



MÄK VR-Forces Release 1.2 Release Notes

This release note supports VR-Forces Release 1.2 and 1.2-ngc. This release fixes several bugs in the previous release of VR-Forces and adds new features. It covers the following:

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Because DMSO RTI 1.3 NG is not link compatible with the previous generation of DMSO RTI releases, we have released a separate version of VR-Forces for each version of the DMSO RTI: one that works with RTI NG, and one that works with the previous generation of RTIs. The version that supports RTI NG is installed in the directory *vrforces1.2-ngc*. The version that supports the previous generation of RTIs is installed in the directory *vrforces1.2*.

Systems Supported

VR-Forces 1.2 is initially available for Windows NT. Table 1 lists other platforms that will be available shortly. For toolkit users, application code must be built with the indicated compilers in order to link to VR-Forces libraries.

Table 1: Platforms supported

Platform	Compiler
SGI IRIX 6.5 (VR-Forces 1.2-ngc only)	MipsPro7.2.1 C++ compiler (available from SGI)
SGI IRIX 6.2 or later (VR-Forces 1.2 only)	MipsPro7.1 C++ compiler (available from SGI)
PC with Red Hat Linux 6.0 (Linux 2.2.5)	GNU C++ (g++) distributed with Red Hat distribution. The command: <code>g++ -v</code> returns: gcc version egcs-2.91.66 19990314/Linux (ecgs-1.1.2 release)
PC with Windows NT, SGI NT	Microsoft Visual C++ 6.0.

System Requirements for PCs

VR-Forces Release 1.2 requires Windows NT 4.0, Service Pack 3 or later. Minimum system requirements are:

- ♦ RAM:
 - 32 MB for DIS exercises
 - 64 MB for HLA federates



Depending on the size of your terrain databases, you may need more RAM.

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- ♦ Hard disk space - Approximately 120 MB for complete installation of application and toolkit. Approximately 90 MB for application alone. Most of this is for the terrain databases shipped with VR-Forces. You may need considerably more space depending on the databases you plan to use.
 - ♦ Two or more multiples of the amount of RAM for virtual memory. Running VR-Forces in HLA may require increased amounts of virtual memory.

Network Compatibility

HLA only

VR-Forces 1.2 contains built-in support for RPR FOM versions 0.5, 0.7, 0.8, and 1.0. RPR FOM version 1.0 is the default.

DIS only

This release supports DIS 2.0.4, IEEE 1278.1, 2.1.4, and IEEE 1278.1a, and can therefore interoperate with DIS applications of any of these versions.

RPR FOM Versions Supported

VR-Forces 1.2 has built-in support for RPR FOM versions 0.5, 0.7, 0.8, and 1.0. All RPR FOM classes are supported. The default version is 1.0. We provide FED files for all the supported versions in the VR-Forces root directory. They are called *VR-Link05.fed*, *VR-Link07.fed*, *VR-Link08.fed* and *VR-Link.fed* (for RPR FOM1.0).

The VR-Forces application has a command line option (`-f`) that you can use to choose an RPR FOM version by passing either `v1RPR05`, `v1RPR07`, `v1RPR08`, or `v1RPR10` as the argument to `-f`.

If you are building an application with the VR-Forces toolkit and you want to specify a version of the RPR FOM through code, pass the version number (0.5, 0.7, or 0.8) to the *DtRprFomMapper* constructor and pass the resulting object to the *DtExerciseConn* constructor. Also, make sure you are using a federation execution name that corresponds to the right FED file. For example:

```
DtExerciseConn conn("VR-Link08", "MyApp", new DtRprFomMapper(0.8));
```

RTI Support

VR-Forces supports the following RTIs:

- ♦ DMSO RTI 1.3 NG v1, v2, and v3
- ♦ DMSO RTI 1.3 v4, v5, v6, and v7
- ♦ MÄK RTI 1.3.2-ngc, which is link-compatible with DMSO RTI 1.3 NG v1, v2, and v3
- ♦ MÄK RTI 1.3.2, which is link compatible with DMSO RTI 1.3 v4, v5, v6, and v7.

The VR-Forces 1.2 release has been tested with the DMSO RTI 1.3 releases and MÄK RTI 1.3.2. The VR-Forces 1.2-ngc release has been tested with DMSO RTI 1.3 NG and MÄK RTI 1.3.2-ngc.

On UNIX, VR-Forces example Makefiles are set up to build against either the appropriate DMSO RTI version (NG or otherwise) or the MÄK RTI. If you've sourced the appropriate DMSO RTI environment file (*rtienv.sh* for RTI NG, or *rti.env* for the previous generation RTI), we use the DMSO RTI, otherwise we use the MÄK RTI, which we get to through the RTI link in the VR-Forces root directory. However, it shouldn't matter whether you build against the MÄK RTI or the corresponding DMSO RTI version. In either case, you can switch between RTI implementations at run-time.

When using the MÄK RTI, remember to make sure that VR-Forces can find your FED file, and optional *rid.mtl* file, by either putting them in the directory from which you are running, or by setting the environment variable RTI_CONFIG to the directory that contains them.

Notes for using VR-Forces with DMSO RTI NG:

- ♦ The NGC version of VR-Forces has been compiled and linked with the compiler and linker options dictated by RTI NG. Please see MÄK example Makefiles or RTI NG documentation for these flags, which vary by platform.
- ♦ DMSO RTI NG requires you to link with *liborbsvcs.so*, *libACE.so*, and *libTAO.so* on UNIX platforms. Although the MÄK RTI does not use these third party libraries, executables provided by MÄK in -ngc releases have been linked against these libraries so that they can be used with either the MÄK RTI or DMSO RTI NG. Because of this, these executables expect libraries by those names to be present on the library search path. For this reason, empty libraries by these names are supplied with the MÄK RTI.
- ♦ In RTI NGv3, the *libRTI.dll* library was renamed *libRTI-NG.dll*. However, VR-Forces expects to find this library under its old name. To use RTI NG v3 with VR-Forces, make a copy of *libRTI-NG.dll* and rename it *libRTI.dll*.

New features

This release of VR-Forces has the following new features:

- ♦ Support for new entity types:
 - Fixed wing
 - Rotary wing
 - Missile
- ♦ Support for specifying altitude of waypoints and routes.
- ♦ Support for editing control objects after they are created
- ♦ Ability to drag an entity or control object to a new location
- ♦ Improved MÄK terrain format (GDB)
- ♦ A new conditional statement (random)
- ♦ Ability to return a scenario to its last saved state without closing it (rewind command)
- ♦ Support for running multiple iterations of a scenario (batch mode)
- ♦ Support for interoperability with other VR-Forces application simulations.
- ♦ Miscellaneous improvements to the interface, including a change to the default entity label display.

The new features are described in *MÄK VR-Forces User's Guide*, which has been updated and is distributed with this release.

Air Platform Vehicles

VR-Forces has added many fixed-wing and rotary wing vehicles. Like ground vehicles, they have parameters specified in the *default.epd* file, which you can edit. You can aggregate air platform vehicles and can assign them tasks and plans, just as with ground vehicles. However, fixed-wing entities do not support formations.

There are entities defined in the *default.epd* file that have the necessary controllers for air-to-ground, ground-to-air, and air-to-air target detection. However, entities do not model maneuvering for target acquisition.

Improved MÄK Terrain Format

VR-Forces 1.2 implements an improved version of the MÄK Terrain Format (GDB). The update format makes the processing of queries relating to the terrain more efficient, so that the terrain libraries can support larger simulations. It also, makes the representation of the terrain richer by providing additional structures, and modifying existing ones, to capture more data for reasoning about the terrain in realistic simulations. VR-Forces is backward compatible with databases created under the earlier format.

The changes and enhancements include:

- ♦ The database format is faster and more efficient.
- ♦ It supports a wider array of soil types, including all of the ones represented in CTDB databases.
- ♦ The representation of cultural features (such as, buildings and trees) is now more detailed.
- ♦ Features that are not a part of the terrain, but yet require a description of location and geometry for terrain reasoning purposes, such as impassable terrain, body of water, or minefield, are represented as terrain features. However, these features are not used by VR-Forces.

Batch Mode

To send the output from a batch scenario to the MÄK Logger, you must install Logger 3.5.1, which is included on the VR-Forces 1.2 distribution CD.

Interoperability Between VR-Forces Applications

In previous releases, VR-Forces could not recognize that entities generated by other VR-Forces applications were generated by VR-Forces and could not make full use of the echelon IDs created for the remote entities. This release supports recognition of remote individual entities simulated by other VR-Forces applications. Future releases will include the ability to simulate remote entities and aggregates in the echelon hierarchy.

HLA only

For HLA, interoperability is built into the application.

DIS only

For DIS, VR-Forces reserves a range of application numbers to allow multiple VR-Forces applications to manage remote VR-Forces entities properly. This feature is described in “Specifying the Application Number” in Chapter 4, Getting Started in *MÄK VR-Forces User’s Guide*.

New Default Label Display

The default for labels on entities has changed. In this release the default is to display only the echelon ID label. You can display additional labels for an entity by selecting the labels you want to display in the Entity Labels dialog box. You can change the default display of labels by editing the *vrflab* file. For information about editing this file, see “Configuring Entity Labels,” in Chapter 2, Installing and Configuring VR-Forces, in *MÄK VR-Forces User’s Guide*.



As a result of this change, remote entities will not display any labels unless you change the default or add labels individually using the Entity Labels dialog box.

Documentation Updates

This release includes an updated electronic version of *MÄK VR-Forces User's Guide*, which documents all new features and corrects errors that were in the first version of the manual. A printed version will be available shortly after VR-Forces 1.2 is released. The following is a list of corrections and/or updates to the user's guide:

- ♦ In section B.4.4, “Fixed-Wing Controllers”, the fixed-wing pilot controller components (move along, patrol route, move to, and patrol between), should have their component-descriptor-type parameter changed from component-descriptor to fixed-wing-pilot-controller-descriptor.
- ♦ In section B.4.4, “Fixed-Wing Controllers”, each of the the fixed-wing pilot controller components (move along, patrol route, move to, and patrol between), should have 2 new parameters added, max-turning-Gs and max-turnrate-cutoff-angle. The parameter max-turning-Gs is the maximum acceleration, measured in Gs (9.8 meters per second squared) that the pilot control controller will allow in a banked turn. The parameter max-turnrate-cutoff-angle is the turn angle (radians) at which the pilot controller will make its maximum allowable turn. The turn rate is linearly proportional from 0 to the maximum turn rate for turn angles between 0 and the max-turnrate-cutoff-angle.
- ♦ The detect-offset parameter of the target-detect-sensor-descriptor (section B.2.1, “Target Detection Sensor”) is now correctly specified in body coordinates.
- ♦ The pilot-max-vel parameter in the rotary wing entity (section 10.2.10, “Rotary Wing Entity Parameters”) has been removed.
- ♦ In section B.4.6, “Missile Controllers”, in the description of the missile entity track controller, the method by which the missile tracks toward its target has changed. The missile continuously moves toward a point at which it estimates it will intercept the target, given the missile's current location and velocity, and the current location and velocity of the target.
- ♦ In section B.4.6, “Missile Controllers”, the missile move to and missile track entity controllers should have a new parameter added to them, cep-radius. The cep-radius is the circular error probable radius (meters) which is the radius within which 50 percent of missiles fired will impact.

This release has updated versions of the class hierarchy and header file documentation. *MÄK VR-Forces Developer's Guide* has updated header file listings, but does not have updated documentation for the new functionality in VR-Forces 1.2. Updated documentation of the API will be available in the near future.

The description of the plug-in API has been moved from *MÄK VR-Forces Developer's Guide* to *MÄK VR-Forces User's Guide*. The plug-in API is available to you whether or not you purchase the VR-Forces toolkit.

Known Problems

VR-Forces Release 1.2 has the following known problems:

- ♦ The Skip Task command does not work. When you choose Skip Task, an entity stops executing its plan.
- ♦ When you choose Set Target, the cursor does not change to select mode.
- ♦ If you open any scenarios with DTED terrain files (e.g. montydted.gdb, knoxdted.gdb), and you give an entity a movement task, the behavior of the entity becomes erratic. This behavior also occurs with the world.gdb database.
- ♦ If you set the formation to line, the aggregates move in a column. They only stop in a line.
- ♦ When you switch formation for an aggregate, entities may not line up in their proper numerical order.
- ♦ VR-Forces evaluates non-task statements, such as set statements and conditional expressions, that are at the beginning of a plan, as soon as you open a scenario, regardless of whether or not you start to run a simulation. If you don't want any statements in a plan to be evaluated until you start the simulation, put a wait statement at the start of each plan.
- ♦ The Go To Next and Go To Previous options on the Map Navigation menu don't work with aggregates. If you have a mixture of aggregates and individual entities, using these menu options works fine if there is a series of contiguously listed individual entities. Once the selection moves to an aggregate (11:1:0 ...) the entity list window loses a selection and the view in the Simulation View window doesn't change.
- ♦ Aggregates composed of fixed-wing entities do not carry out tasks as an aggregate. This is because the Follow Entity task is not implemented for fixed-wing entities.
- ♦ The local-entity group in Entities List doesn't select any entities.
- ♦ If you give a ground vehicle a move to command to a waypoint with a Z value that isn't at ground level, the vehicle can move to the correct location, but cannot complete the task, because it cannot move to the altitude specified by the waypoint. This means that you can't use the same waypoint (or route) for both air and ground vehicles. (A rotary-wing entity could move to a point at ground level if it is moving slowly enough to land.)
- ♦ When you create a When statement, it may have the syntax "do Replace" in the statement until you save the plan. This does not affect the plan.
- ♦ If you move a control object while an entity is moving to or along the object, the behavior of the entity may become unpredictable. We recommend that you not move control objects while a simulation is running.
- ♦ When you create a When or If statement that tests for the condition of an aggregate being destroyed, the condition never evaluates to true, even if all of the members in the aggregate get destroyed.

Any previously reported problems that are not in this list have been fixed.

