit, and assume the AI role.

**ℹ️ NOTE**

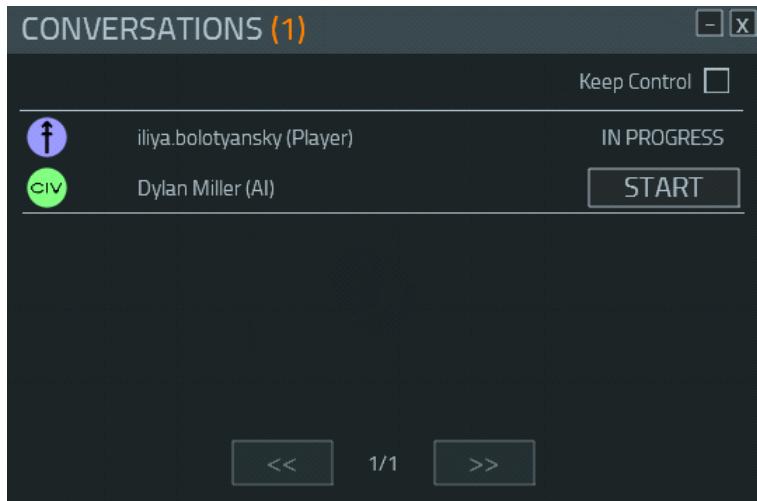
This functionality only works if the [Admin control \(on page 802\)](#) parameter in the Object Properties dialog is set to **With timeout** or **Admin conversation only**.

**Follow these steps:**

1. In VBS Editor in Execute mode, select **View > Show Conversations** to open the Show Conversations dialog.

- When a player selects **Ask For Intel**, the dialog populates and you see the conversation.

#### Image-207: Show Conversations dialog populated



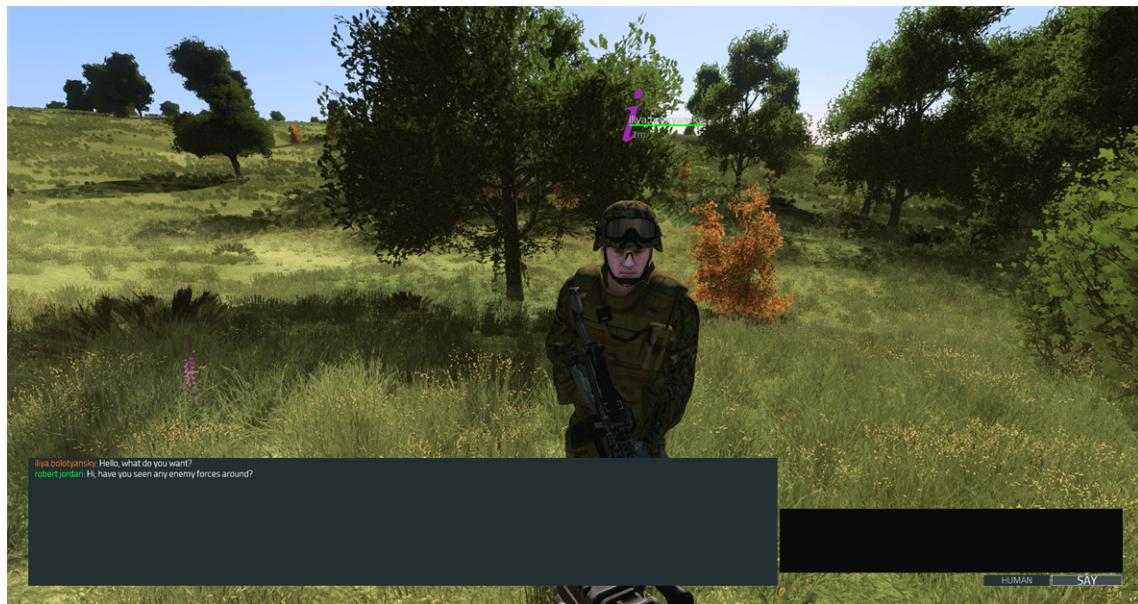
#### **i** NOTE

To keep control of the AI unit after the conversation ends, select **Keep Control**.

- To assume the role of the Intelligence AI unit, click **Start**.

You see the following view with two text boxes. The box on the left displays the conversation, the box on the right with the cursor is used by the administrator to type text.

#### Image-208: Example conversation between the administrator and a player



- When you have finished conversing with the player, press **Esc**.
- Click **X** at the top-right of the Show Conversations dialog to close it.

## 13.4 Add Reference Marks to Missions

Reference marks are an alternative to waypoints, offering greater flexibility to mission editors.

### **NOTE**

For Trainee usage, see Add User Reference Marks (0-8-1) in the VBS4 Trainee Manual.

Reference marks differ from waypoints in the following ways:

- Unlike waypoints, reference marks are persistent, and remain in place.
- They are active, but deactivate under the following conditions:
  - Autocomplete - When a unit / vehicle arrives at the reference mark.
  - Not Autocomplete - When the reference mark is manually deactivated.

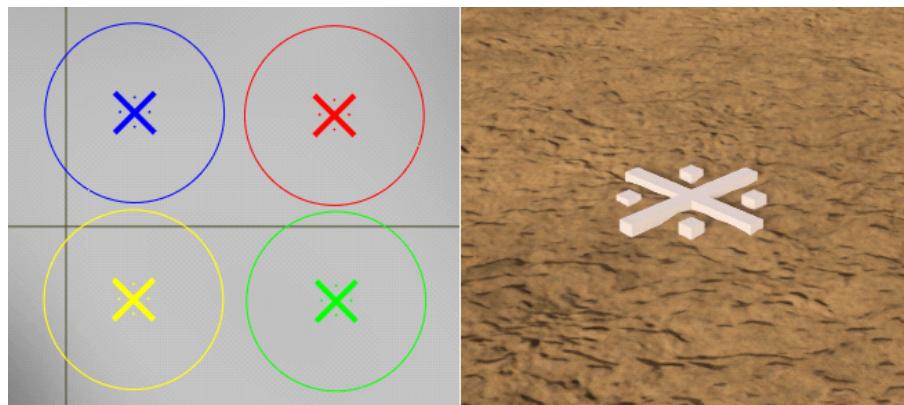
**Follow these steps:**

1. In the Editor Objects List, select **Reference Mark**.
2. Double-click a location on the map to open the Object Properties dialog.
3. Input the **Mark Name**, and the **Side** it is visible to.
4. Set **Autocomplete**:
  - **true** - The reference mark deactivates on arrival.
  - **false** - The reference mark stays active until manually deactivated.
5. Click **OK**.

VBS Editor adds the reference mark to the map at the specified location.

### **NOTE**

Reference Marks must be activated during Scenario Execution to become visible and to auto-complete. For more information, see Add User Reference Marks (0-8-1) in the VBS4 Trainee Manual.



## 13.5 Placing Hidden Objects

VBS4 enables objects (such as IED manufacturing components) to be hidden in other objects.

VBS4 supports the following object types as searchable containers:

- Buildings
- Objects such as Ammunition Boxes and Refrigerators.
- USMC Land Vehicles

### NOTE

All objects that support searching (except USMC vehicles) have **(s)** at the end of their names in VBS Editor.

**Follow these steps:**

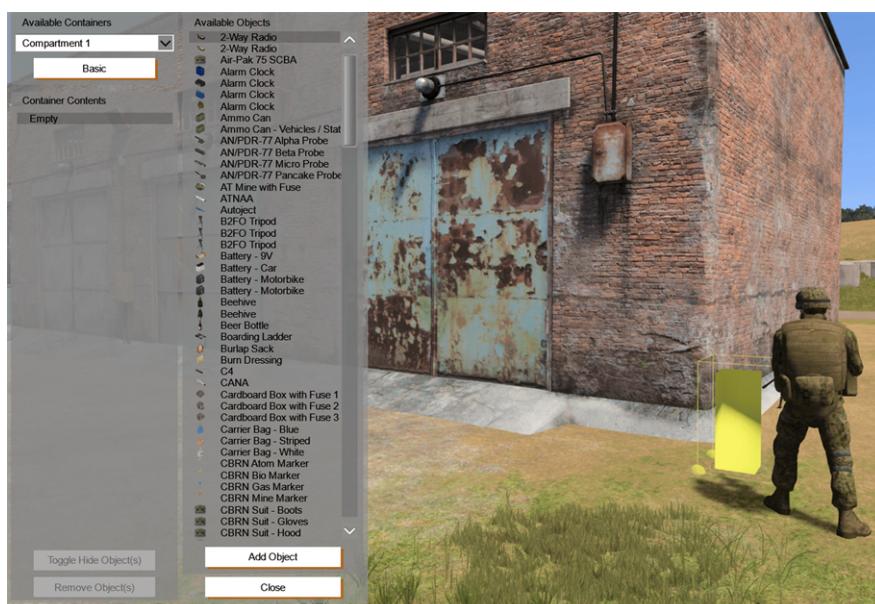
1. In Prepare mode, place a supported container object.

### TIP

Use **(s)** in the filter of the Object Properties dialog to look for objects that support searching, or select from the USMC land vehicle categories.

2. Right-click the object, and select **Equip with Objects** (for vehicles, **More... > Equip with Objects**).

The Equip Objects dialog opens.



3. Use the Available Containers drop-down so select the compartment to hide objects in.

4. To add objects to the container:

- Drag objects from the Available Objects list to the Container Contents list.
- Select an object in the Available Objects list and click **Add Object**.
- Double-click an object in the Available Objects list.
- Drag objects from the Available Objects list to the container in the 3D editor view.

VBS Editor adds the objects to the Container Contents.

 **NOTE**

The Available Objects list only displays objects that fit in the container.

5. **Optional:** Select objects in the Container Contents list and click **Toggle Hide Objects** to force them to be detected before they appear in the container Equipment Inventory in the VBS4 Trainee Manual.

Objects requiring detection are marked with an asterisk \*.

6. To remove objects from the container:

- Drag-and-drop objects from the Container Contents list to the Available Objects list.
- Select an object in the Container Contents list and click **Remove Object**.
- Double-click an object in the Container Contents list.

7. **Optional:** Click **Basic / Advanced** to view controls for the orientation and placement of objects in the container. This may be required in some cases to place large objects in small containers.

 **NOTE**

The Advanced controls apply to all objects in the container, and cannot be applied individually.

8. Press **Esc** or click **Close** to exit the Equip Objects dialog.

The container object contains the hidden objects in the specified compartments. You can move the object with its hidden objects.

The container objects are searchable when the scenario starts. For more information, see Search for Hidden Objects in the VBS4 Trainee Manual.

## 13.6 Triggers

A Trigger is an abstract game entity that waits until a certain condition returns true (for example, a unit or vehicle enters a specific area) and then carries out a specific action (for example, once a unit or vehicle has entered a specific area, an enemy ambush commences).

The location and dimensions of a Trigger are not always relevant, nor does a Trigger need to have any activation effects. Triggers may be linked to a unit or vehicle Editor Object, which means that only the linked unit or vehicle can activate the Trigger.

This topic covers the following Trigger aspects:

- [Basic Trigger Settings \(below\)](#)
- [Advanced Trigger Settings \(on page 816\)](#)
- [Trigger Shortcuts \(on page 819\)](#)
- [Trigger Linking \(on page 819\)](#)

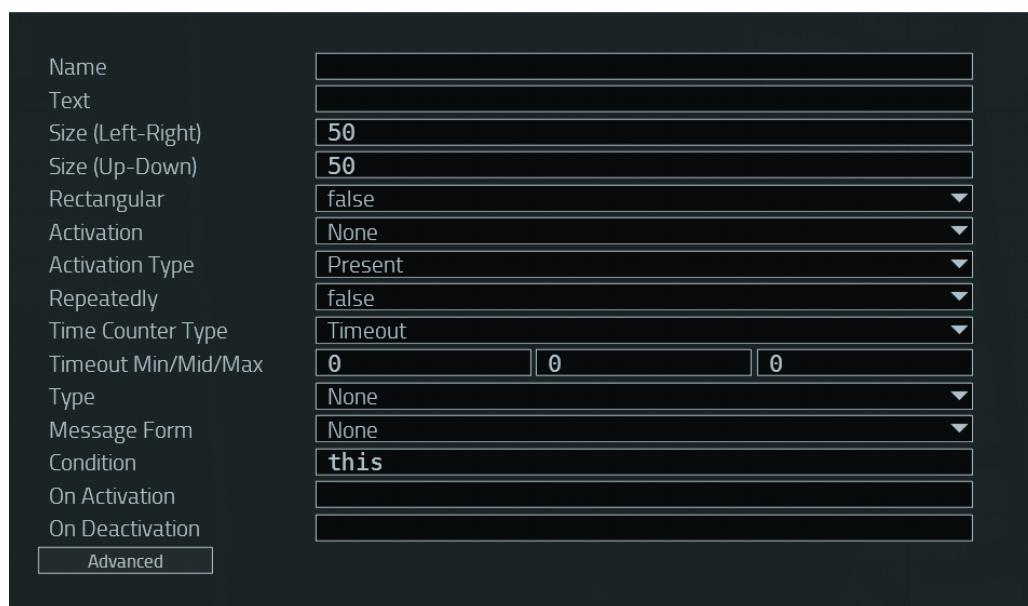
### 13.6.1 Basic Trigger Settings

You can add a Trigger to the map by specifying the basic Trigger settings.

**Follow these steps:**

1. Click the **Trigger** Editor Object type in the Editor Objects List, and double-click the 2D map.

The Trigger dialog appears:



2. Fill in the **Basic Trigger Settings** (on the next page) (for advanced settings, see [Advanced Trigger Settings \(on page 816\)](#)):

**NOTE**

In a multiplayer environment, scripts running in the **Condition**, **On Activation**, **On Deactivation** fields are executed on each computer locally across the network. If the aim of a Trigger script is to execute once and have a global effect, an additional check must be added to make sure that the script does not run multiple times. In some cases, to synchronize the Trigger state across the network, a delay should be introduced (for example, if the Trigger activation leads to vehicle destruction) to avoid incorrect scenario behavior.

**WARNING**

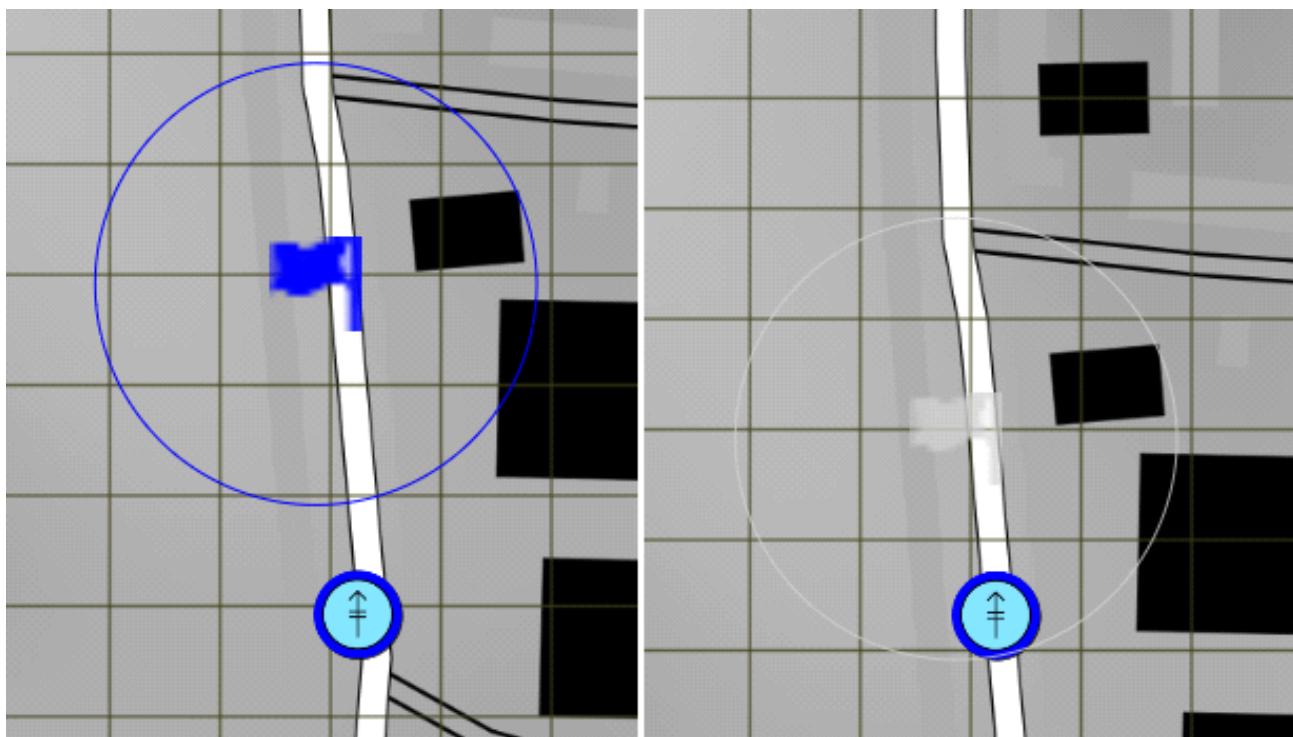
Administrators / Instructors who join a scenario in progress should be aware that they may see Trigger symbols on the 2D Map and Trigger options on the radio visualization, suggesting that they were not triggered when, in fact, they were and should be disabled.

3. Click **OK** to create the Trigger.

The Trigger appears in the 2D view of VBS Editor.

When activated, the Trigger icon changes from **blue** to **gray**.

**Image-209: Trigger icon / activated Trigger icon**



## Basic Trigger Settings

Field	Description
<b>Name</b>	Defines the name of the Trigger, allowing it to be used in script code. The name must comply with normal variable name rules (no spaces, reserved characters or words allowed, and duplicate name warnings may not be given).
<b>Text</b>	If the Trigger is activated by a radio command, this text replaces the default radio command name in the command menu, and in the radio visible on the mission map.
	
	This text is also displayed in VBS Editor when the mouse cursor hovers over the Trigger, allowing the user to quickly identify what the Trigger is and what it does.
<b>Size (Left-Right), Size (Up-Down)</b>	These two options define the dimensions of the Trigger in meters, assuming the Trigger has not been rotated. For example, a Trigger area may be 50m x 50m, meaning that any unit that moves into this area activates the Trigger.
<b>Rectangular</b>	Defines whether or not the Trigger is shaped as a rectangle or an ellipse.

Field	Description
<b>Activation</b>	<p>Provides a number of activation methods for the Trigger, and determines the value of the variable <b>this</b> in the <a href="#">Condition (on page 815)</a> field, each time the Trigger is evaluated.</p> <p><b>NOTE</b> If the Trigger is linked to a unit or group, only the relevant options are available.</p> <p>The options are:</p> <ul style="list-style-type: none"> <li>• <b>None</b> - The Trigger relies solely on the result of the <a href="#">Condition (on page 815)</a> field to determine whether or not the <a href="#">On Activation (on page 816)</a> code needs to be executed.</li> <li>• <b>OPFOR, BLUFOR, Independent, Civilian, Anybody</b> - Defines which unit side can activate the Trigger. For example, if activation is set to <b>OPFOR</b>, the Trigger executes the <a href="#">On Activation (on page 816)</a> code when an OPFOR unit or vehicle enters the Trigger area.</li> <li>• <b>Game Logic</b> - Activated by a Game Logic (GL) object. For more information, see <a href="#">Game Logic (on page 821)</a>.</li> <li>• <b>Radio Alpha - Radio Tango</b> - This Trigger is activated by a radio command available to all players who are group leaders and / or administrators (using the Command Menu, see 0. Radio in Commanding Subordinates in the VBS4 Trainee Manual).</li> </ul>  <ul style="list-style-type: none"> <li>• <b>Seized by BLUFOR / OPFOR / Independent</b> - The Trigger activates when the seizing side is deemed to be in control of the area. This Trigger type works with timeout values - a low level of presence activates the Trigger after a period of time closer to the maximum timeout, and the other way around. Depending on unit types, the seizing side can be outnumbered and still satisfy the minimum required level of presence for the maximum timeout.</li> </ul> <p><b>NOTE</b> You can force the activation of a Trigger in Execute mode - right-click the Trigger in 2D view and select <b>Activate Trigger</b>.</p>

Field	Description
<b>Activation Type</b>	<p>If the Trigger activator is a side or an object, the Trigger is activated if that side / object is or is not present in the Trigger area.</p> <p>To be considered present, an object must be alive (or not destroyed). The options are:</p> <ul style="list-style-type: none"> <li>• <b>Present</b> - The Trigger activates when an object matching the <a href="#">Activation (on the previous page)</a> setting is in the Trigger area.</li> <li>• <b>Not Present</b> - The Trigger activates when no object matching the <a href="#">Activation (on the previous page)</a> setting is in the Trigger area.</li> <li>• <b>Detected by BLUFOR - Detected by Civilians</b> - The Trigger activates when a unit of the specified side is first detected. It has no relation to Trigger location or size. A unit is considered detected when the leader of any other group of a different side first identifies the unit in-game.</li> <li>• <b>EngagementStart</b> - The Trigger activates when an engagement starts.</li> <li>• <b>EngagementEnd</b> - The Trigger activates when an engagement ends.</li> </ul>
	<div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"> <span style="color: #0070C0; font-size: 1.5em; border-radius: 50%; width: 1.2em; height: 1.2em; display: inline-block; vertical-align: middle; margin-right: 0.2em;"></span> <b>NOTE</b>            Also depends on <b>Defeat Timeout</b> (see <a href="#">Define Scenario Settings (on page 278)</a>).         </div>
<b>Repeatedly</b>	<p>Defines how many times the Trigger can be activated. A setting of <b>true</b> means that the Trigger can be activated more than once.</p> <p>Only repeatable Triggers can be deactivated, since single-use (non-repeatable) Triggers remain active for the duration of the mission. Most repeatable Triggers can only be reactivated once they have been deactivated (radio Triggers do not follow this rule).</p>
	<div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"> <span style="color: #0070C0; font-size: 1.5em; border-radius: 50%; width: 1.2em; height: 1.2em; display: inline-block; vertical-align: middle; margin-right: 0.2em;"></span> <b>NOTE</b>            If set to <b>true</b>, the Trigger icon remains blue throughout the scenario, if set to <b>false</b>, the Trigger icon changes to gray when it is activated, see <a href="#">Trigger icon / activated Trigger icon (on page 811)</a>.         </div>
<b>Time Counter Type</b>	<p>Selects the type of countdown timer used for the Trigger:</p> <ul style="list-style-type: none"> <li>• <b>Countdown</b> - The condition must be true for the entire length of the timer before the Trigger activates.</li> <li>• <b>Timeout</b> - Once the condition is met, the timer runs, and then the Trigger activates (does not matter if the condition is no longer true at this point).</li> </ul>
<b>Timeout Min/Mid/Max</b>	<p>These counters add a degree of randomness to Triggers to make Trigger activation less obvious to the player. These values specify a delay in seconds prior to Trigger activation. The <b>Min</b>, <b>Mid</b>, and <b>Max</b> values define the delay in seconds, and if the values are different, then a random value between them is determined.</p>

Field	Description
Type	<p>These are several types of Trigger activation effects and abstract types that are generally unavailable through script code. They take place immediately after the <a href="#">On Activation (on the next page)</a> code block is executed.</p> <p>The options are:</p> <ul style="list-style-type: none"><li>• <b>None</b> - The Trigger has no effect other than that which is scripted in the <a href="#">On Activation (on the next page)</a> block (this is the default).</li><li>• <b>Guarded by BLUFOR / OPFOR / Independent</b> - The Trigger center point defines a point to be guarded. A group must be linked to the Trigger for this option to be valid.</li></ul>
	<div style="border: 1px solid #ccc; padding: 10px; margin-bottom: 10px;"><p><b>NOTE</b></p><p>While available in the menu, these three options are not implemented in VBS4.</p></div>
	<div style="border: 1px solid #ccc; padding: 10px; margin-bottom: 10px;"><p><b>NOTE</b></p><p>This option is deprecated.</p></div>
	<div style="border: 1px solid #ccc; padding: 10px; margin-bottom: 10px;"><p><b>NOTE</b></p><p>This option is deprecated.</p></div>
Message Form	<p>Use the drop-down to select a form to be automatically sent when the Trigger activates (<a href="#">Contact Report</a>, <a href="#">LOCSTAT</a>, <a href="#">MEDEVAC</a>).</p> <p>For more information about forms, see <a href="#">Using Forms in the VBS4 Trainee Manual</a>.</p>
Condition	<p>The Trigger activates when this script code block returns true. In the script code block, the variable <b>this</b> refers to any conditions chosen in the <a href="#">Activation (on page 813)</a> options above, and <b>thisList</b> refers to an array of objects that are currently inside the Trigger area and are on the activation side or option chosen (<b>thisList</b> does not always refer to units that are activating the Trigger).</p> <p>If the activation type is not side related, <b>thisList</b> returns an empty array, and a seized-by-side Trigger returns units of any side. If you leave the <a href="#">Condition (above)</a> box blank, the Trigger never activates. Using a script code based condition allows for the creation of more complex activation requirements, including multiple <b>and</b> / <b>or</b> conditions.</p>

Field	Description
<b>On Activation</b>	This script code block is executed when the Trigger conditions are met, irrespective of the Trigger type. Any actions defined by the Triggers type take place immediately after this activation block begins.
<b>On Deactivation</b>	This script code block is executed the first time a repeatable Trigger condition returns false after having been previously true. Radio Trigger types do not deactivate, or at least never execute the <b>On Deactivation</b> block. As for the <b>On Activation (above)</b> block, the special variables <b>thisList</b> and <b>this</b> retain the same meanings.

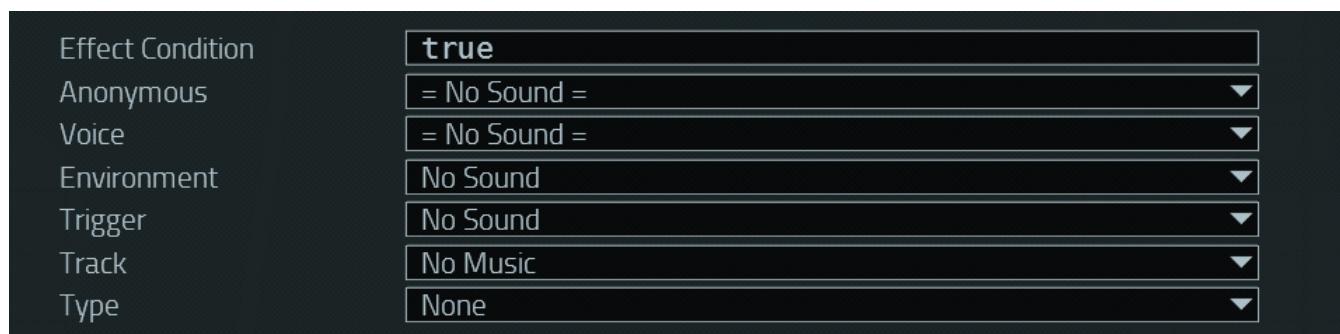
## 13.6.2 Advanced Trigger Settings

You can specify advanced Trigger settings add effects to the Trigger behavior.

### Follow these steps:

1. To specify advanced settings, click the Trigger object on the map, and click **Advanced**.

The advanced Trigger settings appear in the Trigger dialog:



2. Fill in the following fields:

Field	Description
<b>Effect Condition</b>	Must evaluate to true (in addition to the main Trigger condition) for the effect to be activated.
<b>Anonymous</b>	A sound effect that is played everywhere.
<b>Voice</b>	A sound effect that comes from the position of the Trigger.
<b>Environment</b>	A non-locational sound (for example, wind) that seems to come from everywhere.
<p><b>NOTE</b> The options <b>Meadows</b> and <b>Trees</b> are deprecated, and therefore, non-functional.</p>	
<b>Trigger</b>	A brief sound effect (for example, alarm bell).
<b>Track</b>	An ambient sound effect (such as music), based on the values available in the drop-down, that plays when the effect condition is true and the trigger is activated. To insert other custom sound effects, see Custom Sounds and Conversations in the VBS4 Scripting Manual and Sound Configuration in the VBS Developer Reference.
<p><b>NOTE</b> The other custom sound effects are not added to the <b>Track</b> drop-down.</p>	

3. Specify the [Type Effects \(on the next page\)](#).

4. Click **OK** to update the Trigger.

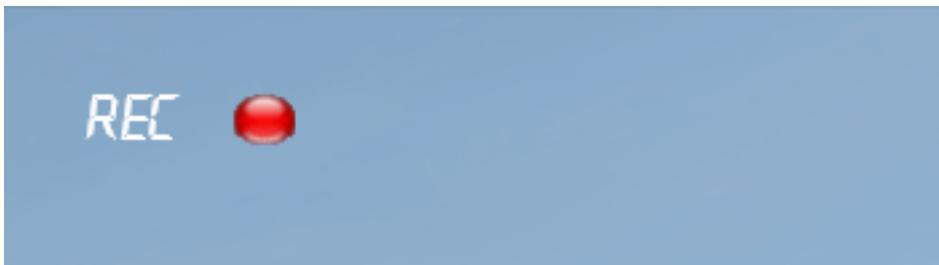
The Trigger is updated with the advanced settings.

## Type Effects

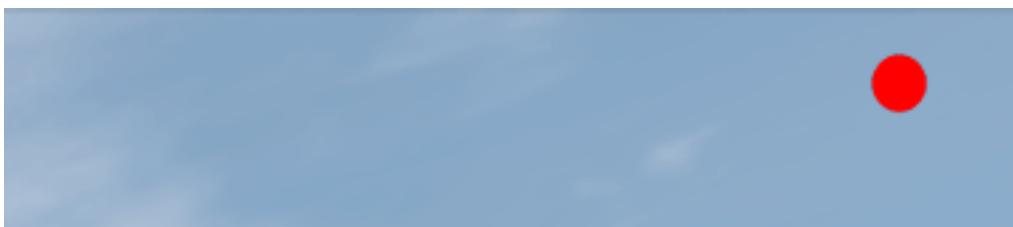
- **None** - No effect.
- **Resource** - Offers several game resources that can be displayed (each game resource has additional fade effects that can be specified in the **Effect** field, see [Fade Effects \(below\)](#)):
  - **binocular** - Displays a binoculars view:



- **RECORDing** - Displays a recording sign:



- **Recording sign** - Displays another recording sign:



- **Object** - Even though it is selectable, no options are available for this effect type in VBS4.
- **Text** - The message to display.

## Fade Effects

The fade effects are:

- **PLAIN** - Displays the specified text / object / resource.
- **PLAIN FADED** - Displays the specified text / object / resource. Plain text is shown near the bottom of the screen.

- **BLACK** - Causes the screen to turn completely black, and displays the optional text / object / resource. All other GUI is hidden behind this black screen.
- **BLACK FADED** - Causes the screen to turn completely black without fading in, and displays the optional text / object / resource. All other GUI is hidden behind this black screen. If **speed** is not specified, the black screen and the displayed element disappears instantly after 5-10 seconds. Otherwise, it stays black with the element still visible.
- **BLACK OUT** - Same as **BLACK**.
- **BLACK IN** - Reveals the GUI after the black screen is withdrawn along with the optional text / object / resource.
- **WHITE OUT** - Causes the screen to turn completely white, and displays the optional text / object / resource. All other GUI is hidden behind this white screen. This can easily blind the player, so it should be used with caution. Make sure that fade-in time is set when using this option.
- **WHITE IN** - Withdraws the white screen and reveals the GUI.

### 13.6.3 Trigger Shortcuts

Triggers can be copied and pasted just like all other Editor Objects.

Once a Trigger is added, there are two specific mouse and keyboard combinations that can be used:

- **Rotate Trigger** - Hold **LShift**, hold the **RMB**, and move the mouse left to right to rotate the Trigger once it is added to the map (as if you are rotating a unit or vehicle).
- **Change Trigger Activation Area** - Hold **LAlt**, hold the **RMB**, and move the mouse forward and back to change the size of the Trigger activation area in-game.

### 13.6.4 Trigger Linking

It is possible to link units and vehicles to Triggers.

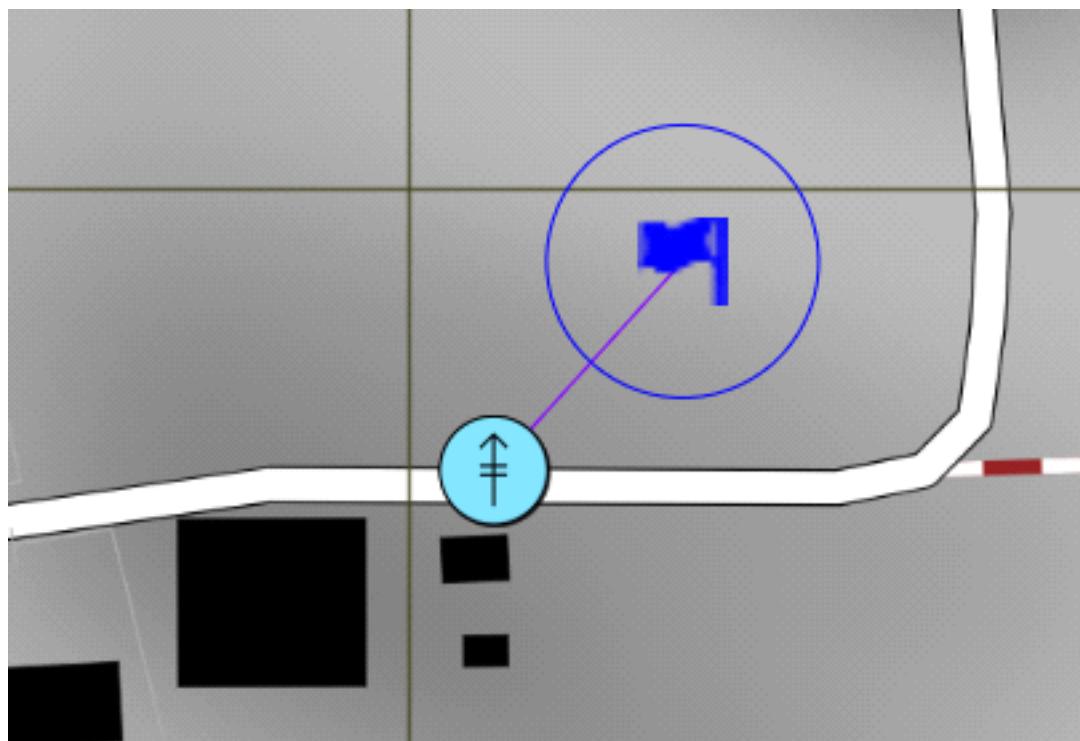
**Follow these steps:**

1. Right-click a unit or a vehicle Editor Object in the VBS Editor 2D view.
2. Click **More... > Attach to Trigger** in the context menu.

The link arrow is drawn from the Trigger to the mouse cursor position.

3. Click the Trigger you wish to link to.

A line is drawn from the unit or vehicle to the Trigger to indicate the link.

**Image-210: A vehicle linked to a Trigger**

Once the link is in place, the Trigger does not activate unless all linked units and vehicles are within the Trigger area.

**NOTE**

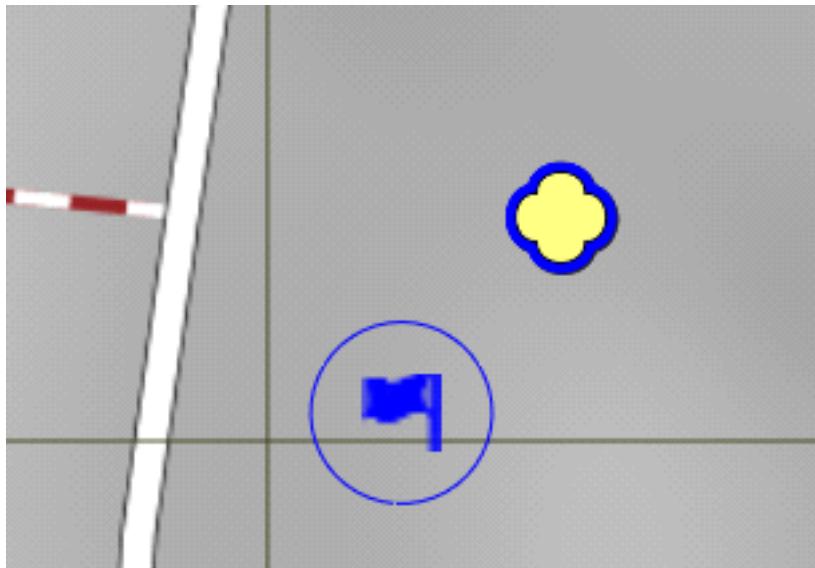
If you set **Activation** to **Radio**, the other units linked to the Trigger do not affect the Trigger activation - making a radio call is enough to activate the Trigger.

To clear a Trigger link, repeat steps 1 and 2 of the previous procedure, and click an empty space in the 2D view.

## 13.7 Game Logic

The Game Logic (GL) object is invisible, and can be used as a helper object. It is considered as a Unit (even though it does not perform any actions by itself), and can be found at **(F1) Unit > VBS Objects > Game Logic**.

**Image-211: GL object (top) and a GL-activated trigger (bottom)**



The GL object is usually used with conditional triggers (see **Activation > Game Logic** in [Triggers \(on page 810\)](#)).

GL objects can also be created using the [`createUnit`](#) (<https://sqf.bisimulations.com/display/SQF/createUnit>) script command.

### NOTE

In multiplayer, a GL object is always local to the host computer, if it is placed while the mission is running (either using Execute mode or [`createUnit`](#) (<https://sqf.bisimulations.com/display/SQF/createUnit>)). This applies to dedicated and player-hosted servers.

## 14. Support Tools and Objects

During a scenario, players may request or administrators can provide additional mission support.

- [Aerial Delivery System \(on the next page\)](#)
- [Artillery Strike \(on page 830\)](#)
- [Close Air Support \(on page 835\)](#)
- [VBS Call for Fire - FDC UI \(on page 842\)](#)
- [IR Laser \(on page 860\)](#)
- [MEDEVAC / CASEVAC \(on page 862\)](#)

## 14.1 Aerial Delivery System

The Aerial Delivery System enables you to create an instant or event driven airborne cargo drop. Airborne cargo drops can be created by a mission designer in Prepare mode, or by an administrator in Execute mode.

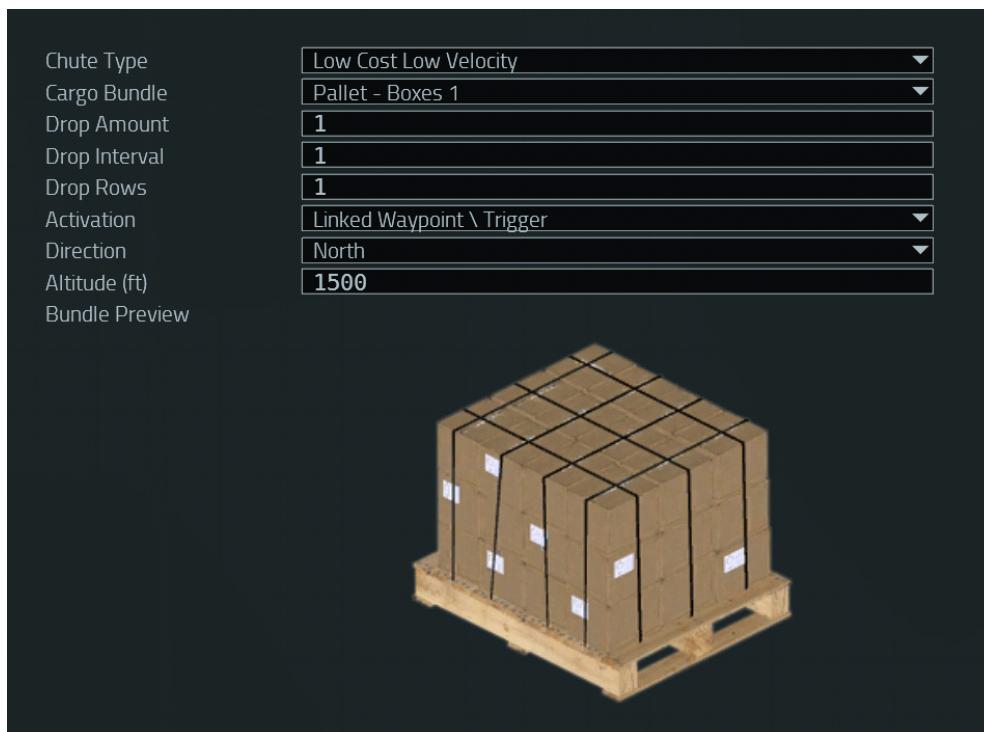
### **WARNING**

It is not possible to set the inventory contents of an airborne cargo drop, and once on the ground, the inventory appears to be empty.

#### Follow these steps:

1. In VBS Editor, select **Module** from the Editor Objects List.
2. Right-click a location on the map, and select **New Object**.
3. Expand the **Module** drop-down, select **Aerial Delivery System**, and click **OK**.

The Aerial Delivery System Object Properties dialog opens:

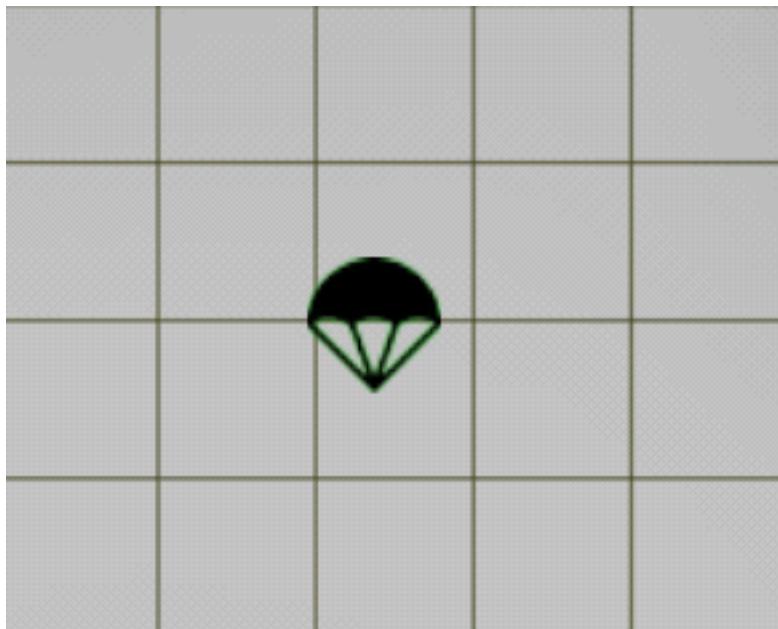


4. Fill-in the following fields:

Field	Description
<b>Chute Type</b>	Expand the drop-down and select the parachute type. Each parachute is designed to operate under different loads, altitudes, and descent velocities. There are no restrictions on which type can be used, the options are: <ul style="list-style-type: none"><li><b>G-12</b> - 26 feet per second descent rate.</li><li><b>Low Cost High Velocity</b> - 90 feet per second descent rate.</li><li><b>Low Cost Low Velocity</b> - 28.5 feet per second descent rate.</li></ul>
<b>Cargo Bundle</b>	Expand the drop-down, select the palletized object you want to use as the cargo bundle.
<div style="border: 1px solid #0070C0; padding: 5px; margin-bottom: 10px;"><p><b>NOTE</b></p><p>Only predefined objects can be dropped using this module.</p></div>	
<b>Drop Amount</b>	Enter the total number of cargo bundles to be dropped by the linked aircraft (there are no restrictions on the number of bundles based on the aircraft class).
<b>Drop Interval</b>	Enter the interval, in seconds, between each drop of a cargo bundle. There is no maximum interval, but there is a minimal interval of one second that allows an adequate gap between drops.
<b>Drop Rows</b>	Use this setting for aircraft that can drop more than one cargo bundle at a time. Cargo bundles are divided up between the amount and number of rows, and dropped with sufficient clearance to avoid unwanted collisions with adjacent bundles.
<b>Activation</b>	Expand the drop-down and select how you want to activate the drop, the options are: <ul style="list-style-type: none"><li><b>Linked Trigger</b> - Use a trigger to activate the drop (see <a href="#">Trigger (on page 826)</a> and <a href="#">Linking (on page 826)</a>).</li><li><b>On Creation</b> - The drop takes place immediately on creation (see <a href="#">On Creation (on the next page)</a>).</li></ul>
<b>Direction</b>	Expand the drop-down and select a compass point that is used to orientate the cargo drop.
<b>Altitude (ft)</b>	Enter the altitude above sea level in feet from which to perform the cargo drop if no aircraft is linked to the Aerial Delivery System Editor Object, see <a href="#">On Creation (on the next page)</a> .
<b>Bundle Preview</b>	Displays and image of the selected cargo bundle.

5. Click **OK** to save your settings.

The Aerial Delivery System icon appears on the map:



There are three ways to use the Aerial Delivery System Editor Object:

- [On Creation \(below\)](#)
- [Trigger \(on the next page\)](#)
- [Linking \(on the next page\)](#)

### 14.1.1 On Creation

Using the **On Creation** setting enables mission administrators to quickly drop cargo bundles into a scenario without the need to add aircraft, triggers. Cargo bundles simply appear in the sky at the position the Editor Object is placed on the map, and fall to the ground in the specified direction.

**Follow these steps:**

1. Open the Object Properties dialog.
2. Expand the **Activation** drop-down and select **On Creation**.
3. Expand the **Direction** drop-down and select the compass direction you want the cargo bundle to fall (for example, to the **West** of the Editor Object position).
4. In the **Altitude (ft)** field, enter the distance in feet above sea level from which you want the cargo bundle to start falling.
5. Click **OK** to save your settings.
6. Preview the mission and notice how the cargo bundle immediately descends from the sky from the position of the Editor Object.

## 14.1.2 Trigger

Cargo drops can be created using just the Aerial Delivery System Editor Object and a Trigger. Using this method, the cargo drop is activated when units or ground vehicles enter the defined Trigger area.

### Follow these steps:

1. Open the Object Properties dialog.
2. Expand the **Activation** drop-down and select Linked Trigger.
3. Expand the **Direction** drop-down and select the compass direction you want the cargo bundle to fall.
4. In the **Altitude (ft)** field, enter the distance in feet above sea level from which you want the cargo bundle to start falling.
5. Click **OK**.

The Aerial Delivery System icon appears on the map.

6. Place a Trigger on the map (see [Triggers \(on page 810\)](#)).
7. Right-click on the **Aerial Delivery System** icon and select **Link to Condition Trigger**.

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

8. Drag the mouse and click the **Trigger** to link it to the Editor Object.
9. Preview the mission.

As a unit(s) or a vehicle(s) enters the defined Trigger area, the cargo bundle appears falling from the sky.

## 14.1.3 Linking

The Aerial Delivery System Editor Object can be used to set up more complex cargo drops by linking it to Aircraft, Triggers. This means that cargo bundles can be dropped at various defined points in conjunction with aircraft.

### **NOTE**

You can only link an Editor Object to one vehicle, trigger at a time. However, you can link multiple Editor Objects to the same vehicle or trigger.

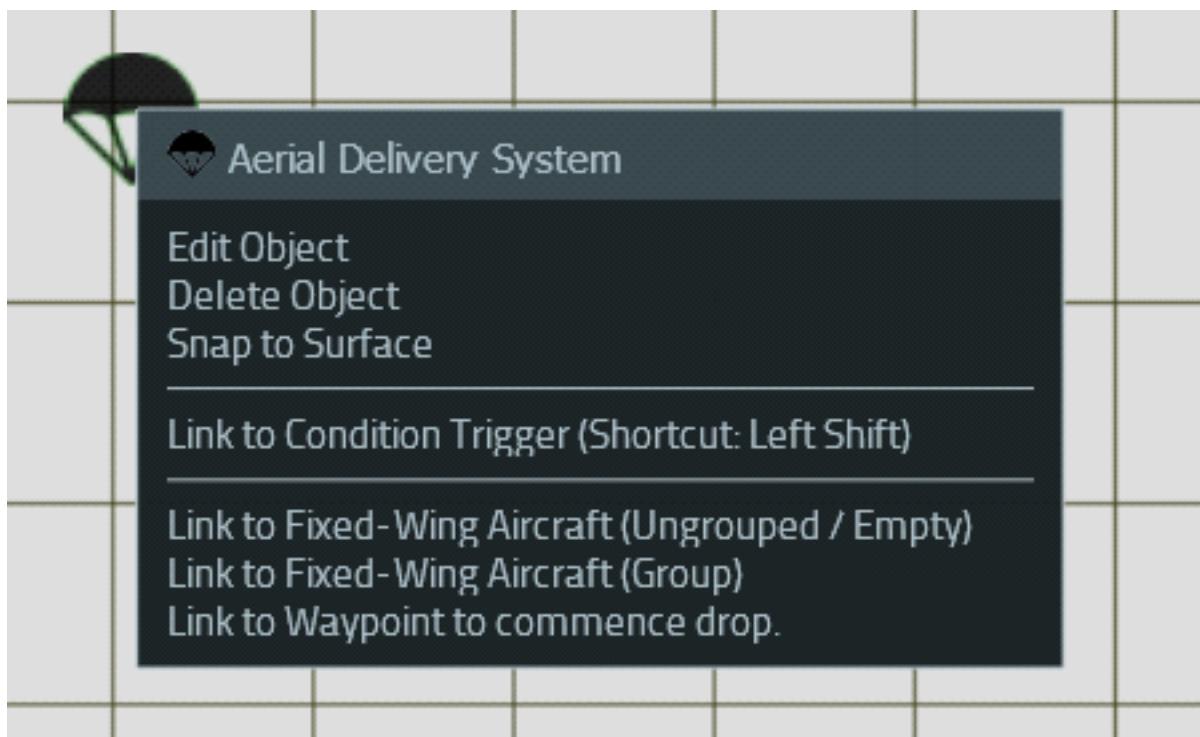
### **NOTE**

The only vehicle type you can link to is **fixed wing aircraft**. If you attempt to link to any other vehicle type, the module fails.

## Follow these steps:

1. Right-click the **Aerial Delivery System** icon.

A menu opens with a selection of linking options:



2. Select the linking option you want.

The list closes and a black arrow is attached to your cursor.

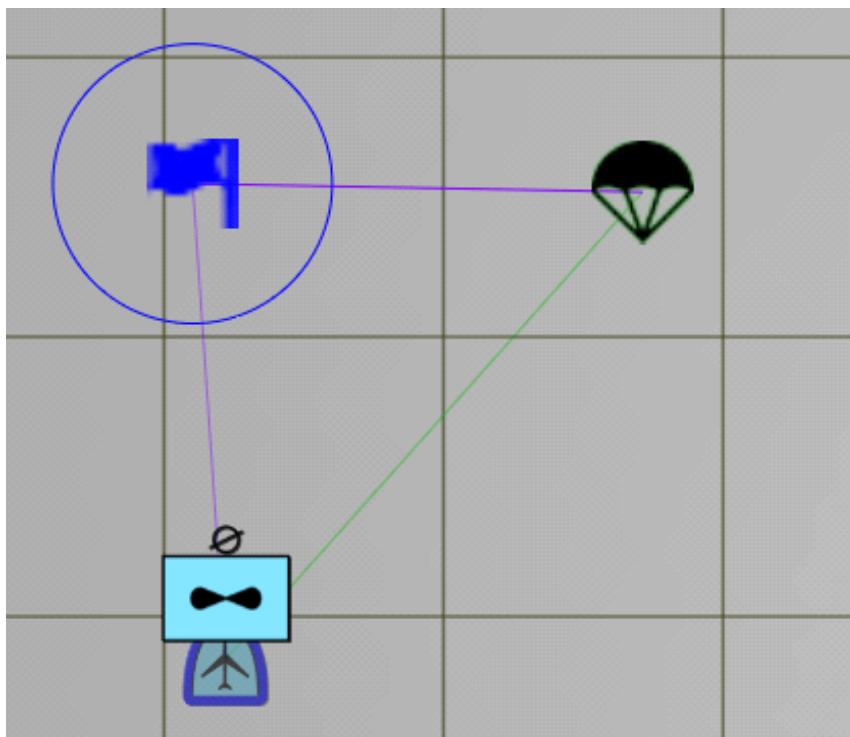
**NOTE**

The **Link to Waypoint to Commence Drop** option does not apply to waypoints.

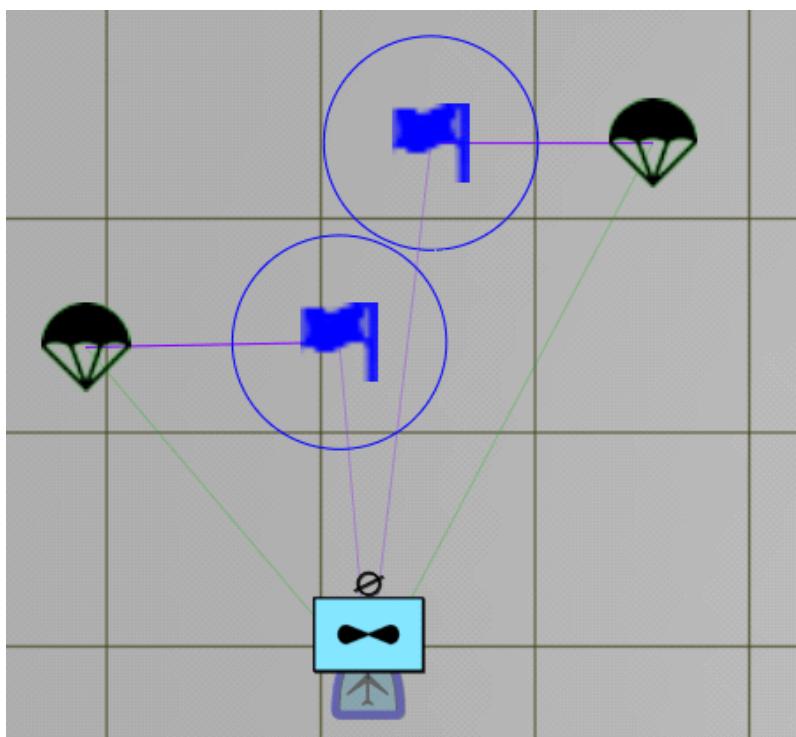
3. Drag the mouse and click an **Aircraft** or **Trigger**. The arrow changes color (to **green**, when linked to an Aircraft, or **purple**, when linked to a Trigger) meaning that the Aircraft or Trigger is linked to the Editor Object.

The following screenshots illustrate valid combinations when using Aircraft, Triggers:

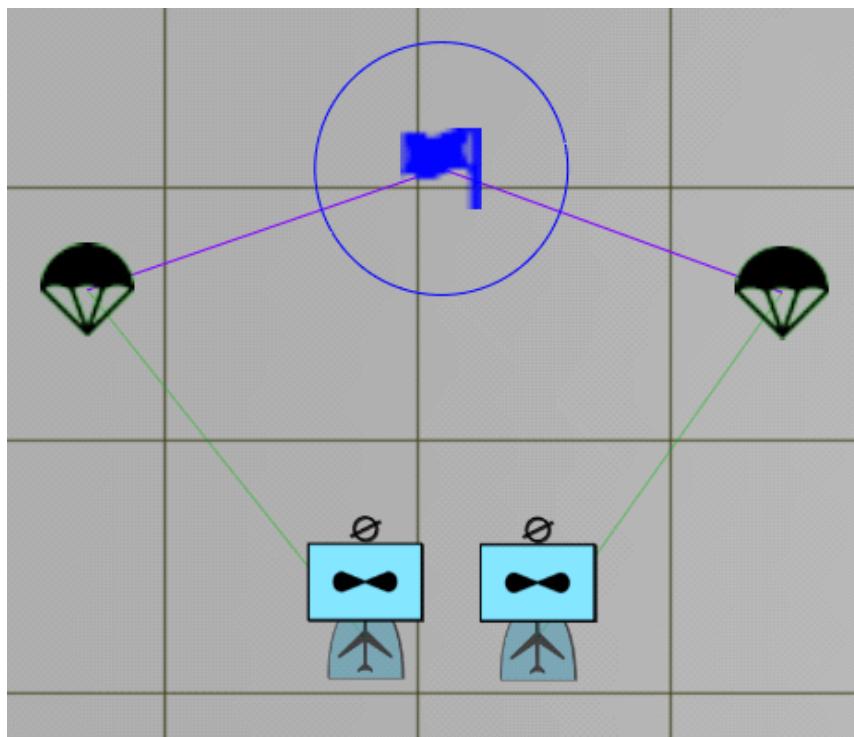
- Linking one **Editor Object**, one **Aircraft**, and one **Trigger**. When the aircraft flies over the defined Trigger area, the cargo bundle is dropped.



- Linking more than one **Editor Object** to a shared **Aircraft**, **Trigger**. This method is useful when creating scenarios that involve multiple cargo drops, for example.



- Linking individual **Editor Objects** to individual **Aircraft** but with a shared **Trigger**. Useful for creating coordinated cargo drops involving more than one aircraft.



## 14.2 Artillery Strike

VBS4 includes an option to provide real-time Artillery Strike support, using the Artillery Strike Editor Object (EO). Placing physical artillery on the map is not required.

### **NOTE**

To add aircraft support to missions, see [Close Air Support \(on page 835\)](#). Existing missions that use the previous version of the Artillery Strike object still function correctly.

In the Editor Objects List, select **Artillery Strike**, and double-click the location of the strike in the map.



### Follow these steps:

1. Select the **Ordnance** you want to use.
2. Select the **Warhead** you want to use. The options depend on the selected **Ordnance**.

### **NOTE**

The following considerations apply:

- Chemical warheads are configurable, see [Configure CBRN Weapons](#) in the VBS Developer Reference.
- The 155 mm SM BONUS warhead requires that target vehicle engines are hot. If a target vehicle is standing idle, the BONUS round does not hit it. The target vehicle must either move or have the following script placed in the **Initialization Statements** field of its Object Properties dialog:

```
this engineOn true; this setVehicleTiPars [1, 0.3, 0];
```

3. Select the **Fuse Type** to use from the drop-down menu (the available Fuse Type is dependent on the Warhead selected in step 4).

Fuse types have the following specific behavior.

Fuse	Description
<b>High Altitude Burst</b>	Explodes high above the target.
<b>Quick / Impact</b>	Ordnance explodes on contact.
<b>Delay</b>	Ordnance explodes after the specified <a href="#">Fuse Time (0.00s) (below)</a> .
<b>Fuse Time (0.00s)</b>	Available if <a href="#">Delay (above)</a> is selected, with a range from 0.00 s to 0.05 s.
<b>Proximity</b>	Ordnance explodes at the specified distance from the target.
<b>Fuse Distance</b>	Available if <a href="#">Proximity (above)</a> is selected, and ranges from 10 ft to 43 ft (or 3 m to 13 m if the metric system is used).
<b>Near Surface Blast</b>	Ordnance explodes just above the target.

4. Specify a **Dispersion Diameter (ft / m)** to determine the possible target area. The rounds fall in a random position within the area specified.

**NOTE**

You can adjust the dispersion diameter directly from the map screen in the same way as resizing a trigger or marker. Hold **LAlt + RMB** and move the mouse forward and back to change the size of the dispersion area.

5. Specify the **No. of Rounds** each gun in the battery fires.

**NOTE**

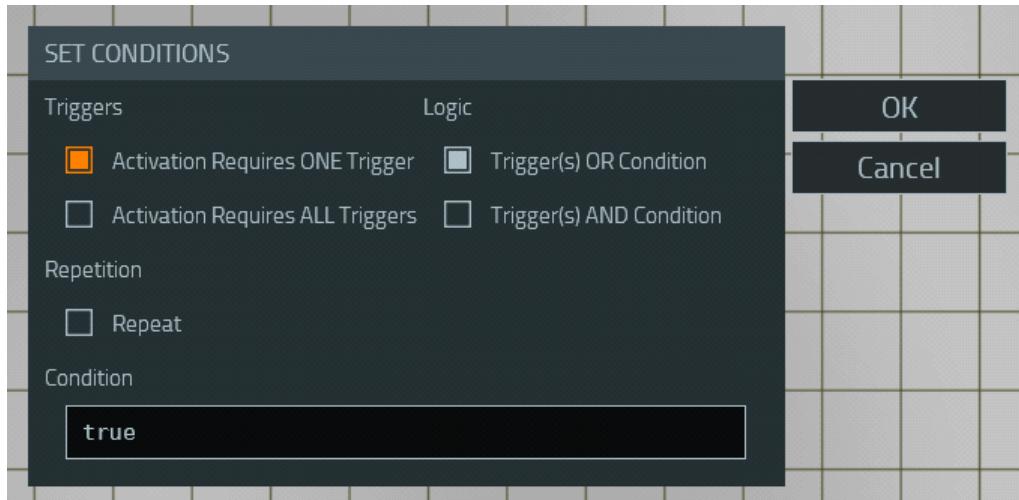
When using CBRN rounds, the recommended maximum you can use at one time is 10, depending on your hardware configuration.

6. Specify the **Gun Reload Time (s)** to determine the time between firing rounds.
7. Specify the **No. of Guns** in the battery.
8. Specify a **Delay Between Guns (s)** to determine a firing delay between guns in the battery.
9. Specify a **Delay Until Start (s)** to determine when the Artillery Strike begins.
10. **Optional:** Click **Set GPS Coordinates** to open the GPS Coordinate Settings dialog and specify a new target location.

11. **Optional:** Click **Set Conditions** to specify a set of scripted conditions or triggers required to start the Artillery Strike.

**NOTE**

To associate an Artillery Strike with a Trigger, see [Artillery - Trigger Synchronization \(on page 834\)](#).



Condition	Description
<b>Activation requires ONE Trigger</b>	Artillery Strike starts when one of the triggers linked to it is activated.
<b>Activation requires ALL Triggers</b>	Artillery Strike starts when all the triggers linked to it are activated.
<b>Trigger(s) OR Condition</b>	The conditions of the triggers (linked to the Artillery Strike EO) are evaluated using logical OR.
<b>Trigger(s) AND Condition</b>	The conditions of the triggers (linked to the Artillery Strike EO) are evaluated using logical AND.
<b>Repeat</b>	If selected, the Artillery Strike is repeated every time the conditions set in <b>Triggers</b> , <b>Logic</b> , and <b>Condition</b> are met.
<b>Condition</b>	Another condition that is taken into account, when the conditions of the linked triggers are evaluated.

12. Click **OK**.

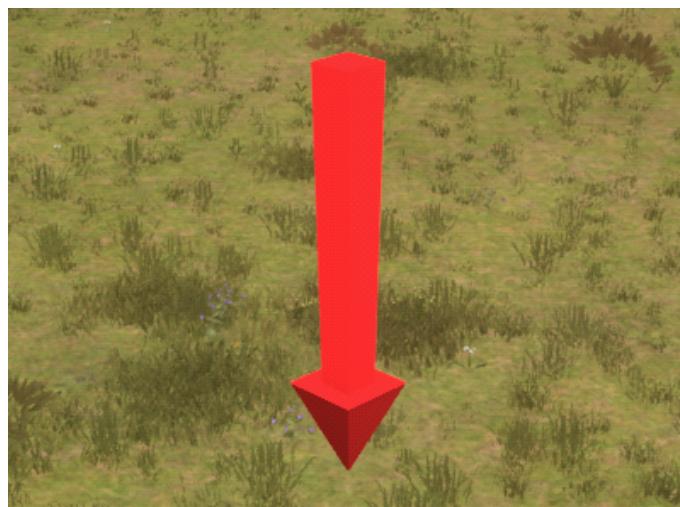
The VBS Editor adds an Artillery Strike icon to the 2D map in the target location, surrounded by an oval to indicate the dispersion area. When the scenario runs, the Artillery Strike starts based on any delay specified, or when the scripted conditions are met.

In 3D Camera View, the Artillery Strike target position displays a 3D arrow.

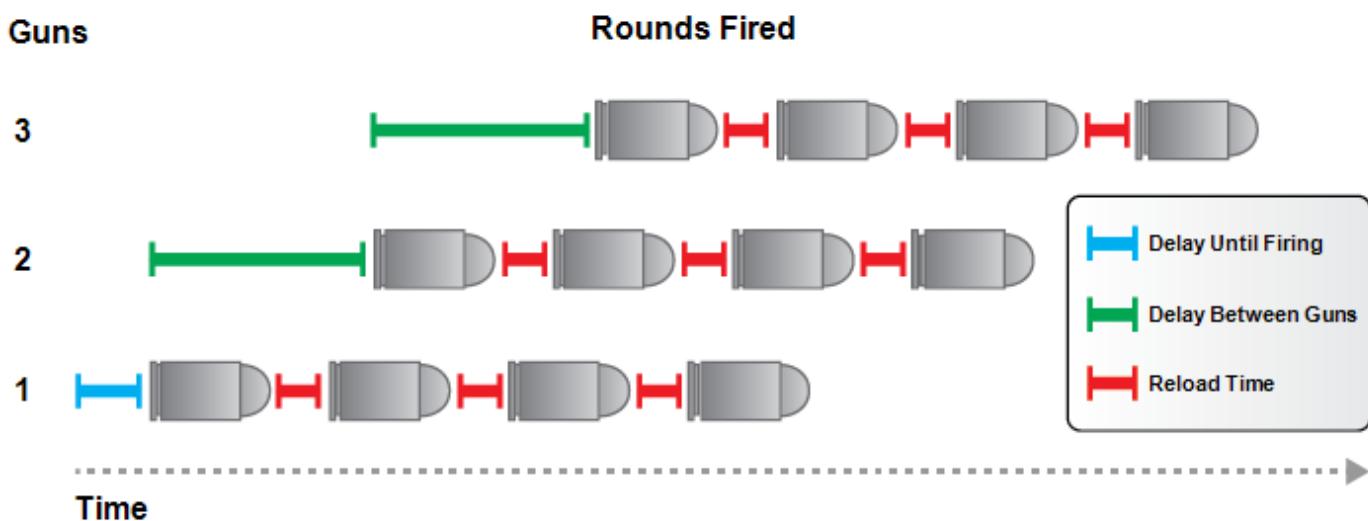
Both the Artillery Strike icon and the 3D arrow change color, based on the time remaining to the firing of the artillery strike.

Color	Description
Green	>10s to firing
Yellow	<10s to firing
Red	Fired

**Image-212: Artillery Strike 3D arrow**



The following diagram illustrates the firing pattern of a 3 gun battery, with firing delays before the start, between rounds, and between guns.



## 14.2.1 Artillery - Trigger Synchronization

You can synchronize the activation and / or the deactivation of a trigger with an Artillery Strike Editor Object.

### Follow these steps:

1. In Prepare Mode, create and place both **Artillery Strike** and **Trigger** Editor Objects on the map.

 **NOTE**

For the synchronization to work correctly, the linkage has to be done in the Prepare mode rather than in Execute mode.

2. Right-click the **Artillery Strike** object, select **Link to Condition Trigger**, and click the **Trigger** object.

The **SET CONDITIONS** dialog appears.

3. Click **OK** twice.

The Artillery Strike is now synchronized with a trigger.

## 14.3 Close Air Support

You can provide Close Air Support (CAS) in a scenario using the **Close Air Support** Editor Object. The Editor Object location on the map is used to define the target area for a CAS air strike.

### FEATURE NOTICE

Using helicopters for CAS may currently result in unexpected behavior of the aircraft, especially over uneven terrain.

### NOTE

CAS may produce unexpected results if a complex mission is running, more than 10 strikes are set, or if the surrounding terrain is rough. Using the maximum 10x10 hardpoints for a bombing run, for example, severely affects performance.

### WARNING

We recommend setting up CAS in Prepare mode, rather than Execute mode, which may lead to unexpected behavior.

### TIP

The VBS Close Air Support product offers extended and more advanced CAS functionality. For more information, see VBS Close Air Support in the Introduction to VBS4 Guide.

This topic discusses the following aspects of CAS:

- [Bomb / Missile Run \(on the next page\)](#)
- [Strafing Run \(on page 838\)](#)
- [Trigger Synchronization \(on page 840\)](#)

The following commands and functions are available for scripting CAS:

- [closeAirSupport](https://sqf.bisimulations.com/display/SQF/closeAirSupport) (<https://sqf.bisimulations.com/display/SQF/closeAirSupport>)
- [fn\\_vbs\\_closeAirSupport](https://sqf.bisimulations.com/display/SQF/fn_vbs_closeAirSupport) ([https://sqf.bisimulations.com/display/SQF/fn\\_vbs\\_closeAirSupport](https://sqf.bisimulations.com/display/SQF/fn_vbs_closeAirSupport)).

## 14.3.1 Bomb / Missile Run

The CAS - Bomb / Missile Run option provides heavy concentrated munitions support in a specified area.

### Follow these steps:

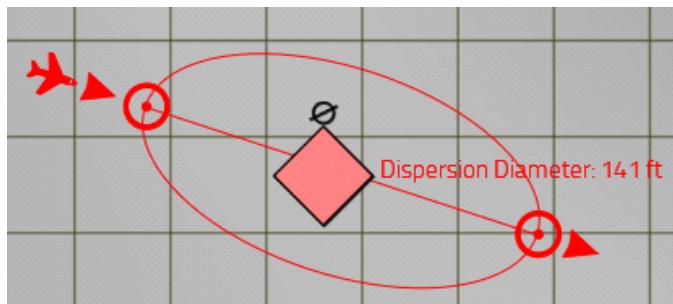
1. Select **Close Air Support** in the Editor Objects List.
2. Double-click on the map, close to the target.

The red CAS icon appears, with a line inside an oval, attached to your cursor.

#### NOTE

If there is no oval, this can be configured in the Object Properties dialog using the **Dispersion Diameter** field.

3. Drag your mouse, so that the target is enclosed inside the oval (the impact point is in the middle), and click on the map.



The Object Properties dialog opens.



4. Select the **CAS - Bomb / Missile** tab.

5. Adjust the following parameters:

- a. Use the **Select Aircraft** drop-down to choose the support aircraft.
- b. Specify an **Ingress Direction** and **Altitude** to determine the aircraft approach parameters.

**NOTE**

When using missile munitions, ensure that there is clear line of sight along the ingress direction to the target. Missiles may impact intervening hills, mountains, or large buildings.

- c. Specify a **Dispersion Diameter** for the red oval on the map, with the semi-major axis oriented to the aircraft approach vector. The munitions impact at a random point in the oval. The semi-major axis of the oval is oriented in the direction of the aircraft flight.
- d. Specify an **Egress Direction** to determine the direction in which the aircraft leaves the target area after dropping the munitions.

**NOTE**

This direction is relative to the **Ingress Direction**. Therefore, if the aircraft has an ingress direction of **90** (degrees) and an egress direction of **0**, the aircraft approaches and exits to the east. If the ingress direction is **90** and the egress direction is **90**, the aircraft exits to the south, and so on. The map icon updates to reflect these settings when you click **OK**. The end point arrow shows the egress direction.

- e. Specify a **Delay Until Start** to determine when the CAS begins.
- f. Specify the **Number of Hardpoints** the aircraft should use and for each Pylon, specify the type and number of munitions to use.
- g. **Optional:** Click **Set GPS Coordinates** to open the GPS Coordinate Settings dialog, to specify the start point of the Dispersion Diameter oval.

**NOTE**

In older versions of VBS4, these coordinates specify the target location.

- h. **Optional:** Click **Set Conditions** to specify a set of scripted conditions, or triggers required to start the CAS.
6. Click **OK**.

The Object Properties dialog closes, and the CAS icon may update, depending on the settings. When the scenario runs, the CAS starts immediately, at a specified delay time, or when any scripted conditions are met.

## 14.3.2 Strafing Run

The CAS - Strafing Run option provides scattered munitions support over a specified distance. The CAS Editor Object enables you to set the start and end point for the run.

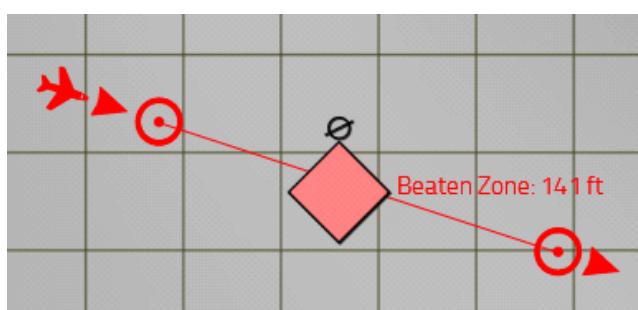
### Follow these steps:

1. In the Editor Objects List, select **Close Air Support**.

2. Double-click on the map, where you want the strafe run to start.

The red CAS icon appears, with a red line attached to your cursor.

3. Drag your mouse, and click on the map where you want the strafe run to end (the impact point is in the middle of the start and end point).



The Object Properties dialog opens.



4. Select the **CAS - Strafing Run** tab.

5. Adjust the following properties:

- a. Use the **Select Aircraft** drop-down to choose the support aircraft.
- b. Use the **Aircraft Weapons** drop-down to select the weapon to use.
- c. Specify an **Ingress Direction**, **Altitude**, and **Angle of Attack** to define the aircraft approach parameters.
- d. Specify an **Egress Direction** to define the direction in which the aircraft leaves the target area after dropping the munitions.

**NOTE**

This direction is relative to the **Ingress Direction**. Therefore, if the aircraft has an ingress direction of 90 (degrees) and an egress direction of 0, the aircraft approaches and exits to the east. If the ingress direction is 90 and the egress direction is 90, the aircraft exits to the south, and so on. The map icon updates to reflect these settings when you click **OK**. The end point arrow shows the egress direction.

- e. Specify a **Contact Point** and **Pull Up Point** to specify the range at which the aircraft should start and stop firing.
- f. Specify a **Delay Until Start** to determine when the CAS begins.
- g. Specify a **Beaten Zone Length** that defines the length of the burst hit line on the ground. A CAS aircraft starts the strafe at a defined angle of attack, aiming at the point of the CAS Editor Object, and then firing on, while slightly pulling up and distributing the burst through the entire Beaten Zone Length.
- h. **Optional:** Click **Set GPS Coordinates** to open the GPS Coordinate Settings dialog, and specify the start point of the strafe.

**NOTE**

In older versions of VBS4, these coordinates specify the target location.

- i. **Optional:** Click **Set Conditions** to specify a set of scripted conditions or triggers required to start the CAS.

**NOTE**

Each input parameter has a tooltip, explaining how it is related to the other parameters, so that correct / realistic values are used.



## EXAMPLE

For best results, Beaten Zone Length needs to be 1.5 - 2x the size of Altitude, and Contact Point should gradually decrease with Altitude as well. The numbers between the red partitions in the following image demonstrate the recommended value ranges:



## 6. Click OK.

The Object Properties dialog closes, and the CAS icon may update, depending on the settings. When the scenario runs, the CAS starts immediately, at a specified delay time, or when any scripted conditions are met.

### 14.3.3 Trigger Synchronization

You can synchronize the activation and / or the deactivation of a trigger with the CAS Editor Object.

#### Follow these steps:

1. In Prepare mode, create and place both **CAS** and **Trigger** Editor Objects on the map.

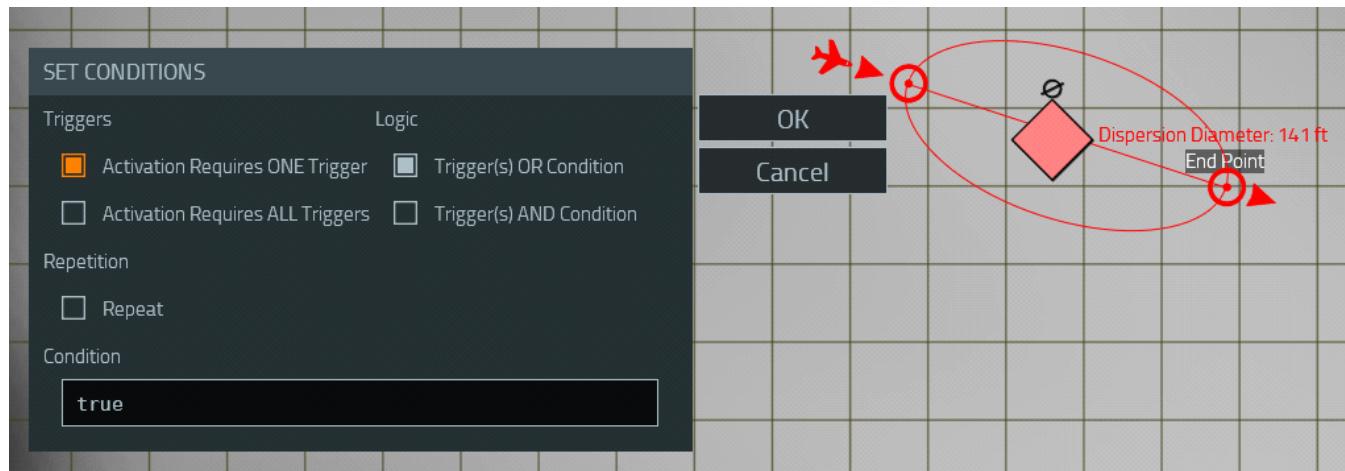


#### NOTE

For the synchronization to work correctly, the linkage has to be created Prepare mode, rather than in Execute mode.

- Right-click the **CAS** object (red circle), select **Link to Condition Trigger** from the context menu, and click the **Trigger** object.

The **SET CONDITIONS** dialog opens.



- Select from the following conditions:

- Activation requires ONE Trigger** - CAS starts when one trigger linked to the Editor Object is activated.
- Activation requires ALL Triggers** - CAS starts when all the triggers linked the Editor Object are activated.
- Trigger(s) OR Condition** - The conditions of the triggers, linked to the CAS Editor Object, are evaluated using logical OR.
- Trigger(s) AND Condition** - The conditions of the triggers, linked to the CAS Editor Object, are evaluated using logical AND.
- Repeat** - If selected, CAS is repeated every time the conditions set in **Triggers**, **Logic**, and **Condition** are met.
- Condition** - Another condition that is taken into account, when the conditions of the linked triggers are evaluated.

- Click **OK**.

- In the Object Properties dialog, click **OK**.

The CAS is now synchronized with a trigger.

## 14.4 VBS Call for Fire - FDC UI

Access the Fire Direction Center (FDC) UI for VBS Call for Fire from the VBS4 Editor, and use it to place gunlines and targets, process target coordinates, create fire missions, and collate fire mission data. It also stores previously configured fire missions, targets, and gunlines.

### TIP

If you are an advanced user, it is possible to configure the ammunition, fuses, and guns available in the FDC UI to your specific requirements, see [VBS Call for Fire UI Configuration](#) in the VBS4 Administrator Manual for more information.

Click the **FDC** tab to open the FDC UI.



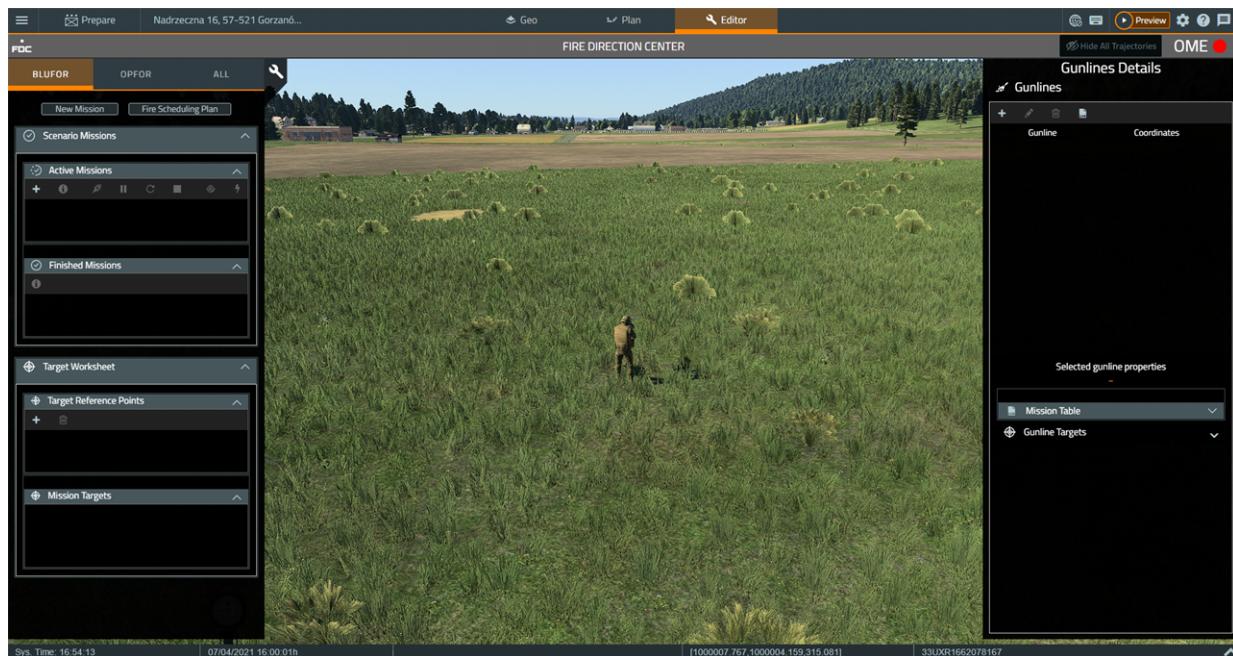
The following panels appear on either side of the screen:

- [Gunlines Details Panel \(on the next page\)](#) - This panel appears on the right, and includes the functions for adding, editing, and deleting gunlines.

### NOTE

Adding gunlines is the first step in the Call for Fire workflow.

- [Main FDC Panel \(on page 844\)](#) - This panel appears on the left, and has functions for creating a new fire mission, and managing any pre-existing ones.



Above the Gunlines Details panel, there is a toolbar with a button at the top-right which you can use to **Hide All Trajectories**.



Click this button to clear all trajectories from the scenario. This is useful since showing a very large number of trajectories in the UI may impact performance.

To exit the FDC UI, click the **Spanner** tab.



#### NOTE

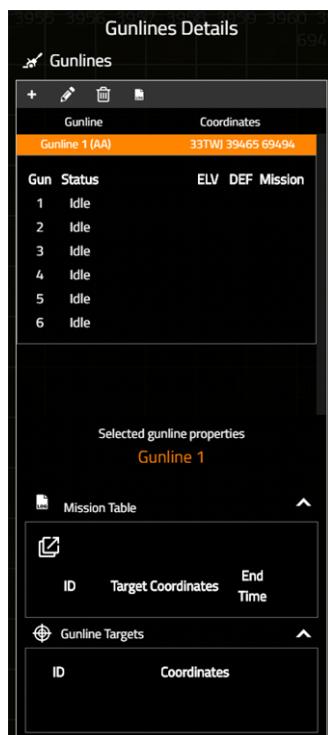
You must exit the FDC UI in order to access the VBS Editor Main Menu options.

### 14.4.1 Gunlines Details Panel

Use this panel to create and manage gunlines, including loadouts, that are available in the scenario. These functions are described in Gunline Management.

#### NOTE

Gunlines should be added before a new fire mission is created.



At the top of the Gunlines Details panel are the following controls:

Button	Description
	Use to create a gunline, see Create Gunlines.
	Use to edit a gunline, see Edit Existing Guns and Gunlines.
	Use to delete a gunline, see Delete Existing Guns and Gunlines.
	Click to open the Mission Table.

## 14.4.2 Main FDC Panel

At the top of the **Main FDC** panel are the following tabs:

- **BLUFOR** - Allows you to create and see all fire missions for BLUFOR scenario participants only.
- **OPFOR** - Allows you to create and see all fire missions for OPFOR scenario participants only.
- **ALL** - Allows you to see all fire missions for BLUFOR and OPFOR sides in the scenario.

The BLUFOR and OPFOR tabs have the following buttons at the top:

### New Mission

Click to Create a Fire Mission.

### Fire Scheduling Plan

Click to open the Fire Scheduling Plan dialog, which contains a list of planned fire mission entries. These are configured during fire mission creation, see Create a Fire Mission in the VBS Call for Fire Manual.

Fire Scheduling Plan							X
+ 	Elapsed Time 00:04:02						
ID	Gunline	Location	Mission Start	Time on Target	Mission End	Errors	
AB0002	Gunline 2	33TWJ 39621 69885	00:05:37	00:06:00	00:05:55	-	
AA0002	Gunline 1	33TWJ 39412 69887	00:04:37	00:05:00	00:04:55	-	

The dialog has the following features:

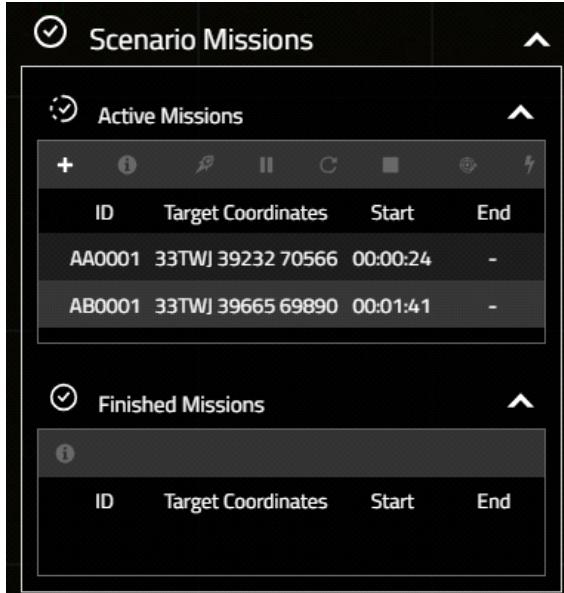
Feature	Description
	Click to open the <b>Fire Mission</b> panel, and create a new fire mission.

Feature	Description
	Click an entry in the list, so that it is highlighted, and click this button to delete it. The planned fire mission is deleted from the list and the scenario, and can never become <b>Active</b> or <b>Finished</b> .
<b>Elapsed / Mission Time</b>	Clock that shows the current time as the Elapsed Time or Mission Time, depending on the time format set. For more information, see Synchronize Time in the VBS4 Editor Manual.
<b>ID</b>	Mission ID.
<b>Gunline</b>	Gunline name / number.
<b>Location</b>	TRP and Target location coordinates.
<b>Mission Start</b>	Scheduled fire mission start time.
<b>Time on Target</b>	The time at which the first round should impact the target, see Time on Target.
<b>Mission End</b>	Scheduled fire mission end time.
<b>Errors</b>	An error warning icon is shown if the mission fails. Hover over the icon to read the list of errors.

The rest of the main FDC panel is divided into the following sections:

### Scenario Missions

This section lists the currently **Active** and **Finished** fire missions.



ID	Target Coordinates	Start	End
AA0001	33TWJ 39232 70566	00:00:24	-
AB0001	33TWJ 39665 69890	00:01:41	-

## Active Missions

Select a **fire mission** entry in this list, so that it is highlighted, and use the following buttons to edit and control an existing fire mission. Creation of new fire missions is also possible here:

Control	Description
	<b>Create</b> Click to open the <b>Fire Mission</b> panel, and create a fire mission (duplicates the <b>New Mission</b> button function).
	<b>Mission Report</b> Click to open the Mission Report Panel.
	<b>Fire Guns</b> Click to instruct the guns to fire when they are ready. Active if <b>At My Command</b> is selected during mission creation (see Create a Fire Mission in the VBS Call for Fire Manual).
	<b>Check Fire</b> Click to pause the mission.
	<b>Repeat Mission</b> Repeats the last mission instruction given.
	<b>End Mission</b> Click to end the mission.
	<b>Adjust Fire</b> Click to open the Adjust Fire dialog. Not available for <b>Fire for Effect</b> type missions.
	<b>Fire for Effect</b> Click to open the Fire Mission panel.

## Finished Missions

Select a **fire mission** entry in this list, so that it is highlighted, click the **Mission Report** button to access the Mission Report Panel, and view data about the selected fire mission.

### NOTE

Finished fire missions cannot be edited or repeated. They are purely for the purpose of VBS Call for Fire in AAR .

## Target Worksheet

Use the functions in this section to create, edit, and adjust targets. For more information, see Target Management.

The screenshot shows the Target Worksheet window. At the top is a section titled "Target Reference Points" with a plus sign (+) and a trash can icon. Below this is a table titled "Mission Targets" with two entries:

ID	Target Coordinates
AA0001	33TWJ 39232 70566
AB0001	33TWJ 39665 69890

## Volleys

Each time you click **Repeat Mission / Adjust Mission > OK**, a new chronological "instruction" entry is added to the Ballistic Information (Volleys) list in the Mission Report Panel, below the previous instruction.

When using Adjust Fire mission types, the FDC Operator typically fires multiple volleys to test the accuracy of the target information, and makes any necessary adjustments. Once they are confident that they can destroy the target, the FDC Operator switches to Fire for Effect for the final bombardment.

### 14.4.3 Gunline Management

Gunlines are created as the first step of creating a fire mission. They are managed in the **Gunlines Details** panel, the right-hand panel on the FDC UI.

Controls at the top of the panel enable you to create new gunlines. You may also edit or delete previously created gunlines listed in this panel. Vehicle mounted guns are also configured in the **Gunlines Details** panel.

#### **WARNING**

Placing more than 10 gunlines may cause performance issues.

Guns must not be placed inside or on top of terrain objects such as buildings or rocks, otherwise they do not function correctly.

#### **NOTE**

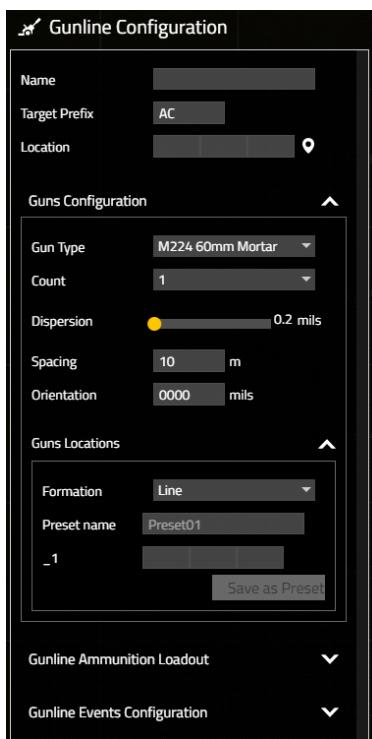
The guns and their crew can not be damaged, destroyed, repaired, grouped, switched to (the gunners themselves are not playable), towed, hitched, or assigned waypoints. The gun coordinates can be changed, but only by the Administrator / Instructor.

Select from the following topics to set up and manage gunlines:

- [Create Gunlines \(on the next page\)](#)
- [Moving Gunlines \(on page 854\)](#)
- [Edit Existing Guns and Gunlines \(on page 855\)](#)
- [Delete Existing Guns and Gunlines \(on page 856\)](#)
- [Mission Table \(on page 856\)](#)

### 14.4.3.1 Create Gunlines

Gunlines are created in the **Gunline Configuration** panel, accessed from the Gunlines Details panel.



**Follow these steps:**

1. In the Main FDC panel (left panel), do one of the following:
  - Click the **BLUFOR** tab.
  - Click the **OPFOR** tab.

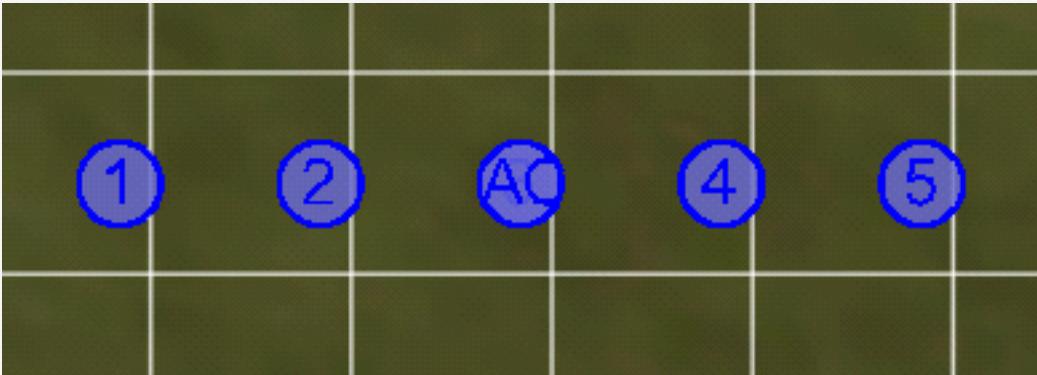
**NOTE**

Gunlines previously added to the scenario for BLUFOR and OPFOR appear in the Gunlines Details panel, and can be modified (see [Edit Existing Guns and Gunlines \(on page 855\)](#)).

2. In the **Gunlines Details** panel click the **plus** icon in the Gunlines List to open the **Gunline Configuration** panel.



### 3. Enter the following information:

Setting	Description
<b>Name</b>	<p><b>Required.</b> Enter a name for the gun / gunline.</p> <div style="border: 2px solid red; padding: 10px;"><p><b>⚠️ WARNING</b></p><p>The permitted symbols (up to 11) are letters, numbers, and spaces. Punctuation marks, such as apostrophes and quotation marks are not supported.</p></div>
<b>Target Prefix</b>	<p>Pre-filled target prefix of missions supported by this gunline, which automatically increments when a new gunline is created.</p> <div style="border: 1px solid #0070C0; padding: 10px; background-color: #F0F8FF;"><p><b>ℹ️ NOTE</b></p><p>The same prefix is used at the beginning of the Mission ID of the mission the gunline is assigned to. You can manually change the ID to a two-letter prefix, if necessary.</p></div>
<b>Location</b>	<p>Required. Enter the gunline location coordinates (specifically, those of the first gun in the line), using one of the following methods:</p> <ul style="list-style-type: none"><li>• <b>Manual</b> - Type the MGRS coordinates into the <b>Location</b> field.</li><li>• <b>Automatic</b> - Click the <b>locator</b>, and click the map where you want to place the center of the gunline.</li></ul> <div style="text-align: center;"></div> <p>The coordinates are automatically entered into the <b>Location</b> field. A preview of the gunline is shown on the map, for example:</p> 

4. In the **Guns Configuration** section, enter the following information.

Setting	Description
<b>Gun Type</b>	<p>Use the drop-down to select from the available gun types.</p> <p><b>NOTE</b> It is not possible to mix Gun Types in a gunline.</p>
	<p><b>WARNING</b> Some guns are vehicle / ship mounted. Placing these Gun Types automatically adds the corresponding vehicle / ship to the scenario.</p>
<b>Count</b>	<p>Use the drop-down to select the number of guns you want in the gunline, or vehicles / ships with mounted guns.</p> <p><b>NOTE</b> This selection causes the <b>Guns Locations</b> section to be populated with a list of all the guns in the gunline, or vehicles / ships, with their coordinates. Gun names are incremented automatically with number suffixes.</p>
<b>Dispersion</b>	<p>Use the slider to select a dispersion setting (in milliradians) to simulate inaccuracy. This setting creates a random offset of the guns in a gunline, up to the value entered. Each time the guns fire, there is an average of 1 meter target inaccuracy, per milliradian, per 1000 meters of range.</p> <p>The degree of inaccuracy is increased by entering a higher value.</p>
<b>Spacing</b>	<p>Enter a value (in meters) of the space you want between each gun. The default setting is 10 m.</p>
<b>Orientation</b>	<p>Enter the orientation of the guns (in milliradians). Gunlines are set at 0000 milliradians by default, and their orientation is in an East-West line.</p>

5. In the **Gun Locations** section, enter the following information.

Setting	Description
<b>Formation</b>	<p>Click the drop-down to select one of the following options:</p> <ul style="list-style-type: none"><li>• <b>Line</b> - The guns are placed in a fixed line on the map. Some parameters can be adjusted, see <a href="#">Dispersion (on the previous page)</a>.</li><li>• <b>Custom</b> - The guns are placed in a line on the map, but their location coordinates can be changed to create a customized formation, see <a href="#">GunName_0 (below)</a>.</li><li>• <b>Preset</b> - If available, select a Custom formation which was saved previously as a Preset.</li></ul>
	<div style="border: 1px solid #0070C0; padding: 5px; margin-top: 10px;"><p><b>NOTE</b></p><p><b>Line</b> formation gunlines cannot be saved as presets. <b>Custom</b> formation gunlines can be saved as presets.</p></div>
<b>Preset Name</b>	<p>The option you select in the <a href="#">Formation (above)</a> drop-down correlates to what is shown in the Preset Name field:</p> <ul style="list-style-type: none"><li>• <b>Line</b> - The name is automatically filled, and cannot be changed.</li><li>• <b>Custom / Preset</b> - The name is automatically filled, but you can type in the field to change it.</li></ul>
<b>GunName_0</b>	<p>Displays the names and location coordinates for the individual guns.</p> <div style="border: 1px solid #0070C0; padding: 5px; margin-top: 10px;"><p><b>NOTE</b></p><p>Gun names are incremented automatically with number suffixes.</p></div> <p>Location coordinates of individual guns can be changed for all <a href="#">Formation (above)</a> types, including <b>Line</b>. For <b>Custom</b> and <b>Preset</b> gunlines, do one of the following:</p> <ul style="list-style-type: none"><li>• Enter new MGRS coordinates in the field next to the gun you want to relocate.</li><li>• Click the <b>locator</b> next to the specific gun you want to relocate, and click the map where you want to place it.</li></ul> <p>The gun is relocated, and new MGRS coordinates are automatically added to the <b>GunName_0</b> field. For <b>Line</b> formation guns, use the functions described in <a href="#">Moving Gunlines (on page 854)</a> to change the coordinates. If you do this, the formation type automatically changes from <b>Line</b> to <b>Custom</b>.</p>
<b>Save As Preset</b>	Click this button to save the gunline formation as a Preset for later use.

6. In **Gunline Ammunition Loadout**, click **plus (+)** to add 100 shells, click **minus (-)** to remove 100 shells, click the **Clear** icon for 0 shells.



Use the up / down arrows for finer adjustments, or type numbers in the fields.

**i NOTE**

The following considerations apply:

- The maximum limit is 300 shells of each type.
- The 155 mm BONUS warhead requires that target vehicle engines are hot. If a target vehicle is standing idle, the BONUS round does not hit it. The target vehicle must either move or have the following script placed in the **Initialization Statements** field of its Object Properties dialog:

```
this engineOn true; this setVehicleTiPars [1, 0.3, 0];
```

7. In the **Gunline Events Configuration** section, you can adjust the various stages of the loading / unloading process, by entering times in seconds in the corresponding fields. No process can take less than 1 second:

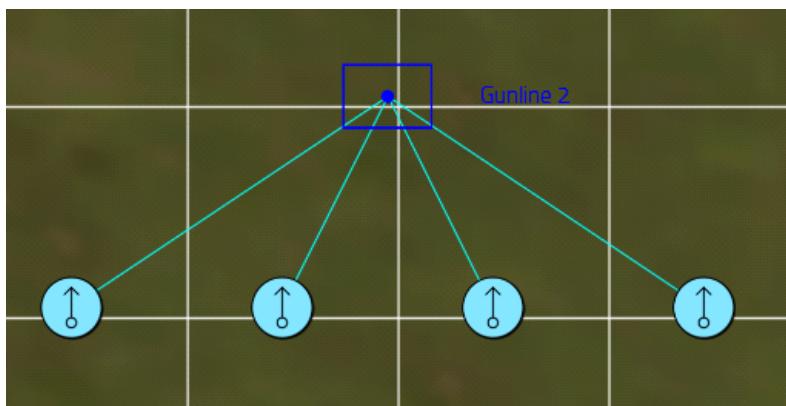
- **Preparing**
- **Attention**
- **Laying**
- **Loading**
- **Unloading**
- **Stowing**

**i NOTE**

If you end a fire mission, it moves from **Active** to **Finished**. However, you cannot use the gunline in a new fire mission until the unloading and stowing processes, configured in this section, have completed. Current processes are shown in the gunline **Status** column (see Gunline Data in the VBS Call for Fire Manual).

8. Click **Create**.

The Gunline Editor Object is placed on the map, with the individual guns linked to it.



In addition, the gunline name and coordinates are added to the relevant list in the **Gunlines Details** panel:

- **BLUFOR** - Shows only gunlines configured specifically for BLUFOR.
- **OPFOR** - Shows only gunlines configured specifically for OPFOR.
- **ALL** - Shows gunlines configured for both BLUFOR and OPFOR.

To switch between the lists, click the **BLUFOR / OPFOR / ALL** tabs in the Main FDC panel.

The following screenshot shows the **Gunlines** list for **ALL** gunlines in the scenario, including one **BLUFOR** gunline (blue rectangle symbology), and one **OPFOR** gunline (red diamond symbology).

Gunline	Coordinates
■ Gunline 1 (AA)	33TWJ 39564 69396
◆ Gunline 2 (AB)	33TWJ 38504 67614

#### 14.4.3.2 Moving Gunlines

If necessary, you can move the gunline to a new position.

**Follow these steps:**

1. Double-click the **Gunline EO**, so that the gunline and the EO are flashing.
2. Click and hold the **Gunline EO**.
3. Drag your mouse, so that the EO and the attached gunline move with your cursor.
4. Re-position the gunline, and click anywhere on the map to deactivate the moving mechanism.

The gunline is fixed in its new position.

#### NOTE

The **Formation** you selected / configured retains its layout, even if moved.

Alternatively, you can move individual guns to create your own custom formations.

**Follow these steps:**

1. Click and hold a single **gun** on the map.
2. Drag your mouse to move it.
3. When the gun is in position, release the **LMB**.
4. Repeat steps 1 to 3 for the other guns, if required.

The guns are in a custom formation.

### 14.4.3.3 Edit Existing Guns and Gunlines

Existing gunlines can be edited from the **Gunlines Details** panel.

#### NOTE

Gunlines that are assigned to Active Fire Missions cannot be moved or edited until the mission has finished.

Changing the **Name** or **Gun Type** for an existing gunline causes all Scheduled Firing Plans for those gunlines to fail.

**Follow these steps:**

1. Click the **gunline** entry in the list that you want to edit, so that it is highlighted.
2. Click **Edit** to open the Gunline Configuration panel.



3. You can edit the following settings, which are updated as you change them:

- |  |   |
|--|---|
| <ul style="list-style-type: none"><li>• <b>Name</b></li><li>• <b>Target Prefix</b></li><li>• <b>Location</b></li><li>• <b>Gun Type</b></li><li>• <b>Dispersion</b></li></ul> | <ul style="list-style-type: none"><li>• <b>Count</b></li><li>• <b>Formation</b></li><li>• <b>Ammunition Loadout</b></li><li>• <b>Events Configuration</b></li></ul> |
|--|---|

4. Click **Save** to save your edits.

#### 14.4.3.4 Delete Existing Guns and Gunlines

Existing gunlines can be deleted from either the list in the Gunlines Details panel, or directly from the map.

##### NOTE

Gunlines that are assigned to Active Missions cannot be deleted until the mission has finished. See Active Missions in the VBS Call for Fire Manual.

Do one of the following:

- Click the **entry** in the Gunlines Details panel of the gunline you want to delete (so that it is highlighted), and click the **trash** icon.



- Right-click the Gunline EO on the map, and select **Delete Object** from the context menu.

The gunline is removed from both the Gunlines Details panel, and the map.

#### 14.4.3.5 Mission Table

Use the Mission Table to view a list all fire mission gunline assignments. Click the **expander** or **log** to open the full version of the Mission Table.



For more information, see Mission Table in VBS Call for Fire Mission Management in the VBS Call for Fire Manual.

## 14.4.4 Target Management

Targets are managed in the Target Worksheet in the main FDC UI panel. There are two types of targets used for CFF missions:

- **Target Reference Points (TRP)**

Targets that are placed on the map during scenario creation, or during scenario run-time. They are also generated by the Record Target during the fire mission.

- **Mission Targets**

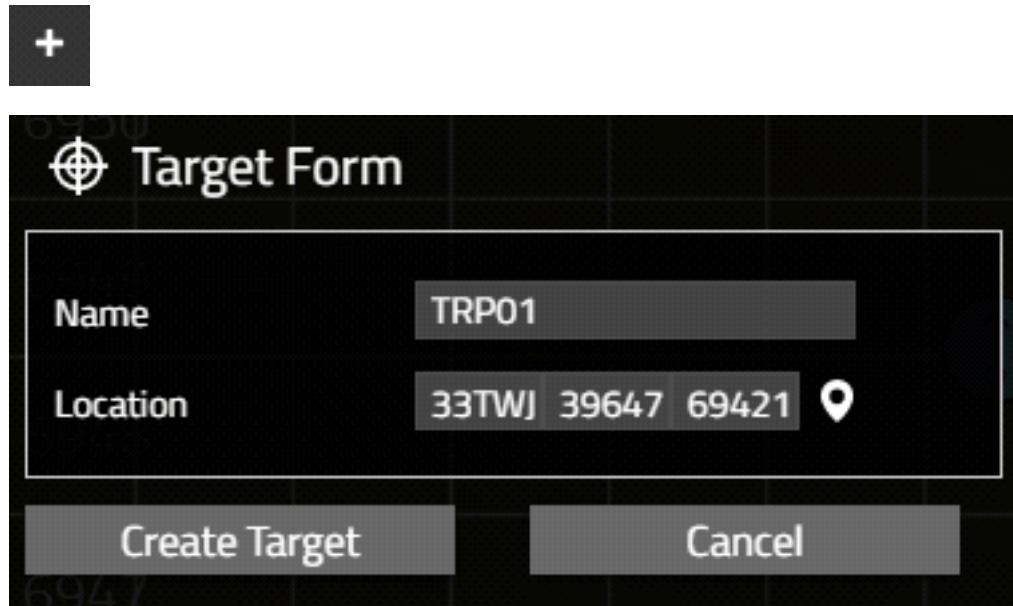
Created during the fire mission. Mission Targets are records of the coordinates at which the fire mission was initially aimed, and do not change if subsequent target adjustments are made. They are also generated by the Record Target.

### 14.4.4.1 Creating TRPs

TRPs are created using the Target Form, which is accessed from the Target Reference Points list.

**Follow these steps:**

1. At the top of the Target Reference Points (TRP) list, click the **plus** icon to open the **Target Form**.



2. Enter a **Name** for your TRP (usually, TRP01 and so on).

**⚠️ WARNING**

The permitted symbols (up to 11) are letters, numbers, and spaces. Punctuation marks, such as apostrophes and quotation marks are not supported.

### 3. Enter the **Location** coordinates of your TRP. Do one of the following:

- Manually enter the MGRS coordinates into the **Location** fields.
- Click the **locator**, and click the map where you want to place the TRP.



The coordinates are automatically entered into the **Location** fields when you click the map.

### 4. Click **Create Target**.

The Target Editor Object is placed on the map, and the TRP name and coordinates are added to the TRP list.

When a TRP is assigned to a mission, it also appears in the Mission Targets list. To assign a TRP, see Create a Fire Mission in the VBS4 Instructor Manual using the Recorded Target Location.

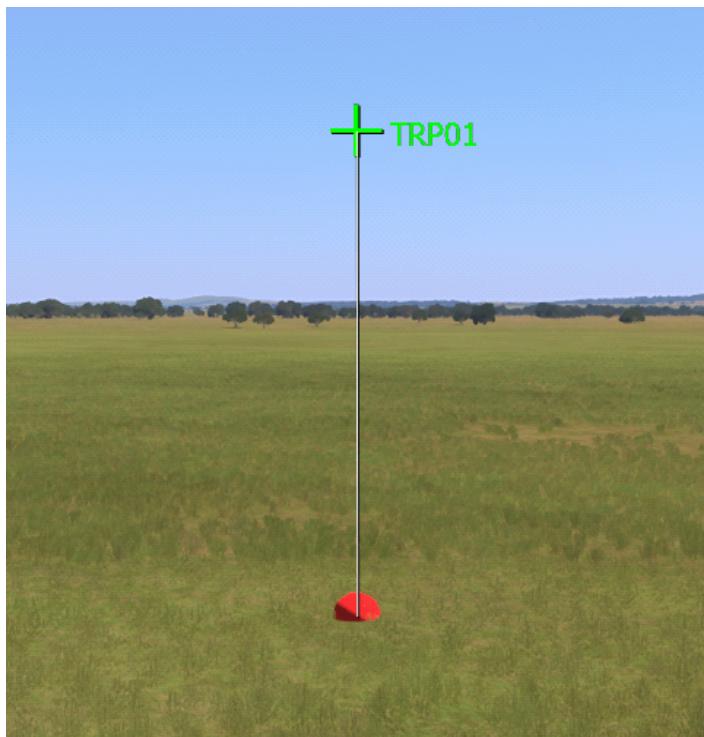
**Image-213: TRP added to Mission Targets**

Target Worksheet	
Name	Target Coordinates
Target 1 30QVK 25356 11234	
ID	Target Coordinates
AA0001	30QVK 25390 11158

The Target Editor Object appears as a red cross on the map, and includes a red hemisphere on the 3D map.

**TIP**

You can move the Target Editor Object around using your mouse (click and drag) for more accurate placing, or to make adjustments. Moving the Target Editor Object automatically adjusts the coordinates of the corresponding entry in the TRP list.



#### 14.4.4.2 Deleting Targets

Targets can be deleted simultaneously from the map, and the TRP List.

**Follow these steps:**

1. Click an **entry** in the TRP List, so that it is highlighted **orange**.
2. Click the **trash** icon.



The target entry is removed from the TRP list, and the Target Editor Object is removed from the map. If the target was used in a mission, a corresponding entry remains in the Mission Targets list.

## 14.5 IR Laser

The IR Laser module simulates the beam of an infrared laser fired from an aircraft-mounted IZLID.

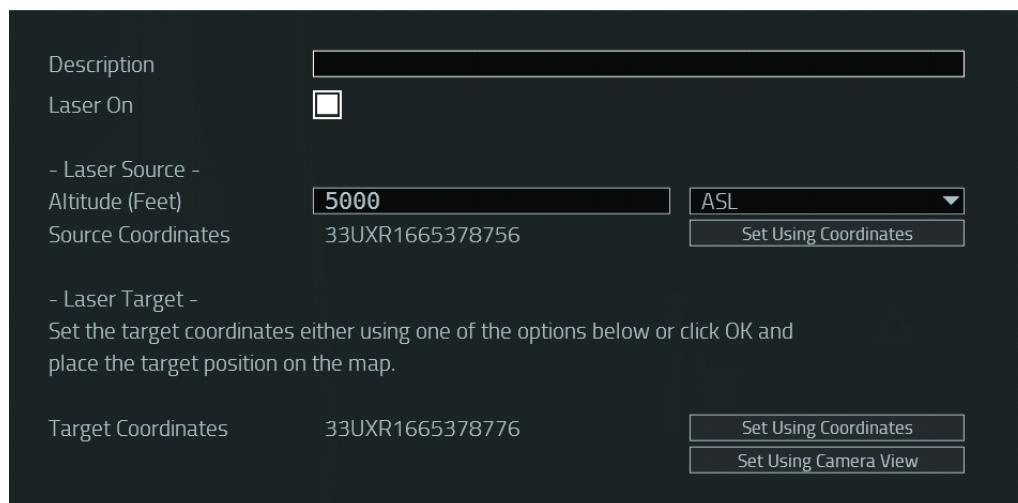
- The beam is only visible using night-vision goggles.
- Only the beam is simulated, no aircraft are added to the mission.
- The beam has a specified source and target and can be turned on and off for active control in Execute mode.



### Follow these steps:

1. In VBS Editor, select **Module** from the Editor Objects List.
2. Double-click a location on the map, and in the Object Properties dialog, use the drop-down to select **IR Laser** from the list.
3. Click **OK**.

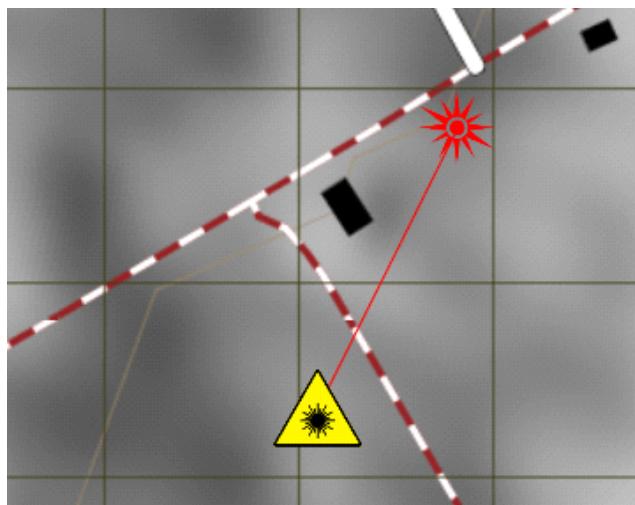
The IR Laser Object Properties dialog opens:



4. Input a **Description** for the object.

5. Specify the Laser Source, with an **Altitude** above sea or ground level, and click **Set Using Coordinates** to specify the source location.
6. Specify the Laser Target:
  - Click **Set Using Coordinates** to specify the target by grid location.
  - Click **Set Using Camera View** to visually specify a target location:
    - a. Use the 3D View Editor Controls to center the target in the view (see [Interacting with Editor Objects \(on page 52\)](#)).
    - b. Press **O** to specify the center of the view as the target or **P** to cancel.

VBS Editor adds the IR Laser marker to the map:



7. Drag-and-drop the **yellow triangle** icon to move the source or the **red flash** icon to move the target.

When the mission is active, players using night-vision goggles are able to see the beam.

In Execute mode, right-click the marker, and use **Turn Laser On** and **Turn Laser Off** to turn the IR Laser on and off.

## 14.6 MEDEVAC / CASEVAC

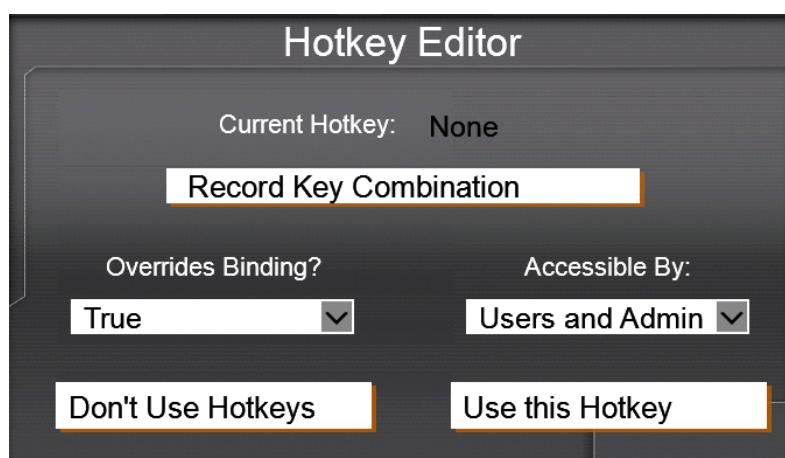
A MEDEVAC / CASEVAC Script Object is available to set up MEDEVAC functionality within a mission. By default, a MEDEVAC request selects a helicopter to fulfill the request. Alternatively, specific vehicles in the mission can be linked to the MEDEVAC Script Editor Object.

### Follow these steps:

1. Place a **Script** Editor Object into the mission, then in the **Script File** field select **MEDEVAC Request**.



2. (Optional) Click **Add Hotkey** to add a hot-key combination for faster MEDEVAC requests.



- a. Click **Record Key Combination** and press the keys that you want to be used as a hot-key combination of requesting MEDEVAC.
- b. Click **Stop recording** to capture the hot-key combination.
- c. In **Accessible by**, select the VBS4 users (administrator and / or non-administrator users) for whom the hot-key combination should be available.
- d. Click **Use this hotkey** to save the hot-key combination.

In VBS4, group leaders call MEDEVAC / CASEVAC either with the Quick Menu **REQUEST MEDEVAC** option (see Quick Menu Actions in the VBS4 Trainee Manual), or using the defined hot-key combination.

Complete the 9 line form to request the MEDEVAC / CASEVAC. If there are any errors in the form, they show during broadcast and you are offered an option to correct them.

Once the 9 line is accepted, follow the MEDEVAC dialog and use the radio to send updates.

#### Image-214: 9 line

The screenshot shows a window titled "MEDEVAC REQUEST FORM". It contains a vertical list of nine input fields labeled "LINE 1" through "LINE 9", each with a small rectangular input box. Below the input fields is a "SEND" button. The background of the window features a faint landscape image of trees and hills.

See Request MEDEVAC / CASEVAC in the VBS4 Trainee Manual for information about filling out the 9-line form.

### 14.6.1 Helicopter Selection

The automatic selection of the helicopter is based on several criteria, in decreasing priority:

- Should be the same side as the requester
- Should have cargo spaces available
- Should be armed (unless "Site Security" is defined as "N" - No enemy)
- Should belong to the same force as the requester
- Should have litter cargo positions
- Should be able to transport all patients at once
- Should be as small as possible

It is possible to override the automatic selection and specify which helicopters to use on a per mission basis. This is done by creating a global array named `vbs2_medevac_choppers`, and putting the classname of the transport and escort helicopter in there, e.g.,

```
vbs2_medevac_choppers = ["VBS2_AU_Army_CH47D_G_M134", "VBS2_US_MC_AH1Z_B"]
```

## 14.6.2 Ground Vehicles

MEDEVAC can use Ground Vehicles to pick up injured personnel. Ground vehicles can be used for missions of any priority, but they must be linked to the MEDEVAC Editor Object otherwise a helicopter is created instead. If no suitable vehicles or helicopters are found or linked to the MEDEVAC Editor Object, or if all those vehicles are busy, then a helicopter is created to fulfill the MEDEVAC mission requirements.

Carrying capacity is determined by the vehicle configuration parameters, specifically:

- **stretcherCapacity** for litter / stretchers cases (Line 5 - L cases)
- **transportSoldier** for ambulatory units (Line 5 - A cases)

### NOTE

Ground vehicles must be explicitly enabled for MEDEVAC.

Enable ground vehicles by **linking the script logic to vehicles present in the mission**.

Alternatively, modify the **VBS3\_MEDEVAC\_VEHICLES\_GROUND** array.

The array accepts following entries:

- **vehicle** - Actual vehicle object already present in the mission.
- **[className, spawnPoint, radius]**:
  - **className** - Vehicle class that the mission designer wants present in MEDEVAC missions (can be an ambulance or escort).
  - **spawnPoint** - Can be either:
    - 2D / 3D position in world coordinates (AGL for 3D).
    - String Grid code (such as "85001433"). This is what the military uses in RL (and is filled into the MEDEVAC form).
    - Object - Vehicles use the object position as their spawn.
  - **radius** (optional) - Radius around the spawn position where vehicles can spawn.

## 14.6.3 MEDEVAC Player Re-spawn Location

If you re-spawn a MEDEVACed player, they are healed and dropped off on the nearest land, which is standard VBS behavior.

However, if you want to place a re-spawned player at a specific location, you can use the **(F6) Marker** Editor Object to do this. In this case, the **Name** field in the Marker Object Properties dialog should contain one of the following names (in the format shown):

- **MEDEVAC\_respawn\_west** - For BLUFOR units.
- **MEDEVAC\_respawn\_east** - For OPFOR units.

Adding these names places MEDEVACed players at the location of the marker on the map.

For more information, see [Create Markers \(on page 783\)](#) in the [Adding Markers \(on page 782\)](#) topic.

#### 14.6.4 Known Limitations

A human controlled unit is currently not supported by the MEDEVAC system in VBS4. Attempts by player units to get in to a helicopter result in them being ejected from it.

Administrators who use **Switch to Unit** in an attempt to try and switch a player unit with an AI unit in the helicopter, cause the player unit to be ejected, either whilst the helicopter is on the ground or in flight, with unfortunate consequences.

# 15. Observation Tools and Objects

VBS4 includes various ways to observe a scenario including cameras and invisible spectator objects.

- [Action Camera \(on the next page\)](#)
- [Camera Editor Object \(on page 869\)](#)
- [Bookmark Camera \(on page 873\)](#)
- [GBOSS Security Camera \(on page 875\)](#)
- [Invisible Camera / UAV \(on page 876\)](#)
- [Spectator Units \(on page 877\)](#)
- [UAV Video Streaming \(on page 879\)](#)
- [Render Target Config \(on page 902\)](#)
- [Viewport Config \(on page 890\)](#)

During Scenario Execution, Instructors can visualize activity in the Scenario using VBS Editor in Execute Mode.

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

In addition, the administrator can record parts of or an entire scenario for After Action Review (AAR). For more information, see After Action Review (AAR) in the VBS4 AAR Manual.

## 15.1 Action Camera

The Action Camera is used to create cinematic cutscenes.

To add an Action Camera, select **(F8) Objects > VBS Scripts > Action Camera** in the Editor Objects List, and place it anywhere on the map.

- To use the Action Camera, you need to have more than one character or vehicle placed on the map.
- The Action Camera only works in multiplayer when it is local. If you want to use the Action Camera from a client machine, you must place it using VBS Editor during a multiplayer session.

To start the Action Camera, start the mission.

The Action Camera has the following basic controls:

- To view the camera help, press **F1**.
- To exit the camera, press **Esc** and click **OK**.
- Press the **Left / Right** arrows to switch to the previous / next camera shot.
- Press **Spacebar** to hold the current camera shot.
- To access the Action Camera menu, position the mouse cursor at the top of the screen.

The Action Camera menu has the following options:

Option	Description
<b>Playback Control</b>	The following options are available: <ul style="list-style-type: none"><li>• Fast Backward - Switches to the previous camera shot.</li><li>• Play - Holds the current camera shot.</li><li>• Fast Forward - Switches to the next camera shot.</li></ul>

<b>Preferred Shot</b>	The following options are available: <ul style="list-style-type: none"><li>• No Preference - The camera switches automatically from one shot to the next (from the following Preferred Shot options).</li><li>• Fixed Shot - The camera shot is fixed on the character / vehicle.</li><li>• Attached Shot - The camera moves with the target character / vehicle.</li><li>• Rotate Shot - The camera rotates around the character / vehicle.</li><li>• Wide Angle Shot - The camera displays the character / vehicle in wide-angle view.</li></ul>
-----------------------	--

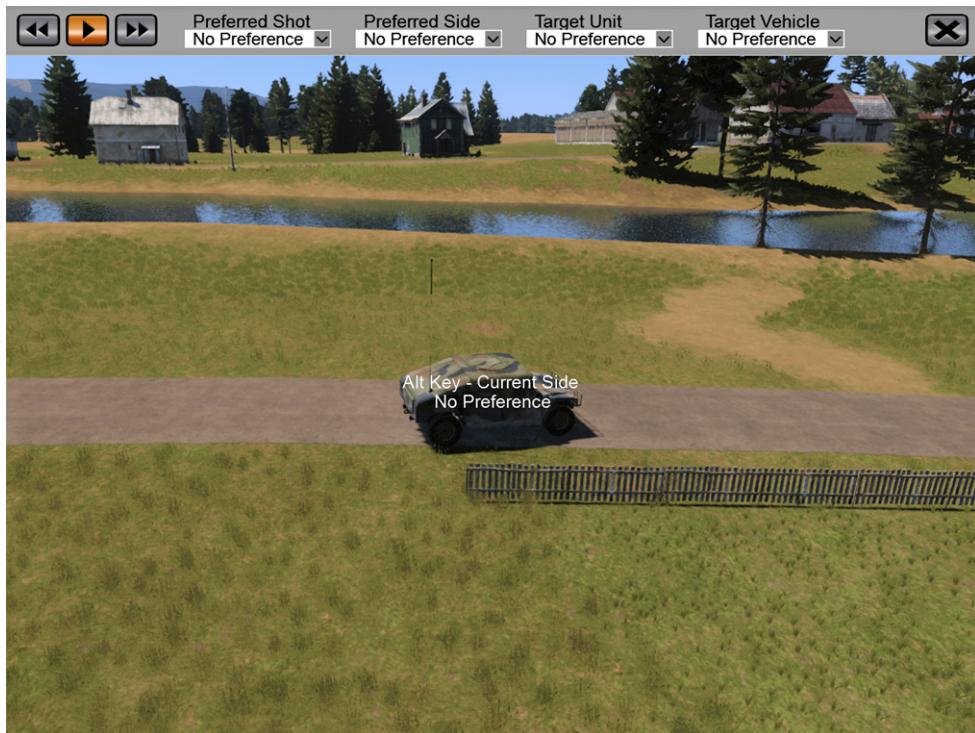


### TIP

Press and hold **Ctrl** and use the up / down arrow keys to scroll through the options.

Option	Description
Preferred Side	<p>The camera can display the characters / vehicles of the following sides:</p> <ul style="list-style-type: none"> <li>• No Preference - The camera switches from one side to another (the sides are listed in the drop-down list).</li> <li>• BLUFOR - The camera only displays BLUFOR characters / vehicles.</li> <li>• OPFOR - The camera only displays OPFOR characters / vehicles.</li> <li>• Civilian - The camera only displays Civilian characters / vehicles.</li> <li>• Independent - The camera only displays Independent characters / vehicles.</li> </ul> <div style="border: 1px solid green; padding: 5px; margin-top: 10px;"> <span style="color: green;">✓</span> <b>TIP</b>            Press and hold <b>Alt</b> and use the up / down arrow keys to scroll through the options.         </div>
Target Unit	A drop-down which allows you to select a specific character for the camera to display.
Target Vehicle	A drop-down which allows you to select a specific vehicle for the camera to display.

**Image-215: Action Camera menu**



## 15.2 Camera Editor Object

VBS4 allows you to create camera cut scenes by placing one or more Camera Editor Objects in your scenario.

Select the **Camera** Editor Object in the Editor Objects List and double-click the map in 2D or 3D view to place it.

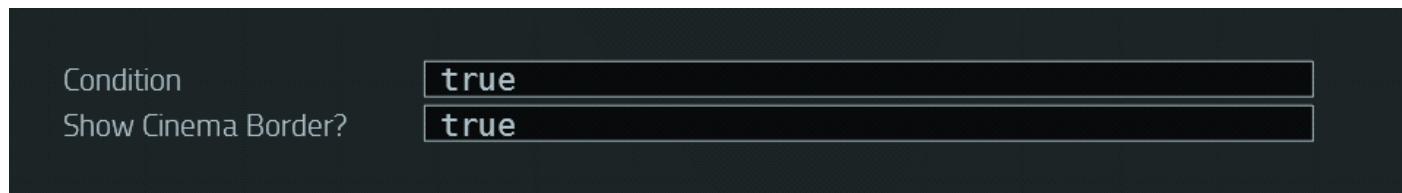
### ★ FEATURE NOTICE

It is not possible to record the Camera Editor Object waypoints path using the **Record to Disk?** option, which is not present. For more information, see Artificial Intelligence (AI) in the Introduction to VBS4 Guide.

### ℹ NOTE

The Camera Editor Object can only be placed in Prepare mode.

### Image-216: Camera Editor Object Properties



- **Condition** - This field accepts a scripted condition statement that must evaluate to true. VBS4 monitors the condition statement in-game and automatically starts the cutscene when the condition evaluates to true.

### EXAMPLE

- `!alive player` - The cut scene starts when the player dies.
- `count units group player < 4` - The cut scene starts when less than 4 units are left in the player group.
- `startCutscene` - The cut scene starts when the variable `startCutscene` equals true (`startCutscene = true`, which can be placed in a trigger **On Activation** field).
- `time > (60 * 5)` - The cut scene starts 5 minutes into the scenario.

### ℹ NOTE

In a multiplayer session, cut scenes run on all computers where **Condition** evaluates to true.

- **Show Cinema Border?** - Shows / hides the cinema border.

Once the camera is created, a camera icon becomes visible in 2D and 3D view of VBS Editor.

You can now set the camera position.

#### Follow these steps:

1. Right-click the camera icon and select **Set Camera Position**.

The camera switches to 3D view.

2. Manually fly the camera into its starting position.

3. Once the camera is in position, press **O** to save the position or **P** to cancel without saving the position (if saved, the Camera Editor Object instantly moves to where the 3D camera is).

The camera is positioned.

To create a cutscene, move the camera by assigning camera waypoints.

#### Follow these steps:

1. Right-click the camera waypoint and select **Assign New Waypoint**.

2. Position the waypoint the same way as you would assign a waypoint to a unit / vehicle (see [Waypoints \(on page 421\)](#)).

3. To set the camera position for the waypoint, right-click the waypoint and select **Set Camera Position** (repeat the steps from the prior procedure to complete position setting).

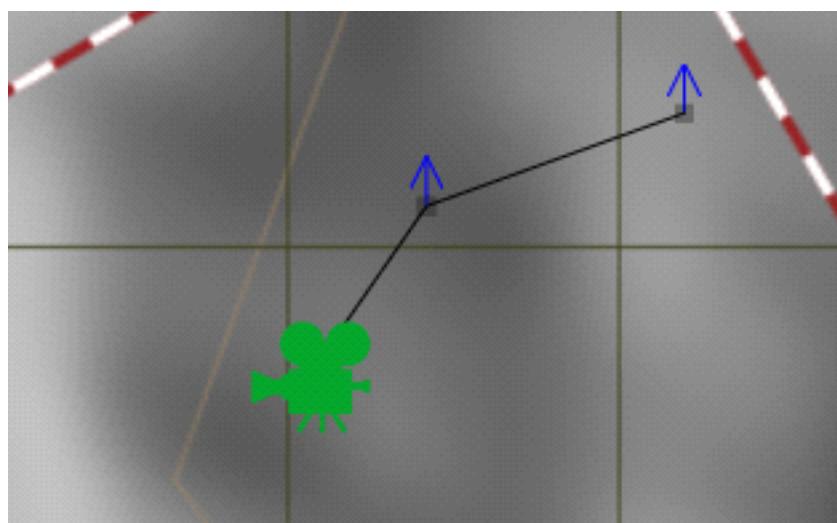
#### NOTE

If still want to modify the camera position, you can move the camera waypoint in 3D as per a normal waypoint object. Left-click and drag the camera object as required or raise its altitude by holding down the **LAlt**, holding down the **LMB**, and moving the mouse forward and back.

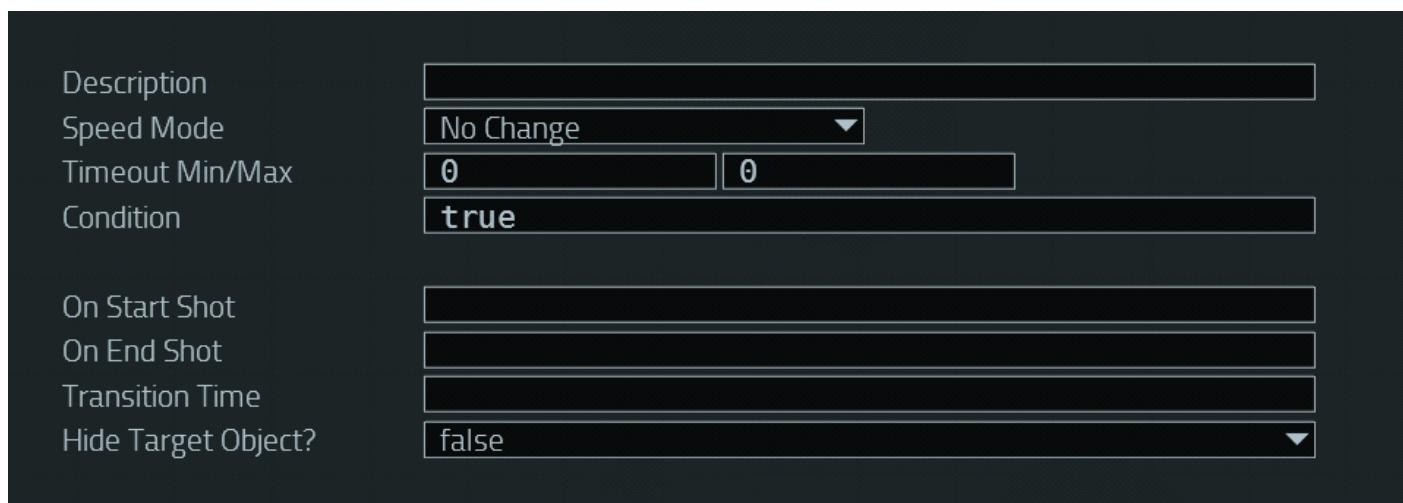
4. To assign more waypoints, right-click the waypoint and select **Add New Waypoint**, then click the location for the next waypoint.

The camera has waypoints.

### Image-217: Camera Editor Object with waypoints



### Image-218: Add Camera waypoint options



Option	Description
<b>Description</b>	Description of the camera waypoint.
<b>Speed Mode</b>	Allows you to define the speed of the camera. The speed defaults to <b>Normal</b> , if this combo box states <b>No change</b> for the first waypoint. You can also select <b>Limited</b> , <b>Full</b> , or <b>Custom</b> . If <b>Custom</b> is selected, you can manually enter the camera speed km/h.
<p><b>NOTE</b></p> <p>If <a href="#">Transition Time (on the next page)</a> is defined later in the dialog then the speed setting will have no effect.</p>	
<b>Timeout Min/Max</b>	If defined, the camera pauses at this waypoint for a random amount of time between <b>Min</b> and <b>Max</b> .

Option	Description
<b>Condition</b>	A scripted condition that must evaluate to true before the camera moves past this waypoint.
<b>On Start Shot</b>	Script code that is executed when the camera starts moving to the waypoint.
<b>On End Shot</b>	Script code that is executed when the camera reaches this waypoint (does not execute unless <b>Timeout</b> and <b>Condition</b> values are met).
<b>Transition Time</b>	This setting can be used to override the speed of the camera, allowing you to define an amount of time in seconds that the camera takes to move to the waypoint.
<b>Hide Target Object?</b>	If the camera is linked to an object (see <a href="#">Linking Camera Waypoints to Objects (below)</a> ), then the target object is hidden from view throughout the scenario. Not applicable for linked units or vehicles.

## 15.2.1 Linking Camera Waypoints to Objects

You may assign a camera target to any camera waypoint by linking from the camera waypoint to a unit / vehicle / group / object. The camera turns to the targeted object when it reaches the given camera waypoint.

1. Right-click the waypoint and select one of the following:

- **Look at Unit**
- **Look at Vehicle**
- **Look at Group**
- **Look at Object**

2. Click the unit / vehicle / group / object you want the camera to look at.

The camera looks at the unit / vehicle / group / object.

## 15.2.2 Scripting the Camera

When active, the camera can be accessed by the global variable `camera_object`. It is possible to target the camera manually in the [On Start Shot \(above\)](#) field. For example, if you want to position the camera relative to a vehicle named `veh1`, use the following script:

```
camera_object camSetTarget veh1;
camera_object camSetRelPos [10,-20,2];
camera_object camCommit 0;
```

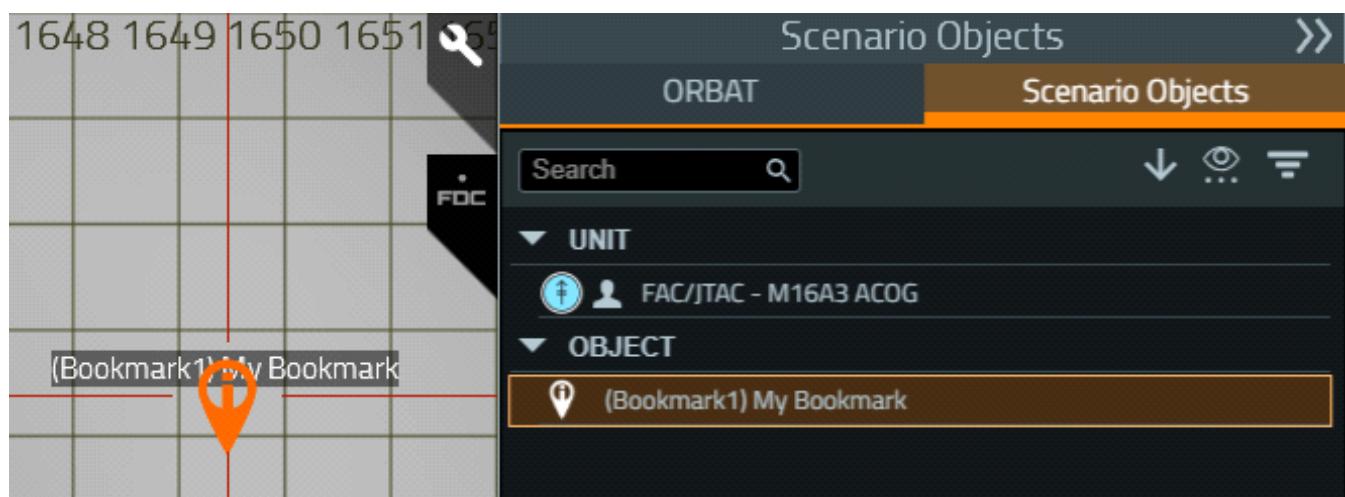
## 15.3 Bookmark Camera

VBS4 enables you to place bookmarked positions in a mission with fixed camera viewpoints. The bookmark cameras enable mission administrators to quickly change their perspective in running scenarios to these saved viewpoints.

### To place a Bookmark Camera, follow these steps:

1. Open your mission in VBS Editor.
2. Select **Bookmark** from the Editor Objects List, right-click a location on the map, and select **New Object**.
3. In the Object Properties dialog, input a **Name** and an optional **Description**, and click **OK**.

VBS Editor adds a Bookmark icon to the map, which is only visible to administrators in 2D or 3D views, and to the Object Tree, visible with the **All Types** or **Objects** filter.



4. Right-click the Bookmark object, and select **Set Bookmark Camera**.

The view switches to 3D mode with control of the camera viewpoint.

5. See [Interacting with Editor Objects \(on page 52\)](#) to position the camera with the view you want.
6. Press **O** to save the camera position, or **P** to cancel.

When saved, the Bookmark object moves to the camera position on the map and saves the camera view as its perspective. The Bookmark is available for switching perspectives in Execute mode.

### To switch Bookmark Camera perspectives, follow these steps:

1. In the running scenario access Execute mode.
2. Right-click the Bookmark object in the 2D or 3D view or in the Scenario Objects Panel, and select **View Bookmark Camera**.

Your perspective switches to the 3D view from the Bookmark Camera viewpoint.

**To delete the Bookmark camera view / object, follow these steps:**

- To delete the Bookmark camera view, right-click the Bookmark object in the 2D or 3D view or in the Scenario Objects Panel, and select **Delete Bookmark Camera**.
- To delete the Bookmark object, right-click the Bookmark object in the 2D or 3D view or in the Scenario Objects Panel, and select **Delete Object**.

**⚠️ WARNING**

It is not possible to delete the Bookmark object, before deleting the Bookmark camera view.

The Bookmark camera view / object is deleted.

## 15.4 GBOSS Security Camera

It is possible to remotely access security video feeds using the GBOSS Security Camera.

### **NOTE**

The video recording feature is disabled in VBS4.

#### Follow these steps:

1. Place the GBOSS Security Camera in VBS Editor (**Vehicle > Unmanned Vehicles > GBOSS Security Camera**).
2. Place a [Control Links \(on page 618\)](#) in VBS Editor, choose **Security Camera** as **Type of Control Station**, and link to the unit or vehicle as required (not to the GBOSS Camera).
3. While in-game, when controlling the GBOSS camera, press **Quick Menu (Left Windows)** to access the Quick Menu (see Quick Menu Actions in the VBS4 Trainee Manual), and use the **SECURITY CAMERA** action to start the video feed, and the **VEHICLE > EXIT SECURITY CAMERA** (when viewing the GBOSS camera video feed) to stop the video feed.

**Image-219: Security Camera station**

The screenshot shows the 'Control Station' configuration window for a 'Security Camera'. The window has several sections with dropdown menus and input fields:

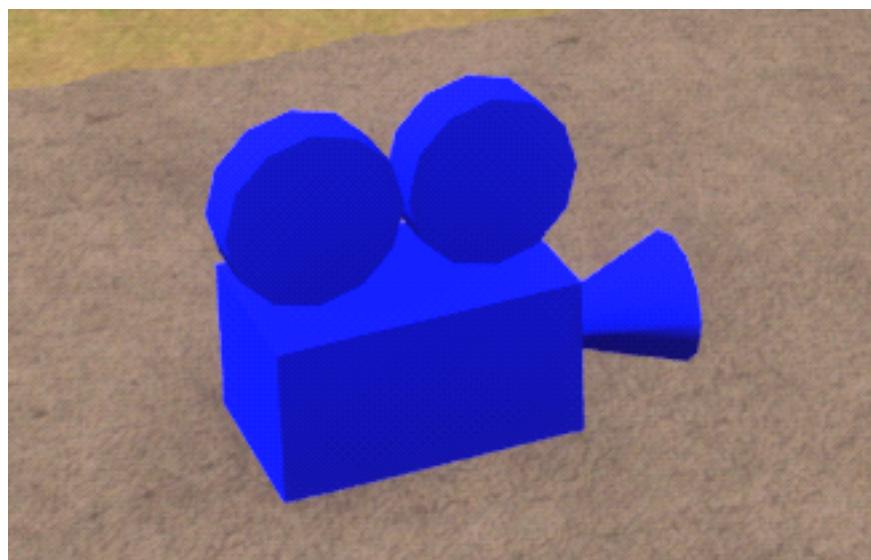
- Type of Control Station:** Security Camera
- Origin /W/S/Zone/Hem:** -383585 | 4578300 | 33 | North
- Coordinates Type:** UTM
- Allow Camera Locking:** True
- Activate on Veh Entry:** False
- Activate on Msn Start:** False
- Show Hints:** Show Hints
- Can Mark Tgts on Map:** True
- Relocate Locked Target:** Allow Relocating

## 15.5 Invisible Camera / UAV

An invisible camera and UAV (both cannot be seen or heard by other entities) can be found under **Vehicles > Unmanned Vehicles > Invisible Camera and Invisible UAV Camera**.

The invisible camera and UAV operate in the same was as their visible counterparts. Administrators can see them as camera icons in 2D Map views and as generic objects in the 3D Camera views.

**Image-220: Invisible Camera and Invisible UAV**



## 15.6 Spectator Units

Spectator units are intended for administrators or observers, who do not want to control entities, but only be scenario spectators.

Spectator units can be found under **Unit > VBS Objects** in the Editor Objects List.

### NOTE

The position of spectator unit Editor Objects does not change in the VBS Editor map.

- **Invisible Spectator (Walking)**

The **Invisible Spectator (Walking)** represents an invisible person, who is similar to a real person (for example, they can use actions and get into vehicles) but can walk through walls / objects, is invisible, and cannot take damage.

### NOTE

Administrators can still wound / kill units of this type.

- **Invisible Spectator (RTE)**

Starting the mission as an **Invisible Spectator (RTE)** automatically opens VBS Editor. If VBS Editor is closed, the administrator takes control of an **Invisible Spectator (Walking)**.

- **Invisible Spectator (Camera / Free Camera)**

Starting the mission as an **Invisible Spectator (Camera)** or **Invisible Spectator (Free Camera)**, automatically switches to a flying camera. **Invisible Spectator (Free Camera)** is a simple flying camera, and **Invisible Spectator (Camera)** has cinematic effects.

The following camera controls are available for these cameras:

Key	Action	Control Name
W	Forward	Move Editor Camera Forward
A	Left	Move Editor Camera Left
D	Right	Move Editor Camera Right
S	Back	Move Editor Camera Back
Q	Up	Raise Editor Camera
Z	Down	Lower Editor Camera
<b>LShift + Move Key</b>	Faster	Editor Camera Turbo

The **Invisible Spectator (Camera)** has additional cinematic-effect controls:

Key	Action
I	Toggle Letterbox
G	Toggle Grid (the camera view is placed into a rectangular grid)
H	Show / Hide Cinematic-Effect Controls
L	Toggle Crosshair
M	Show / Hide the 2D map
Delete	Camera Inertia On / Off
Keypad + / -	Zoom In / Out
<b>Mouse Scroll Up / Mouse Scroll Down</b>	Zoom In / Out
V	Cancel Camera Mode

After exiting the camera mode (by pressing **V**), the administrator takes control of an **Invisible Spectator (Walking)**. You can restart the camera mode using the Quick Menu option **SWITCH TO CAMERA MODE** (see Quick Menu Actions in the VBS4 Trainee Manual).

Starting the mission as a VR Spectator / VR Planner automatically opens VBS Editor in free camera mode. If VBS Editor is closed, the administrator takes control of an **Invisible Spectator (Walking)** unit.

## 15.7 UAV Video Streaming

VBS4 enables you stream the camera view from a UAV to an external NATO - STANAG 4609 type imagery system. UAV video streaming is set up and triggered by an Instructor, and shows the view of the player unit that is in control of the UAV. Based on the streaming set up, the resulting video can be viewed outside of VBS.

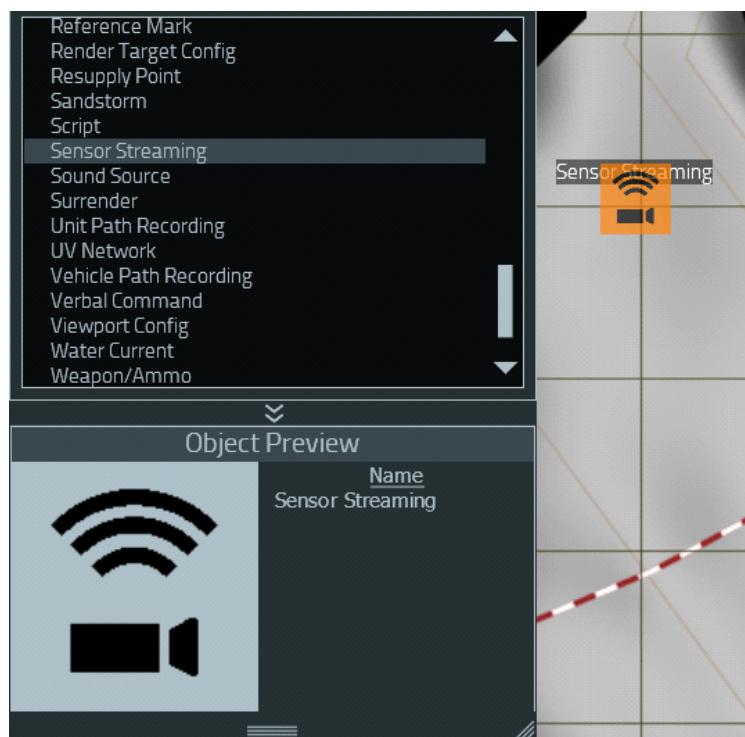
UAV video streaming is made possible using the following Editor Objects (EOs):

- [Control Links \(on page 618\)](#)
- [Sensor Streaming \(below\)](#)

The following aspects of UAV streaming are discussed (usually executed in the following order):

1. If necessary, how to edit the [Streaming.xml File \(on the next page\)](#).
2. How to [Place and Set Up the Editor Objects \(on page 882\)](#), and edit the [DefaultStreamConfiguration.json File \(on page 885\)](#).
3. How to [Link the Editor Objects to a Unit / UAV \(on page 886\)](#).
4. [Starting the Stream \(on page 887\)](#) and the [Metadata Passed to the Imagery System \(on page 887\)](#).
5. The [Limitations \(on page 889\)](#) that UAV Video Streaming has.

**Image-221: Sensor Streaming**



## 15.7.1 Streaming.xml File

Before starting VBS4, you can edit the values in this file to adjust video streaming settings to suit your particular setup. The file is found at the following locations:

Default VBS4 Profile location: `%LOCALAPPDATA%\VBS4\Settings\Streaming.xml`

Other VBS4 Profile location: `Path\Settings\Streaming.xml`

The `Path` is specified using the `-profiles=Path` Command Line option. For more information, see Command Line and Launcher Options in the VBS4 Administrator Manual.

An excerpt from the beginning of the `Streaming.xml` file.

```
<Streaming>
  <StreamOnStartup>false</StreamOnStartup>
  <Source>
    <Type>RenderTarget</Type>
    <RenderTargetName>Main</RenderTargetName>
    <ViewID>1</ViewID>
    <Crop>
      <Left>0.0000000000</Left>
      <Top>0.0000000000</Top>
      <Right>1.0000000000</Right>
      <Bottom>1.0000000000</Bottom>
    </Crop>
  </Source>
  <Encoder>
    <Type>Software</Type>
  </Encoder>
  <Output>
  ...
  ...
```

### TIP

If the `Streaming.xml` file is not present, run VBS4 to generate it. However, ensure that VBS4 is closed before attempting to edit the file.

### NOTE

The settings described here may be edited. However, it is not recommended to edit other settings in the `Streaming.xml` file.

## Video Quality Settings

These settings affect the quality of the resulting video output.

## **WARNING**

Settings are sensitive and should be edited with care to achieve video quality.

Setting	Type	Description
<b>Width</b>	Integer	Video width (pixels).
<b>Height</b>	Integer	Video height (pixels).
<b>Bitrate</b>	Integer	Bitrate of the video.
<b>Framerate</b>	Integer	Framerate of the video.
<b>KeyframeInterval</b>	Integer	Interval at which a full-frame (i-frame) is sent / produced.

## Stream Cropping Settings

You can crop the video stream view to hide parts of the streamed frame so that, for example, symbology and certain VBS UI features are not visible to Trainees.

Adjust the following settings in the `<Crop>` section of the `Streaming.xml` file.

Setting	Type	Description
<b>Left</b>	Float	Adjust the value to crop the left-side of the frame.
<b>Top</b>	Float	Adjust the value to crop the top of the frame.
<b>Right</b>	Float	Adjust the value to crop the right-side of the frame.
<b>Bottom</b>	Float	Adjust the value to crop the bottom of the frame.

The settings define relative coordinates with values between `0` and `1`, where `0` is the left / top of the frame and `1` is right / bottom of the frame.

### Example:

With the VBS resolution set to 1920 x 1200 px, and the stream resolution set to 1280 x 720 px, if the values are set as follows, 10% of the view is cropped from the top of the frame, and 20% is cropped from the right of the frame.

```
<Crop>
  <Left>0.00000000</Left>
  <Top>0.10000000</Top>
  <Right>0.80000000</Right>
  <Bottom>1.00000000</Bottom>
<Crop>
```

The resulting real stream dimensions are 1280 x 720 px (showing 1728 x 864 px crop region of the VBS view scaled to 1280 x 720 px).

The **red** rectangle shows the remaining area once the view is cropped.



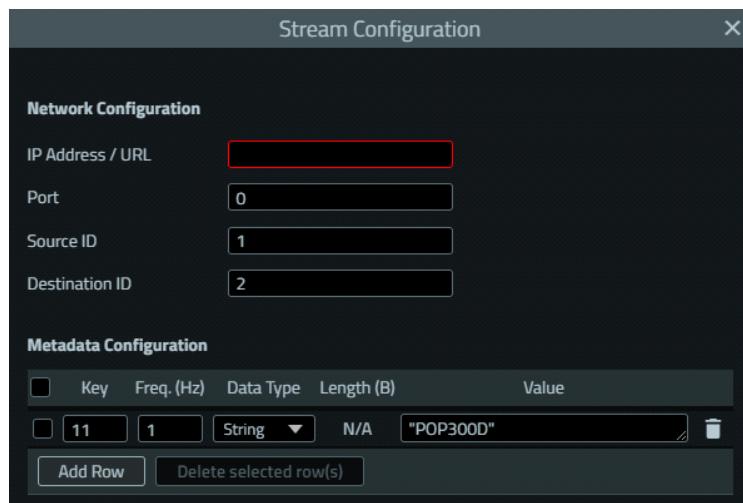
More information about these settings can be found in Streaming Settings in the VBS Blue IG Manual.

## 15.7.2 Place and Set Up the Editor Objects

The following procedure explains how to place and set up the required EO s. Multiple Sensor Streaming EO s can be used as each UAV requires its own Sensor Streaming EO to enable video streaming. The EO s can be placed and set up in either Prepare Mode or Execute Mode.

### Follow these steps:

1. Create a scenario that includes one or more units and UAVs.
2. Select **Editor Objects List > Control Links (on page 618)** and double-click the map to place it.
3. Select **Editor Objects List > Sensor Streaming** and double-click the map.



#### 4. Enter the **Network Configuration** information:

 **NOTE**

If you enter invalid values in any of the fields, a red tooltip advises what is invalid.

Field	Description
<b>IP Address / URL</b>	Mandatory. The IP address / URL on which the video is streamed.
<b>Port</b>	The port on which the video is streamed.
<b>Source ID</b>	ID number of the UAS element which is originating / transmitting the message.
<b>Destination ID</b>	ID number for the UAS element for the intended recipient of the message.

#### 5. Enter the **Metadata Configuration** information:

Click **Add Row** to add custom metadata, and enter the following information in each row.

Field	Description
<b>Key</b>	Unique number identifier for the metadata.
<b>Freq. (Hz)</b>	The update frequency of the given metadata, in Hertz.
<b>Data Type</b>	Data type of the metadata output. Use the drop-down to select from the following data types: <ul style="list-style-type: none"> <li>• Unit 8 / 16 / 32 / 64</li> <li>• Int 8 / 16 / 32 / 64</li> <li>• Float 32 / 64</li> <li>• String</li> </ul>
<b>Length(B)</b>	Length of the output metadata value. Expressed in bytes.
<b>Value</b>	Must be a valid SQF script. The return value of this script is used as the value of the metadata.



**EXAMPLE**

String constant: "Example String"

Number constant: 1234.5

Script example: position player select 0

For more information about SQF scripting, see Scripting Overview in the VBS4 Scripting Manual.

#### 6. Click **Save Configuration**.

**NOTE**

To remove metadata, open the Stream Configuration dialog, and do one of the following:

- Check the **box** at the beginning of the rows of the metadata you want to remove, and click **Delete Selected Row(s)**.
- Click the **Trash** icon at the end of the row you want to remove.

**To make changes in the Stream Configuration dialog, follow these steps:**

1. Do one of the following:

- Right-click the **Sensor Streaming EO**, and click **Edit Object** in the context menu.
- Right-click the **Sensor Streaming EO** entry in the Scenario Objects Panel, and click **Edit Object** in the context menu.

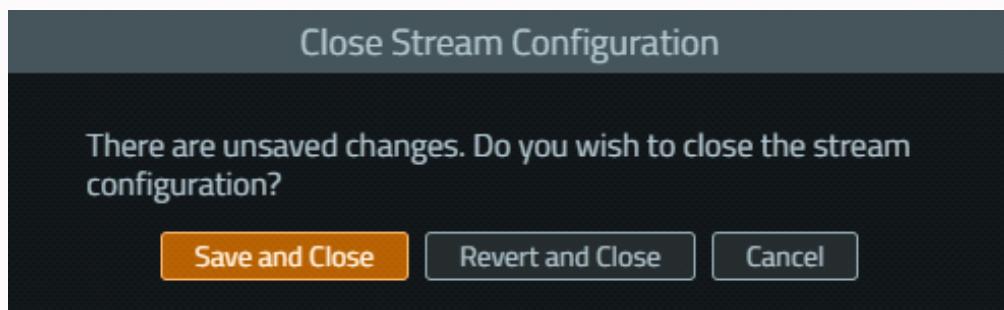
The Stream Configuration dialog opens.

2. Make your changes and click one of the following:

- **Save Configuration** - Saves the settings for the current Sensor Streaming EO.
- **Set As Default** - Saves the current settings in the Stream Configuration dialog so that they are already there the next time you place a new Sensor Streaming EO. See also [DefaultStreamConfiguration.json File \(on the next page\)](#).
- **Revert Changes** - Reverts to the settings saved when you clicked **Save Configuration**.

**WARNING**

If you try to close the Stream Configuration dialog without clicking one of the options mentioned in step 2, you see the following dialog.



### 15.7.2.1 DefaultStreamConfiguration.json File

The values that are saved when you click **Set As Default** in the Stream Configuration EO dialog are stored in the **DefaultStreamConfiguration.json** file, which is found at the following locations:

- Default VBS4 Profile location:

```
%LOCALAPPDATA%\VBS4\Settings\SensorStreamController\DefaultStreamConfiguration.json
```

- Other VBS4 Profile location:

```
Path\Settings\SensorStreamController\DefaultStreamConfiguration.json
```

The **Path** is specified using the **-profiles=Path** Command Line option. For more information, see Command Line and Launcher Options in the VBS4 Administrator Manual.



#### TIP

**Optional.** The values can be edited here as an alternative to clicking **Set As Default**. If the file is not present, run VBS4 to generate it. However, ensure that VBS4 is closed before attempting to edit the file.

```
{
  "data" :
  {
    "metadata" :
    [
      {
        "dataType" : "String",
        "frequency" : 1.0,
        "key" : 11,
        "value" : "\"POP300D\""
      }
    ],
    "network" :
    {
      "address" : "",
      "destinationId" : 2,
      "port" : 0,
      "sourceId" : 1
    }
  },
  "version" : 1
}
```

### 15.7.3 Link the Editor Objects to a Unit / UAV

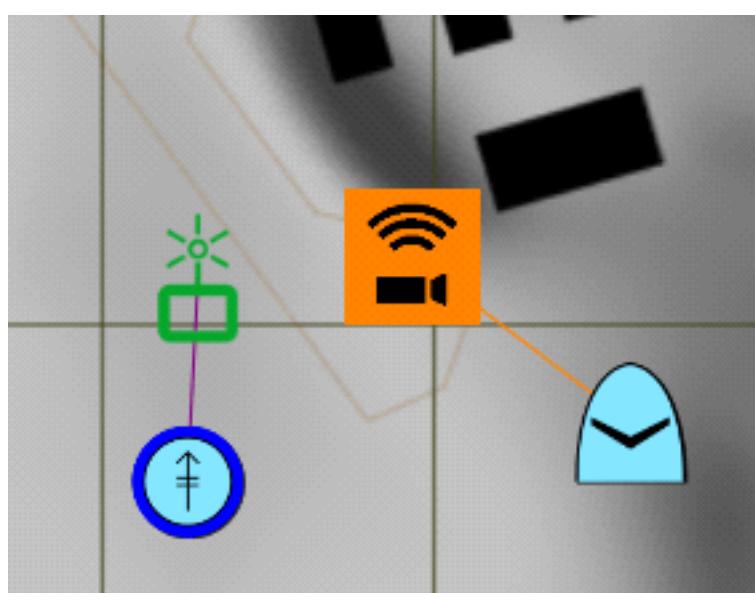
For video streaming to work, the [Control Links \(on page 618\)](#) must be linked to a **unit**, and the Sensor Streaming EO must be linked to a **UAV**.

**Follow these steps:**

1. Link the [Control Links \(on page 618\)](#) to a unit.
2. Right-click the **Sensor Streaming EO**, and select **Link to Vehicle** in the context menu.  
A black arrow is attached to the Sensor Streaming EO and your cursor.
3. Drag your mouse and click on a **UAV**.

The black arrow changes to an **orange** line, which indicates that the UAV is linked to the Sensor Streaming EO.

**Image-222: Linked UAV**



**i** **NOTE**

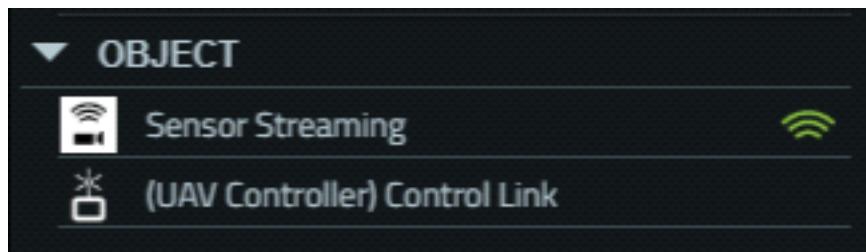
If you repeat steps 2 and 3 and link to a different UAV, the original link to the first UAV is deleted. This is because a Sensor Streaming EO can only be linked to one UAV at a time. Each UAV requires its own Sensor Streaming EO.

## 15.7.4 Starting the Stream

Once the mission starts, open the Stream Configuration EO dialog and click **Start Stream**. The Sensor Streaming radio wave indicator in the Scenario Objects Panel changes to **green**, which confirms that video streaming is active.

### **WARNING**

A player unit must be in control of a UAV before you can start streaming. For more information, see Using UAVs in the VBS4 Trainee Manual.



### 15.7.4.1 Metadata Passed to the Imagery System

The following mandatory metadata is passed to the STANAG 4609 Imagery System. The mandatory metadata is sent every second while the stream is running.

Metadata	Key	Description
<b>Checksum</b>	1	Used to detect errors within a UAV Local Set packet.
<b>UNIX Time Stamp</b>	2	Coordinated Universal Time (UTC) represented in the number of microseconds elapsed since midnight (00:00:00), January 1, 1970.
<b>Mission ID</b>	3	Descriptive Mission Identifier to distinguish event or sortie.
<b>Platform Heading Angle</b>	5	Aircraft heading angle. Relative between longitudinal axis and True North measured on the horizontal plane.
<b>Platform Pitch Angle</b>	6	Aircraft pitch angle. Angle between longitudinal axis and horizontal plane. Positive angles above horizontal plane.
<b>Platform Roll Angle</b>	7	Platform roll angle. Angle between transverse axis and transverse longitudinal plane. Positive angles for lowered right wing.
<b>Platform Designation</b>	10	Use Platform Designation String.

Metadata	Key	Description
<b>Image Source Sensor</b>	11	String of image source sensor.
		<p><b>NOTE</b></p> <p>This is not sent as mandatory metadata. Instead, use the custom metadata field in the Stream Configuration dialog (see <a href="#">Place and Set Up the Editor Objects (on page 882)</a>).</p>
<b>Image Coordinate System</b>	12	String of the image coordinate system used.
<b>Sensor Latitude</b>	13	Sensor Latitude based on WGS84 ellipsoid.
<b>Sensor Longitude</b>	14	Sensor Longitude based on WGS84 ellipsoid.
<b>Sensor True Altitude</b>	15	Altitude of sensor as measured from Mean Sea Level (MSL).
<b>Sensor Horizontal Field of View</b>	16	Horizontal field of view of the selected imaging sensor.
<b>Sensor Vertical Field of View</b>	17	Vertical field of view of the selected imaging sensor.
<b>Sensor Relative Azimuth Angle</b>	18	Relative rotation angle of sensor to platform longitudinal axis. Rotation angle between platform longitudinal axis and camera pointing direction as seen from above the platform.
<b>Sensor Relative Elevation Angle</b>	19	Relative Elevation Angle of sensor to platform longitudinal-transverse plane. Negative angles down.
<b>Sensor Relative Roll Angle</b>	20	Relative roll angle of sensor to aircraft platform. Twisting angle of camera about lens axis. Top of image is zero degrees. Positive angles are clockwise when looking from behind camera.
<b>Slant Range</b>	21	Slant range in meters. Distance to target.
<b>Target Width</b>	22	Target width within sensor field of view. It is the ground distance between the left and right side of the frame, in meters.
<b>Frame Center Latitude</b>	23	Terrain Latitude of frame center. Based on WGS84 ellipsoid.
<b>Frame Center Longitude</b>	24	Terrain Longitude of frame center. Based on WGS84 ellipsoid.
<b>Frame Center Elevation</b>	25	Terrain elevation at frame center relative to Mean Sea Level (MSL).

Metadata	Key	Description
<b>Security Local Metadata Set</b>	48	Local set tag to include the ST0102 Local Set Security Metadata items within ST0601. Use the ST0102 Local Set Tags within the ST0601 Tag 0d48.
<b>UAS LDS Version Number</b>	65	Version number of the UAS LS document used to generate a source of UAS LS KLV metadata.

## 15.7.5 Limitations

The following limitations apply:

- Streaming works for UAVs and UGVs controlled using a Control Link. Additionally, you can stream from any vehicle from the first turret defined in the vehicle turrets configuration.
- If VBS4 crashes for the UAV operator, the stream stops and the Stream Configuration dialog shows the incorrect status and is blocked from any modifications until a Trainee takes control of the UAV (see also Turrets in the in the VBS Developer Reference).

## 15.8 Viewport Config

The Viewport Config Editor Object is similar to the IG View Object (see [Add IG Viewpoints to Scenarios \(on page 220\)](#)) and allows you to:

- Add a Viewport / Camera to a scene.
- Configure the Viewport / Camera and where it is rendered (see [Render Target Config \(on page 902\)](#)).
- Link the Viewport / Camera to other entities in the scene.

Similarly to the IG View Object, the Viewport Config Editor Object is able to load a predefined configuration XML file that automatically sets up the Viewport / Camera as defined in the file. For more information, see [Viewport Configuration File \(on page 895\)](#).

For a list of limitations, see:

- [General Viewport Limitations \(on page 900\)](#)
- [Viewport Config Editor Object Limitations \(on page 901\)](#)
- [Render Target Config Editor Object Limitations \(on page 906\)](#)

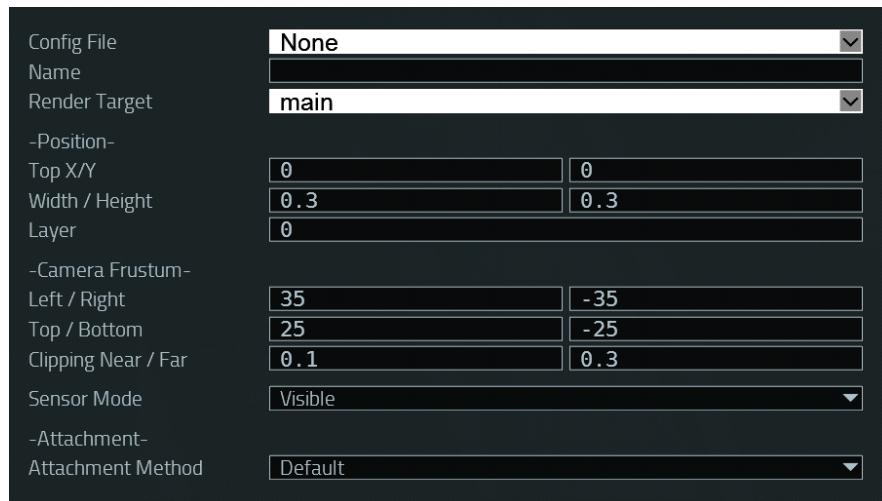
### Follow these steps:

1. Select Viewport Config in the Editor Objects List.
2. Double-click a location on the map where you want to place the Viewport Config Editor Object.

#### NOTE

The actual Viewport / Camera location depends on the location of the entity (another Editor Object) that the Viewport Config Editor Object is linked to and how it is configured. For more information, see [Attachment \(on page 894\)](#) and step 5.

The Objects Properties dialog opens.



3. Set the [Viewport Settings \(on page 893\)](#).

4. Click **OK**.

The Viewport Config Editor Object is placed on the map.

5. (Optional) If the **Attachment** setting is used, link the Viewport Config Editor Object to other Editor Objects:

- a. Right-click the Viewport Config Editor Object on the map.
- b. To link to an Editor Object where the Viewport / Camera position needs to be, select **Link to Entity**.
- c. Click the needed Editor Object.
- d. To link to an Editor Object (for example, a unit) seeing the Viewport / Camera input, select **Link to Observer**.

 **NOTE**

The **Link to Observer** option allows the user to specify what instance the Viewport / Camera and its [Render Target \(on page 893\)](#) is created on. If the Viewport Config Editor Object has an Observer set, then it only becomes active (created) on the VBS4 instance that has the player as the selected Observer. This allows users to create Scenarios that have Viewports / Render Targets set up for multiple VBS4 Clients, without all the Viewports showing up for each client.

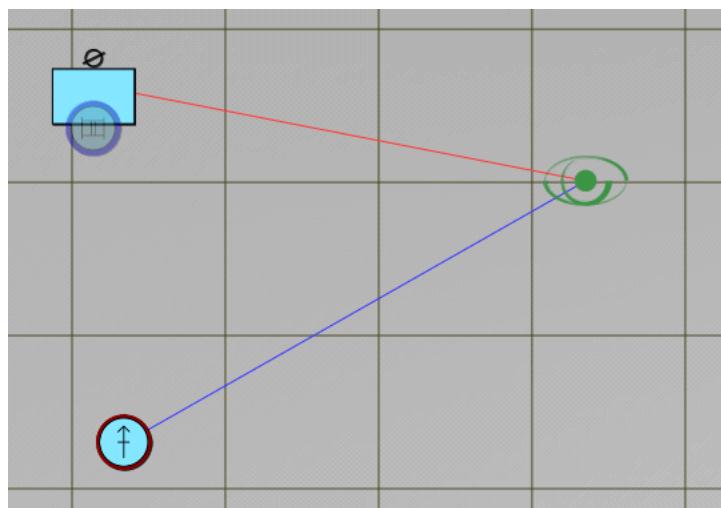
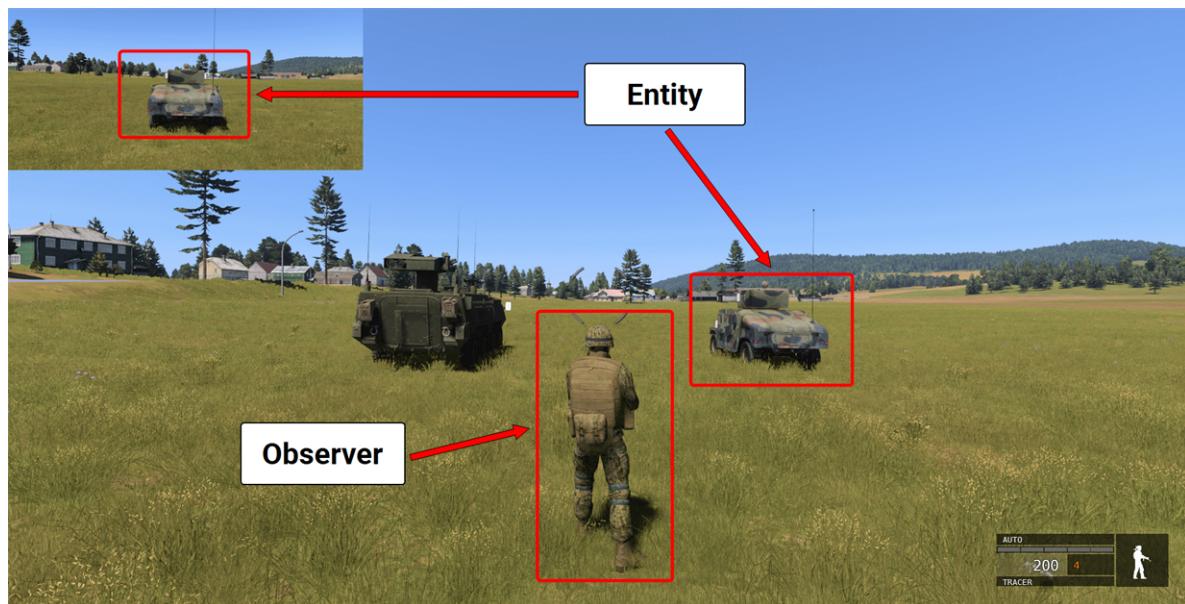


**WARNING**

If a Viewport Config Editor Object does not set the Observer, then the Viewport / Camera is only created on the VBS4 instance that is the server. Make sure that the server instance is not a *headless host* (for example, a Dedicated Server), in which case, no image rendering takes place.

- e. Click the needed Editor Object.
- f. Double-click the Viewport Editor Object and set the [Attachment \(on page 894\)](#) settings.
- g. Click **OK**.

The Viewport Config Editor Object is linked to other Editor Objects.

**Image-223: Linked Entity (red line) and Observer (blue line) in the 2D View****Image-224: Linked Entity and Observer in the 3D View**

## Viewport Settings

Setting	Description
<b>Config File</b>	Select a Viewport Configuration File to use, based on the values in the drop-down.  <b>TIP</b> The values that are set when selecting the Viewport Configuration File can be overridden by manually editing individual values listed in the Object Properties dialog, before clicking <b>OK</b> . If the Viewport Configuration File is updated, any pre-existing Viewports created by the original file maintain the values defined prior to the update. For information on how to create Viewport Configuration Files, see <a href="#">Viewport Configuration File (on page 895)</a> .
<b>Name</b>	Name of the Viewport / Camera.
<b>Render Target</b>	Available targets that the Viewport / Camera can be rendered to, based on the values in the drop-down. For information on how to create Render Targets, see <a href="#">Render Target Config (on page 902)</a> .
<b>Position</b>	Viewport / camera position: <ul style="list-style-type: none"><li>• <b>Top X / Y</b> - Where the X and Y coordinates of the top-left corner of the Viewport are rendered on the Render Target. The values are relative and in the range of [0.0, 1.0].</li><li>• <b>Width / Height</b> - Width / height of the Viewport. The values are relative and in the range of [0.0, 1.0].</li><li>• <b>Layer</b> - Viewport layer number (layers with higher numbers are rendered on top).</li></ul>
<b>Camera Frustum</b>	Camera frustum settings: <ul style="list-style-type: none"><li>• <b>Left / Right</b> - Left / right side Field of View (FOV) angle, in degrees.</li><li>• <b>Top / Bottom</b> - Top / bottom side FOV angle, in degrees.</li><li>• <b>Clipping Near / Far</b> - Near / far clipping distance, in meters.</li></ul>

Setting	Description
<b>Sensor Mode</b>	Camera sensor mode: <ul style="list-style-type: none"><li>• <b>Visible</b> - Default sensor mode.</li><li>• <b>Night Vision</b> - Night vision mode.</li><li>• <b>TI - White Hot</b> - White hot Thermal Imaging (TI) mode.</li><li>• <b>TI - Black Hot</b> - Black hot TI mode.</li><li>• <b>TI - Green Hot</b> - Green hot TI mode.</li><li>• <b>TI - Green Cold</b> - Green cold TI mode.</li><li>• <b>TI - Red Hot</b> - Red hot TI mode.</li><li>• <b>TI - Red Cold</b> - Red cold TI mode.</li><li>• <b>TI - White Hot - Red Spectrum</b> - White hot in red spectrum TI mode.</li><li>• <b>TI - White Hot - Full Spectrum</b> - White hot in full spectrum TI mode.</li></ul>
<b>Attachment</b>	You can attach the Viewport Config Editor Object to another Editor Object (such as a unit or a vehicle), so that the Viewport / Camera shows that Editor Object perspective. <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"><p><b>i NOTE</b></p><p>See Step 5 of how to link the Viewport Config Editor Object to another Editor Object first, before using the attachment settings.</p></div>

Select the **Attachment Method** based on the values in the drop-down.

- **Default** - Default view (**Third Person**).
- **First Person** - First-person view.
- **Third Person** - Third-person view.
- **Optics** - Optics view (if the Editor Object model has an optics device).
- **Custom** - Custom view:
  - **Attachment Point** - Attachment point based on the values in the drop-down:
    - **Origin** - Origin point of the Editor Object.
    - **Memory Point** - Memory point on the Editor Object. When selected, another drop-down with the available memory points for the linked Editor Object appears.
    - **Bone** - Bone on the Editor Object. When selected, another drop-down with the available bones for the linked Editor Object appears.
  - **Offset X / Y / Z** - X / Y / Z coordinate offset (in meters) from the attachment point.
  - **Yaw / Pitch / Roll** - Yaw / pitch / roll angle offset (in meters) from the attachment point.

## 15.8.1 Viewport Configuration File

A Viewport Configuration File allows you to use predefined Viewport / Camera settings, instead of setting them manually in the Viewport Config Editor Object.

### NOTE

The Viewport Configuration Files are stored in:

`\VBS_Installation\Components\ViewportControl\Configs\ViewportConfigs\`

The Viewport Configuration File is an XML file that uses XML-tag properties for the Viewport / Camera settings.

The XML properties are:

Property	Description
<code>&lt;Camera&gt;</code>	Defines the Viewport / Camera <a href="#">Name (on page 893)</a> . The <code>Name</code> attribute is used to define the Viewport / Camera name. All the other properties are defined in <code>&lt;Camera&gt;</code> .
<code>&lt;RenderTarget&gt;</code>	Defines the <a href="#">Render Target (on page 893)</a> . The <code>Name</code> attribute defines the Render Target. <b>Example:</b> <pre>&lt;RenderTarget Name="MyCustomRenderTarget" /&gt;</pre>

Property	Description
<Sensor>	<p>Defines the <a href="#">Sensor Mode (on page 894)</a>.</p> <p>The <b>Name</b> attribute defines the Sensor Mode and can have the following values:</p> <ul style="list-style-type: none"><li>• "none" - No sensor.</li><li>• "visible" - Matches the <b>Visible</b> Sensor Mode in the Viewport Config Editor Object Properties.</li><li>• "nvg" - Matches the <b>Night Vision</b> Sensor Mode in the Viewport Config Editor Object Properties.</li><li>• "ti_whitehot" - Matches the <b>TI - White Hot</b> Sensor Mode in the Viewport Config Editor Object Properties.</li><li>• "ti_blackhot" - Matches the <b>TI - Black Hot</b> Sensor Mode in the Viewport Config Editor Object Properties.</li><li>• "ti_greenhot_blackcold" - Matches the <b>TI - Green Hot</b> Sensor Mode in the Viewport Config Editor Object Properties.</li><li>• "ti_blackhot_greencold" - Matches the <b>TI - Green Cold</b> Sensor Mode in the Viewport Config Editor Object Properties.</li><li>• "ti_redhot_blackcold" - Matches the <b>TI - Red Hot</b> Sensor Mode in the Viewport Config Editor Object Properties.</li><li>• "ti_blackhot_redcold" - Matches the <b>TI - Red Cold</b> Sensor Mode in the Viewport Config Editor Object Properties.</li><li>• "ti_whitehot_redspectrum" - Matches the <b>TI - White Hot - Red Spectrum</b> Sensor Mode in the Viewport Config Editor Object Properties.</li><li>• "ti_whitehot_fullspectrum" - Matches the <b>TI - White Hot - Full Spectrum</b> Sensor Mode in the Viewport Config Editor Object Properties.</li></ul>
Example:	<pre>&lt;Sensor Name="ti_whitehot" /&gt;</pre>

## &lt;FOV&gt;

Defines the optional Field of View (FOV) for the Viewport / Camera.

**i NOTE**

In general, either the <FOV> or <[Frustum](#)> (see [Camera Frustum \(on page 893\)](#)) properties are used, but not both.

The **Value** attribute defines the FOV.

## Example:

```
<FOV Value="65.75" />
```

Property	Description
<code>&lt;Frustum&gt;</code>	<p>Defines the optional frustum (see <a href="#">Camera Frustum (on page 893)</a>) for the Viewport / Camera.</p> <p>The attributes are:</p> <ul style="list-style-type: none"><li>• <code>Left</code> / <code>Right</code> - Matches the <b>Left</b> / <b>Right</b> frustum settings in the Viewport Config Editor Object Properties.</li><li>• <code>Top</code> / <code>Bottom</code> - Matches the <b>Top</b> / <b>Bottom</b> frustum settings in the Viewport Config Editor Object Properties.</li><li>• <code>Near</code> / <code>Far</code> - Matches the <b>Clipping Near</b> / <b>Far</b> frustum settings in the Viewport Config Editor Object Properties.</li></ul> <p><b>Example:</b></p> <pre>&lt;Frustum Left="43.25" Right="-43.25" Top="27.75" Bottom="-27.75" Near="0.07" Far="5500" /&gt;</pre>
<code>&lt;Viewport&gt;</code>	<p>Defines the optional Viewport dimensions the Camera uses (see <a href="#">Position (on page 893)</a>).</p> <p>The attributes are:</p> <ul style="list-style-type: none"><li>• <code>LeftX</code> / <code>TopY</code> - Matches the <b>Top X</b> / <b>Y</b> position settings in the Viewport Config Editor Object Properties.</li><li>• <code>Width</code> / <code>Height</code> - Matches the <b>Width</b> / <b>Height</b> position settings in the Viewport Config Editor Object Properties.</li><li>• <code>Layer</code> - Matches the <b>Layer</b> position settings in the Viewport Config Editor Object Properties.</li></ul> <p><b>Example:</b></p> <pre>&lt;Viewport LeftX="0" TopY="0" Width="0.5" Height="0.5" Layer="0" /&gt;</pre>
<code>&lt;LockedOnObj ect&gt;</code>	<p>Defines the optional Viewport / Camera lock on a specific Editor Object.</p> <div style="border: 1px solid #0078D4; padding: 5px; margin-top: 10px;"><p><b>NOTE</b></p><p>The Editor Object must be placed in the Scenario for the setting to work.</p></div> <p>The <code>ObjectName</code> attribute defines the Editor Object to lock on to:</p> <p><b>Example:</b></p> <pre>&lt;LockedOnObject ObjectName="Stryker" /&gt;</pre>

Property	Description
<code>&lt;AttachedObject ect&gt;</code>	Defines the optional attachment of the Viewport / Camera to a specific Editor Object.
	<p><b>NOTE</b></p> <p>The Editor Object must be placed in the Scenario for the setting to work. Also, the configuration should only define either the <code>&lt;AttachedObject&gt;</code>, <code>&lt;LinkedObject&gt;</code>, or <code>&lt;Transform&gt;</code> property. If more than one is defined, only the first defined property is used.</p>
	<p>The sub-properties are:</p> <ul style="list-style-type: none"> <li>• <code>&lt;AttachedBone&gt;</code> - Defines the optional bone attachment on the Editor Object for the Viewport / Camera. The <code>Name</code> attribute is used to define the bone.</li> <li>• <code>&lt;AttachedMemoryPoint&gt;</code> - Defines the optional memory point attachment on the Editor Object for the Viewport / Camera. The <code>Name</code> attribute is used to define the memory point.</li> <li>• <code>&lt;Offsets&gt;</code> - Defines the optional transform offsets to apply to the Viewport / Camera after attaching to the Editor Object.</li> </ul>
	<p><b>NOTE</b></p> <p>If no offsets are provided, both the Viewport / Camera local position and orientation are zeroed out.</p>
	<p>The sub-properties are:</p> <ul style="list-style-type: none"> <li>◦ <code>&lt;LocalPosition&gt;</code> - Defines the optional local position offsets to apply to the Viewport / Camera after attaching to the Editor Object. The <code>X</code>, <code>Y</code>, and <code>Z</code> attributes define the local position offsets.</li> <li>◦ <code>&lt;LocalOrientation&gt;</code> - Defines the local orientation offsets to apply to the Viewport / Camera after attaching to the Editor Object. The <code>Yaw</code>, <code>Pitch</code>, and <code>Roll</code> attributes define the local orientation offsets.</li> </ul>
	<p><b>Example:</b></p> <pre>&lt;AttachedObject ObjectName="M2A3"&gt;   &lt;AttachedBone Name="main_trav" /&gt;   &lt;Offsets&gt;     &lt;LocalPosition X="0.0" Y="4.5" Z="-5.0" /&gt;     &lt;LocalOrientation Yaw="0" Pitch="-20.0" Roll="0" /&gt;   &lt;/Offsets&gt; &lt;/AttachedObject&gt;</pre>

Property	Description
<code>&lt;LinkedObject&gt;</code>	<p>Defines the optional link of the Viewport / Camera to a specific Editor Object, and the link type. Matches the <b>Attachment Method</b> in <a href="#">Attachment (on page 894)</a>.</p> <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"> <p><b>i NOTE</b></p> <p>The Editor Object must be placed in the Scenario for the setting to work.</p> </div> <p>The attributes are:</p> <ul style="list-style-type: none"> <li>• <code>ObjectName</code> - The Editor Object name.</li> <li>• <code>LinkType</code> - Link type: <ul style="list-style-type: none"> <li>◦ <code>0</code> - Default view.</li> <li>◦ <code>1</code> - First-person view.</li> <li>◦ <code>2</code> - Third-person view.</li> <li>◦ <code>3</code> - Optics view.</li> </ul> </li> </ul> <p><b>Example:</b></p> <pre>&lt;LinkedObject ObjectName="UAV" LinkType="2" /&gt;</pre>
<code>&lt;Transform&gt;</code>	<p>Defines the optional position and orientation for the Viewport / Camera to use.</p> <p>The sub-properties are:</p> <ul style="list-style-type: none"> <li>• <code>&lt;Position&gt;</code> - Defines the optional geographic position that the Viewport / Camera is placed at. The <code>Lat</code>, <code>Long</code>, and <code>Alt</code> attributes define the position latitude, longitude, and altitude.</li> <li>• <code>&lt;Orientation&gt;</code> - Defines the optional orientation for the Viewport / Camera to use. The <code>Yaw</code>, <code>Pitch</code>, and <code>Roll</code> attributes define the yaw, pitch, and roll of the orientation.</li> </ul> <div style="border: 1px solid #0070C0; padding: 10px; margin-top: 10px;"> <p><b>i NOTE</b></p> <p>Not all of these attributes are required to be defined. Those that are not defined default to 0.</p> </div> <p><b>Example:</b></p> <pre>&lt;Transform&gt; &lt;Position Lat="48.1759126900112" Long="17.9146034837095" Alt="122.74324798584" /&gt; &lt;Orientation Yaw="-154.282785500728" Pitch="-17.4641687454135" Roll="1.7179789123565" /&gt; &lt;/Transform&gt;</pre>



## EXAMPLE

Here is a full Viewport Configuration File example titled [SampleViewportConfig.xml](#):

```
<Camera Name="SampleConfigCamera">
    <RenderTarget Name="main" />
    <Sensor Name="Visible" />
    <Frustum Left="45" Right="-45" Top="28" Bottom="-28" Near="0.05"
    Far="6000" />
    <Viewport LeftX="0.0" TopY="0.0" Width="0.25" Height="0.25" Layer="100" />
    <Transform>
        <Position Lat="48.1759126900112" Long="17.9146034837095"
        Alt="122.74324798584" />
        <Orientation Yaw="-154.282785500728" Pitch="-17.4641687454135"
        Roll="1.7179789123565" />
    </Transform>
</Camera>
```

### 15.8.2 General Viewport Limitations

The following general Viewport limitations apply:

- Incorrect object draw modes in certain situations for additional Viewports that are not the main Viewport.

Currently in VBS4, all object draw modes are determined by the main VBS4 Viewport. This means that if the VBS4 main Viewport is in a situation where an object is in a certain draw mode (for example, the interior view of a vehicle), all additional Viewports also display that object in that draw mode.

- Object simulation / update rates are based on the main Viewport.

Certain aspects of an object simulation are calculated from the distance of the object from the main Viewport Camera position. For example, an object that is very far away from the main Viewport Camera position gets updated at a slower rate, regardless of whether there is an additional Viewport close to that object.

- Wrong animations in certain situations for additional Viewports that are not the main Viewport.

Some animations are tied to certain LODs and draw modes, so if an object is in a certain draw mode based on the main VBS4 Viewport, the animations displayed in other Viewports may be incorrect in certain situations.

- If a Viewport Config Editor Object does not set the Observer, then the Viewport / Camera is only created on the VBS4 instance that is the server. Make sure that the server instance is not a *headless host* (for example, a Dedicated Server), in which case, no image rendering takes place.

### 15.8.3 Viewport Config Editor Object Limitations

The following Viewport Config Editor Object limitations apply:

- Not all the VBS4 Camera properties are fully supported by the Viewport Config Editor Object UI or [Viewport Configuration File \(on page 895\)](#). They may be added in future releases.

If additional properties need to be applied to a Viewport Camera, the Viewport Camera can be retrieved and referenced by its given name using the VBS Simulation SDK or SQF.

- Each Viewport Config Editor Object can only be linked to one Observer, which means that if a Viewport needs to appear on multiple VBS4 Clients, a separate Viewport Config Editor Object with the same configuration needs to be created.

## 15.9 Render Target Config

The Render Target Config Editor Object is used together with the [Viewport Config \(on page 890\)](#) Editor Object to define an additional window for the Viewport / Camera to render to.

The Render Target Config Editor Object is able to load a predefined configuration XML file that automatically sets up the Render Target as defined in the file. For more information, see [Render Target Configuration File \(on page 904\)](#).

### ★ FEATURE NOTICE

Additional Render Target windows created through the Render Target Config Editor Object (for example, to project onto separate screens) require the Render Target License. For more information, contact [sales@bisimulations.com](mailto:sales@bisimulations.com).

For a list of limitations, see:

- [General Viewport Limitations \(on page 900\)](#)
- [Viewport Config Editor Object Limitations \(on the previous page\)](#)
- [Render Target Config Editor Object Limitations \(on page 906\)](#)

### Follow these steps:

1. Select Render Target Config in the Editor Objects List.
2. Double-click a location on the map where you want the Viewport to render to.

The Objects Properties dialog opens.



3. Set the following settings:

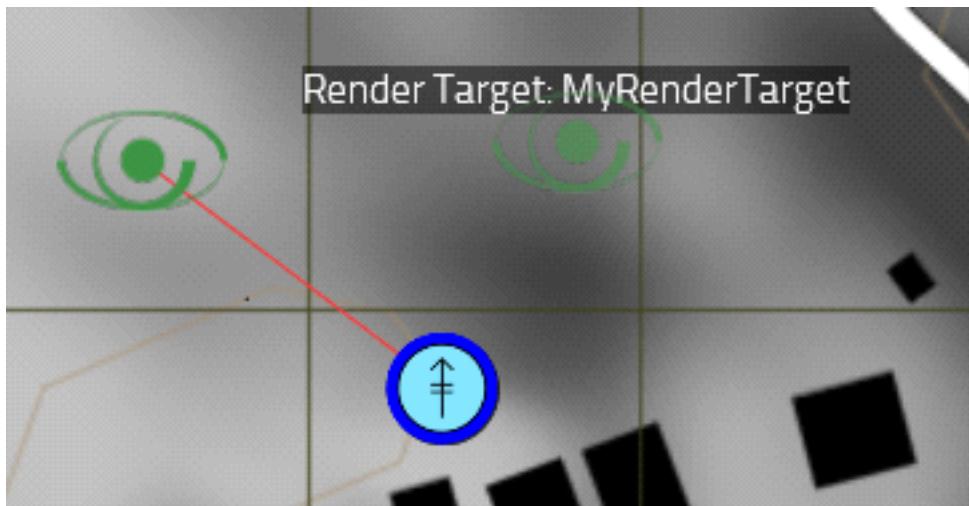
Setting	Description
<b>Config File</b>	Select a Render Target Configuration File to use, based on the values in the drop-down.
	<div style="border: 2px solid green; padding: 10px;"><p> <b>TIP</b> If a Render Target Configuration File is used, all the settings are set based on the definitions in the file, and you can directly click <b>OK</b> to finish the Render Target setup. For information on how to create Render Target Configuration Files, see <a href="#">Render Target Configuration File (on the next page)</a>.</p></div>
<b>Render Target Name</b>	Name of the Render Target.
<b>Top X / Y</b>	X and Y coordinates of the top-left corner of the Render Target window.
<b>Width / Height</b>	Width / height of the Render Target window.
<b>Resolution</b>	Render Target window resolution.

4. Click **OK**.

The Render Target Config Editor Object is placed on the map.

You can now use the Render Target Config Editor Object with the [Viewport Config \(on page 890\)](#) Editor Object.

**Image-225: Render Target Config and Viewport Config Editor Objects**



## 15.9.1 Render Target Configuration File

A Render Target Configuration File allows you to use predefined Render Target settings, instead of setting them manually in the Render Target Config Editor Object.

### NOTE

The Render Target Configuration Files are stored in:

`\VBS_Installation\Components\ViewportControl\Configs\RenderTargetConfigs\`

The Render Target Configuration File is an XML file that uses XML-tag properties for the Render Target settings.

The XML properties are:

Property	Description
<code>&lt;RenderTarget&gt;</code>	Defines the <a href="#">RenderTarget Name</a> (on the previous page). The <code>Name</code> attribute is used to define the Render Target name. All the other properties are defined in <code>&lt;RenderTarget&gt;</code> .
<code>&lt;Resolution&gt;</code>	Defines the <a href="#">Resolution</a> (on the previous page) the Render Target is created with. The <code>Width</code> and <code>Height</code> attributes define the resolution. <b>Example:</b> <pre>&lt;Resolution Width="1440" Height="1080" /&gt;</pre>
<code>&lt;Window&gt;</code>	If this optional property is defined, the Render Target is created as a Render Target Window, whereas if the property is left undefined, the Render Target is created as an Offscreen Render Target (RTT). The optional attributes are: <ul style="list-style-type: none"><li><code>Width</code> / <code>Height</code>- Render Target Window width / height.</li><li><code>XPosition</code> / <code>YPosition</code> - Top-left corner X / Y coordinate of the Render Target Window.</li></ul> <b>Example:</b> <pre>&lt;Window Width="1024" Height="768" XPosition="500" YPosition="256" /&gt;</pre>

Property	Description
<AutoInvalidation n>	<p>Defines the optional Auto-Invalidation mode of the Render Target.</p> <p><b>NOTE</b> By default, Render Targets are created with Auto-Invalidation enabled.</p> <p>The <b>Value</b> attribute defines whether Auto-Invalidation is enabled ("true") / disabled ("false").</p> <p><b>Example:</b></p> <pre>&lt;AutoInvalidation Value="true" /&gt;</pre>
<UpdateMode>	<p>Defines the optional update mode of the Render Target.</p> <p>The <b>Value</b> attribute defines the update mode:</p> <ul style="list-style-type: none"> <li>0 - Represents the <b>Essential</b> mode, where the Render Target is updated every frame, no matter what.</li> </ul> <p><b>NOTE</b> By default, Render Targets are created with the <b>Essential</b> mode.</p> <ul style="list-style-type: none"> <li>1 - Represents the <b>Substantial</b> mode, where the Render Target is updated every frame, if there are resources for it to be drawn in the current frame.</li> <li>2 - Represents the Accidental mode, where the Render Target is updated, if it is visible in scene and there are resources for it to be drawn in the current frame.</li> </ul> <p><b>Example:</b></p> <pre>&lt;UpdateMode Value="0" /&gt;</pre>



## EXAMPLE

Here is a full Render Target Configuration File example titled [SampleRenderTargetConfig.xml](#):

```
<RenderTarget Name="MyRenderTargetWindow">
  <Resolution Width="1024" Height="768" />
  <Window Width="1440" Height="1080" XPosition="128" YPosition="128" />
  <AutoInvalidation Value="true" />
  <UpdateMode Value="0" />
</RenderTarget>
```

## 15.9.2 Render Target Config Editor Object Limitations

The following Render Target Config Editor Object limitations apply:

- Not all the Render Target properties are fully supported by the Render Target Config Editor Object UI. They may be added in future releases.
- If additional properties need to be applied to a Render Target, the Render Target can be retrieved and referenced by its given name using the VBS Simulation SDK.