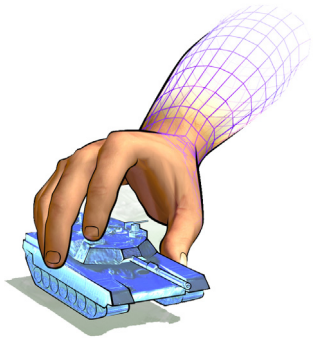

B-HAVE Module for VR-Forces 1.3

This release note contains the following release-specific information for B-HAVE Module for VR-Forces Release 1.3 for VR-Forces 3.11:

Document ID: BHV-1.3-2-090227

Systems Supported

B-HAVE Module for VR-Forces 1.3 for VR-Forces 3.11 (and 3.11.0.x binary compatible releases) is available for:

- Windows XP and Vista, MSVC++ 7.1 and 8.0
- Red Hat Enterprise Workstation Linux 4 and 5
- Fedora 7.

For complete system requirements, please see *VR-Forces 3.11 Release Notes*.

Disk Space Requirements

A full installation of the B-HAVE Module requires approximately 138 MB of disk space.

MÄK Product Compatibility

The B-HAVE Module for VR-Forces is compatible only with the version of VR-Forces for which it was built. It has the same compatibility with simulation protocols and versions and third party libraries as the version of VR-Forces for which it was built.

FLEXlm Support

The B-HAVE Module for VR-Forces uses FLEXlm 11.4-2. You must obtain and install a license file for the B-HAVE Module in addition to your VR-Forces license file.

New Features and Updates

The B-HAVE Module for VR-Forces 1.3 has the following new features:

- Integration of B-HAVE Module and native VR-Forces tasks
- Ability to send VR-Forces tasks and set data requests using Lua functions
- Ability to edit and implement Lua scripts while VR-Forces is running
- Support for external text editors
- Ability to extract one-way roads in PathData
- New Lua functions
- Miscellaneous improvements to Kynapse algorithms
- Support for Linux.

Integration of B-HAVE Module and VR-Forces Tasks

In previous releases, all B-HAVE Module tasks were listed separately at the bottom of the Task menu. For movement tasks that overlapped VR-Forces native tasks, a user had to choose which one to use. In B-HAVE Module 1.3, B-HAVE tasks are integrated into the Task menu. They are no longer prefaced with "B-HAVE". If you want to use a task that has a B-HAVE Module version and a VR-Forces version, such as Follow Entity, VR-Forces determines which version to use. It chooses the B-HAVE Module version if:

- The task is applied to an entity type supported by the B-HAVE Module and for which PathData has been generated
- The task is to be executed on a portion of the terrain that contains PathData (that is, both the entity, and if applicable, the destination are on terrain for which there is PathData).

If these criteria are not met, the native VR-Forces version of the task is used. VR-Forces handles the decision making process for when to use the B-HAVE Module or VR-Forces versions of these tasks. You do not have to do anything except assign the tasks that you want to use. However, you should be aware of these conditions in case your entities behave in unexpected ways.

If while a B-HAVE Module task is being executed, conditions change so that the criteria for a B-HAVE Module task no longer apply, the B-HAVE Module changes the task to a VR-Forces task. For example, if you give an entity a Move to Waypoint task and the entity and waypoint are both inside an area that has PathData for that entity type, the B-HAVE Module assigns a B-HAVE Move to Waypoint task. However, if while the entity is moving to the waypoint, you move the waypoint outside of the area with PathData, the B-HAVE Module changes the task to a VR-Forces Move to Waypoint task.

Support for Sending Tasks and Set Data Requests Using Lua

B-HAVE Module 1.3 adds Lua functions that let you assign VR-Forces tasks and set data requests to entities. The functions only support tasks that are appropriate for the ground entities that the B-HAVE Module supports. For details, please see Section 5.5.6, "VR-Forces Task and Set Data Request Functions", in the PDF version of *B-HAVE Module for VR-Forces User's Guide*.

Dynamic Editing of Lua Scripts

You can now edit Lua scripts while VR-Forces is running and put the changes into effect immediately. When VR-Forces starts, it loads the Lua scripts in the *./data/parameters/BHAVE/Scripts* directory. If you want to edit a script during runtime, follow the procedures for editing scripts in *B-HAVE Module for VR-Forces User's Guide*. VR-Forces makes a copy of the script you want to edit and loads it into the text editor. When you save your changes and close the text editor, VR-Forces replaces the script in memory with the new script. It is now available for immediate use.

If you edit a script off-line (that is, you open it in a text editor from outside of VR-Forces), changes do not take effect until the next time you start VR-Forces.

Support for External Text Editors

In previous versions of the B-HAVE Module, a simple text editor was included for creating and editing Lua scripts. This editor is no longer included. You must now specify an external text editor to use. You do this in the B-HAVE Options dialog box. For details, please see Section 5.2.1, "Specifying a Text Editor", in the PDF version of *B-HAVE Module for VR-Forces User's Guide*.

New Lua Functions

In addition to the new functions for VR-Forces tasks and set data requests (described in "Support for Sending Tasks and Set Data Requests Using Lua," on page 3), the B-HAVE Module has the following new Lua functions:

- AIPathfindingGetPathStatus() returns the status of the path finding computation (as an integer).
- AIPathfindingGetPathStatusString() returns the status of the path finding computation (as a string).
- AIUtilGetVRFObjectOrientation() returns the entity orientation, in Kynapse coordinates, of any VR-Forces moving object.
- AIUtilGetVRFObjectPosition() returns the position, in Kynapse coordinates, of any VRF object

Extracting One Way Roads

The TDB Tool can now extract one way roads from a road network and take them into account during PathData generation. To extract one way roads, the following conditions must be met:

- You must have imported your linear features with TDB Tool 4.1.0.1 or more recent.
- The linear features must have a field named DtDirectivity, with a value of 1 if mono directional and 2 otherwise. The TDB Tool should be able to import this parameter from your shape files.
- If you want to define a one way road, the linear feature associated with it must be on the opposite driving side of the road. For example, if the driving side is right, the feature must be on the left side of the road (Figure 1).

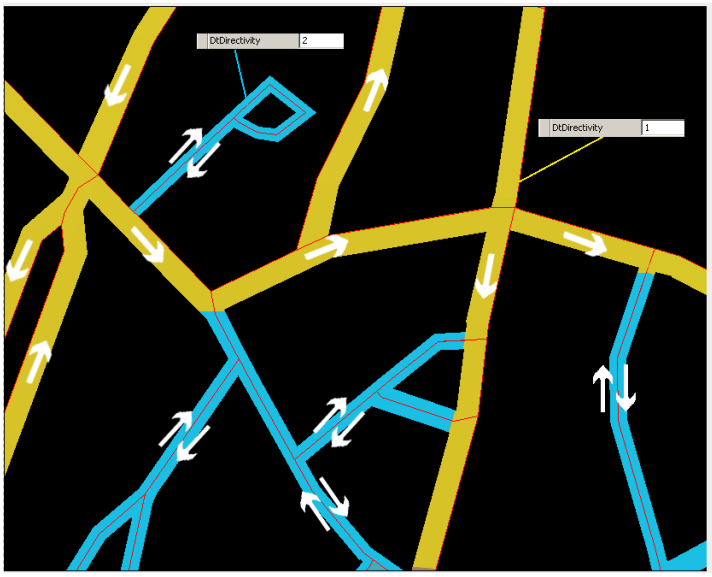

Figure 1. One way road network

Miscellaneous Improvements

- The algorithms used for dynamic avoidance between vehicles have been refined. Ground platforms should be able to better avoid one another when a collision is imminent.
- Some redundant or irrelevant messages have been removed from the vrfSim console output when running in debug mode. This will make debugging of abnormal situations easier and clearer.

- Some new algorithms have been added to extract road networks during pathdata generation. The constraints your shape files should respect have been lightened by adding some new computation to detect intersections and create junctions between segments.
- The logic for the Wander task has changed to reduce the incidence of abrupt U-turns and other changes of directions.
- Improved performance of the Wander task on large areas with many graph edges.
- Published routes are now updated at most once every second, to alleviate some performance issues with a large number of entities. It is still recommended to turn off route publishing when simulating many entities.
- Local Zones during PathData generation now take the density setting (max edge length) of the template used for the local zone.
- PathData is displayed after it is generated.
- The Edit PathData Configuration dialog box has a new check box that lets you specify that vehicles should drive on the left side of the road. This check box is not shown in the screen captures in *B-HAVE Module for VR-Forces User's Guide*.
- The Hide agent now uses a more accurate visibility function, which approximates entity eye positions.

Documentation Updates

The PDF version *B-HAVE Module for VR-Forces User's Guide* has been updated for this release. The print version has not been updated.

Bug Fixes

The following problems have been fixed in this release:

- When giving a BHAVE flee task to an entity in the simulation, it will stop just after reaching a sufficient distance and not further.
- Pedestrians now avoid vehicles with more accuracy and are less prone to get stuck while trying to find an avoidance trajectory.
- Some entities had troubles "smoothing" their path on large terrains due to some missing obstacle information.

Known Problems

B-HAVE Module Release 1.3 has the following known problems:

- PathData cannot be generated on geocentric or geodetic terrain databases, so most functions of the B-HAVE Module will not work on these databases.
- Civilian lifeforms are not configured by default to spot other civilians, only armed entities. This is done for performance reasons, but can be changed in the OPE files. Edit the visual-sensor detection-types parameter to change what types of entities are spotted.
- The AIEntitySetSpeed() Lua function and the VR-Forces Set Ordered Speed command set the same parameter of an entity, so Lua scripts that call AIEntitySetSpeed() every tick will override any ordered speed set from the GUI or plan.
- Lua scripts over a particular length cannot be edited through the VR-Forces GUI. If you have a problem editing a script through the GUI, you can open it directly in a text editor.
- Obstacles will sometimes be ignored if their perimeter is too big.
- Using the default dead-reckoning thresholds, vehicles in traffic appear to move too much when stopping or starting. To reduce this effect, you can do either or both of the following:
  - Change the dead-reckoning threshold in VR-Forces, as described in Section 1.8, "Setting Thresholds for Entity Updates", in *VR-Forces Configuration Guide*. Lowering the dead-reckoning threshold will cause VR-Forces to send more packets on the network, but the location of entities will be represented more accurately.
  - Reduce the smooth period in the MÄK Stealth to a value such as 0.1, as described in Section 6.9, "Setting Trajectory Smoothing", in *MÄK Stealth User's Guide*.

  If you are running VR-Forces 3.11.0.1 or later, as an alternative to the actions described in the previous paragraphs, you can adjust the Performance/Quality setting in the Performance Options dialog box. For details, please see *VR-Forces 3.11.0.1 Release Notes*.
- Vehicle traffic entities driving on roads do not drive correctly when the road network has intersections that are too close together. Too many vehicle traffic entities in too small of an area can cause the traffic to become locked, and entities to stop moving.