



# *VR-Forces 4.0 Release Notes*

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## Systems Supported

VR-Forces 4.0 is available for the platforms listed in [Table 1](#). Releases for Linux and MSVC++ 9.0 are expected later. For the availability of other platforms, contact your MÄK salesperson. For toolkit users, application code must be built with the indicated compilers in order to link to VR-Forces libraries.

Table 1: Platforms supported

Operating System	Compiler
Windows XP/Windows Vista/Windows 7	Microsoft Visual C + + 8.0 SP1

## Using Libraries and Binaries Built with Visual Studio 2005 and Later

All MÄK products built with Microsoft Visual Studio require the C Runtime Library to function. The C runtime libraries have always been available from Microsoft for download, they are also installed on a user's machine when a Microsoft compiler is installed. The C runtime libraries are not part of the normal Windows installation.

Unfortunately, the C Runtime Libraries required by Microsoft Visual Studio 2005 (MSVC++8.0) and later cannot just be copied into the *bin* directory of an application. The libraries need to be installed correctly into Windows system folders. (The process is actually a little more complicated, a manifest file needs to be created to tell Windows where to find the libraries.)

To accommodate this change, MÄK distributes the Windows installer for the C runtime libraries with all MÄK products released for MSVC++8.0 and later. The 32-bit installer is named *vcredist\_x86.exe*; the 64-bit installer (if supported) is named *vcredist\_x64.exe*. They are in the base directory of any installed MÄK product that requires them.

For more information see this Microsoft URL:

<http://msdn2.microsoft.com/en-us/library/ms235299.aspx>



You must ensure that the preprocessor defines `_SECURE_SCL=0`, and `_HAS_ITERATOR_DEBUGGING=0` are set for MSVC++8.0 and MSVC++9.0 builds. If these are not set, random crashes and assertions may be encountered during runtime. The MSVC++ 10.0 version uses the default values for these flags.

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## Building on Linux

The example Makefiles require gmake 3.81 or later. For operating systems with an older version of gmake (currently only Red Hat WS 4), a binary has been included for your convenience in the *.mkbin* directory. This version includes a memory fix that is needed to use our makefiles. The source code for the modified gmake is freely available from <http://ftp.mak.com/out/gmake3.80-patch1.tar.gz>.

Before you compile the examples, go to the top level of your installation and create a symbolic link called 'VR-Link' to your VR-Link installation, and another called 'RTI' to your RTI installation. You must use the versions listed under [MÄK Product Compatibility](#).

## Disk Space Requirements

A full installation of VR-Forces requires approximately four GB of disk space.

## Compiler Compatibility on Windows

MÄK provides versions of product releases that have been compiled with different versions of Microsoft Visual C++ (for example, 8.0 and 9.0). When you run MÄK products together on the same computer, for example, VR-Forces and VR-Vantage Stealth, we strongly recommend that you run versions compiled with the same compiler. Mixing products compiled with different versions of the compiler can result in program instability.

## MÄK Product Compatibility

To build VR-Forces applications, you must link with VR-Link 3.13.2. If you are building for HLA and want to link with the MÄK RTI, use MÄK RTI 3.x or later.

## Qt Release Compatibility

If you want to do development using the VR-Forces GUI API, you need to use Qt, a cross-platform GUI toolkit from Qt Software. The VR-Forces GUI was built with Qt release 4.6.3. Qt is available as a free download under the LGPL version 2.1 license at [www.qtsoftware.com](http://www.qtsoftware.com). This version should be satisfactory for most VR-Forces customers. If you need a Qt commercial license, you must purchase the license from Qt Software.

## FLEXlm Support

VR-Forces 4.0 uses FLEXlm 11.8. If you have a previous version of FLEXlm installed, you can install the MÄK License Manager and run FLEXlm from that directory, or you can copy the files installed by MÄK License Manager to your previous FLEXlm directory on your license server. You do not need to change license files (unless your maintenance agreement has expired.)

## Third-Party Library Requirements

VR-Forces 4.0 uses Boost 1.37. The VR-Forces front-end uses DI-Guy 10.0.

## Patch Required for AMD Dual-processor Windows PCs

VR-Link-based products use a high resolution counter for time calculations on Windows PCs. Customers who are running Windows on PCs with multiple AMD Athlon 64-bit processors may notice clock jitter, which may cause time in MÄK products to run backwards. This occurs when the Windows scheduler changes the CPU the MÄK process is using. If the high resolution counters on each processor are not synchronized, the application may witness a decrease in the high resolution counter value stored in the processor causing an incorrect time calculation. To fix this problem customers, apply the AMD Dual-Core Optimizer patch provided by AMD. You can get the patch at:

[http://www.amd.com/us-en/Processors/TechnicalResources/0,,30\\_182\\_871\\_9706,00.html](http://www.amd.com/us-en/Processors/TechnicalResources/0,,30_182_871_9706,00.html)



If you get an error when you try to access this URL, reload the page.

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## Network Compatibility

### HLA only

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VR-Forces 4.0 was built against VR-Link 3.13.2 and is compliant with:

- ♦ RPR-FOM 1.0 and a subset of 2.0 (draft 6 and 17)
- ♦ MÄK RTI 3.x, 4.x, and other RTIs that meet the HLA 1.3 or IEEE 1516 SISO DLC API specifications and are built with the same compilers as VR-Forces.

VR-Forces 4.0 is compatible with applications that use earlier versions of VR-Link if they support versions of the RPR FOM listed.

The VR-Forces 4.0 front-end is not compatible with RTI-NG Pro because it uses a non-standard version of *xerces\_c\_2\_7.dll*.

### DIS only

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VR-Forces 4.0 supports DIS 4, 5, and 6, and can therefore interoperate with DIS applications of any of these versions.

## ***Backwards Compatibility***

The VR-Forces 4.0 APIs are not compatible with VR-Forces 3.x or earlier. Scenarios and object parameter databases created with VR-Forces 3.x are forward compatible.

## ***RPR FOM Versions Supported***

VR-Forces 4.0 has built-in support for versions 1.0 and 2.0 (draft 6 and 17) of the RPR FOM and RPR FOM 2.0, draft 17 with DI-Guy extensions. It also supports VR-Link's ability to support alternative FOMs through the FOM Mapper. By default, VR-Forces 4.0 uses RPR FOM 1.0.

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 (for example, 2.0006) 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-Link20006", "MyApp", new DtRprFomMapper(2.0006));
```

In order to support RPR FOM 1.0, we have added the following extensions (which are supported in later versions of the RPR FOM):

- ◆ EnvironmentProcess
- ◆ GriddedData
- ◆ EmbeddedSystem.IFF
- ◆ EmbeddedSystem.IFF.NatoIFF
- ◆ EmbeddedSystem.IFF.NatoIFF.NatoIFFTransponder
- ◆ EmbeddedSystem.IFF.NatoIFF.NatoIFFInterrogator
- ◆ EmbeddedSystem.IFF.SovietIFF
- ◆ EmbeddedSystem.IFF.SovietIFF.SovietIFFTransponder
- ◆ EmbeddedSystem.IFF.SovietIFF.SovietIFFInterrogator
- ◆ EmbeddedSystem.IFF.RRB
- ◆ BaseEntity.AggregateEntity
- ◆ ObjectRoot.BaseEntity.PhysicalEntity.Lifeform.

For both RPR FOM 1.0 and 2.0 VR-Forces 4.0 relies on the LgrControl and View-Control custom MÄK extensions.

## ***New Features and Updates***

VR-Forces 4.0 has the following new features and updates.

### **VR-Forces Front-End**

VR-Forces 4.0 includes a new front-end based on the VR-Vantage GUI architecture and rendering engine. This new front-end includes many new features and capabilities, as well as a completely new and improved customization API. Key new features include:

- ♦ Integrated 3D and 2D views within one application
- ♦ High performance hardware accelerated 2D map view display
- ♦ Intuitive “terrain drag” map interface
- ♦ Integrated “eXaggerated Reality” (XR) view mode with notional models displayed on a 3D terrain
- ♦ Rotatable 2D map view
- ♦ Multiple channel support for simultaneous map view, 3D view, and entity point of view displays
- ♦ Improved entity and object creation interface for both 2D and 3D views
- ♦ A has a dynamic compass that shows the observer’s heading.
- ♦ Changes to internationalization. For details, please see [“Changes to Internationalization,”](#) on page 10.

### **Terrain**

VR-Forces 4.0 has many new features for terrain support in both the visual and simulation sides of VR-Forces, including:

- ♦ Ability to connect to streaming terrain servers for elevation and imagery data. Data is streamed in real time to VR-Forces as the scenario is built and executed.
- ♦ Free use of VR-TheWorld Online streaming terrain server from within VR-Forces. This includes 90m elevation data and Landsat 7 (15m resolution) imagery data of the entire earth.
- ♦ Support for paging metaflight terrains in both the GUI and simulation engine.
- ♦ Support for feature data on geocentric terrains.
- ♦ Terrains are automatically correlated between visuals and simulation engine.
- ♦ Ability to add props (buildings, bridges, signs, and so on) to a terrain through the GUI, and have the simulation engine respond to them.

## VR-Forces Simulation Engine

- ♦ New road driving behaviors for ground vehicles, including turn management, lane changing and passing
- ♦ New convoy behaviors for ground vehicles
- ♦ New vertical launched anti-missile missile model (previously available as the Marine Missile Defense plugin for VRF 3.12)
- ♦ New weather system allows you to set and alter the weather and time of day, which will affect entity sensors, as well as the visual display.

## Toolkit

- ♦ New GUI toolkit based on Qt and VR-Vantage, which allows customization of both user interface and rendered map and 3D views.
- ♦ New abstracted terrain interface API, which allows for a single API to all simulation terrains types. Also allows new simulation terrain types to be added through a terrain specific plugin.
- ♦ New include file structure. For details, please see [“New Include File Structure,”](#) on page 8.
- ♦ Separate installers for the VR-Forces application and SDK. For details, please see [“Separate Installers for the VR-Forces Application and SDK,”](#) on page 8.

## Terrain Database Tool

In previous versions of the TDB Tool, when you built a project, the TDB Tool asked you where to create the MTD file. It created the MTD file and the GDB file in that location. In VR-Forces 4.0, the TDB Tool asks you where to save the GDB file. It always creates the MTD file in `./userData/terrains`. The MTD file contains the full path to the GDB file. Therefore, you should not move the GDB file after you create it or the MTD file will not be able to find it (unless you edit the MTD file to change the path).

## Miscellaneous

- ♦ New commercial aircraft models are included with VR-Forces.
- ♦ *VR-Forces Scenario Management Guide* has been added to the documentation set. This manual describes all procedures related to creating and running scenarios. Most of this material was previously in *VR-Forces Users Guide*.
- ♦ *VR-Forces Front-End Developers Guide* has been added to the documentation set. This manual explains how to build and extend the graphical user interface (front-end). GUI API documentation has been removed from VR-Forces Developers Guide, which now focuses on the simulation engine.
- ♦ *VR-Forces First Experience Guide* is a brief introduction to VR-Forces designed for persons who are evaluating VR-Forces. (If you have purchased VR-Forces and want to get acclimated to it, we recommend you start with *VR-Forces Getting Started Guide*.)

## Separate Installers for the VR-Forces Application and SDK

VR-Forces 4.0 has separate installers for the VR-Forces applications and the VR-Forces Software Developers Kit. If you are installing both, it is recommended that you install the VR-Forces application first.

## New Include File Structure

VR-Forces 4.0 has restructured its include files to improve scalability and reduce collisions with existing include files. Most include files are in subdirectories of the `./include` directory. This means that source code that compiles against VR-Forces now needs to include those subdirectories in its include directories; for example:

```
#include "cgf.h"
```

now needs to read:

```
#include "vrfcgf/cgf.h"
```

There are many different include directories for different parts of VR-Forces. VR-Forces 4.0 includes a script to help you convert your legacy code to the new structure. This script is called `./bin/fix-include-statements`. To use the script:

1. Run the script, for example:

```
C:/MAK/vrforces/bin/fix-include-statements.exe
```

2. Enter the directory that has the source files to update:

```
> H:/dev/myProject
```

3. Enter the VR-Forces `./include` directory:

```
> C:/MAK/vrforces/include
```

The script scans for all include files in the specified directory (`C:/MAK/vrforces/include`), determines where they are located, and then updates references to them that appear in source files in the source directory (`H:/dev/myProject`). The script modifies the source files in place.

A perl version of the script (`fix-include-statements.pl`) is included in the Windows version of VR-Forces. This is the source to the include file moving script and may be useful for reference. For the Linux version of VR-Forces, only the perl version of `fix-include-statements.pl` is provided.

## VR-Forces 3.x Features that are Not in VR-Forces 4.0

Although VR-Forces 4.0 provides new features and the benefits of a combined 2D and 3D GUI, some features from VR-Forces 3.x are not supported in VR-Forces 4.0, as follows:

- ♦ VR-Forces 4.0 supports multiple windows, but they do not have full menus and toolbars like additional windows do in VR-Forces 3.x.

- ♦ VR-Forces 4.0 simulates tactical smoke, but does not display it in the GUI.
- ♦ The minimap is not implemented.
- ♦ Terrain profiles are not implemented.
- ♦ The navigation toolbar is no longer provided. All navigation is from the keyboard and mouse.
- ♦ The GUI API has been completely replaced with an API based on VR-Vantage.
- ♦ HLA time management is not supported in the front-end.
- ♦ Selection groups are not supported.
- ♦ Indirect artillery is not supported.
- ♦ Entity resource graphics are not supported.
- ♦ Intervisibility grids are no longer supported. Configuration of intersection types is no longer supported.
- ♦ The Overlay Palette (and the various overlay objects that could be created from it) is not supported.
- ♦ The Rewind Pauses Back-End option is not supported.
- ♦ The functionality of the Raster Map Layers dialog box is no longer supported. However, there is significant ability to manipulate terrain images in the Terrain Settings dialog box.
- ♦ Watermarks are not supported.
- ♦ The ability to change display units is not supported.
- ♦ Range rings are not supported.
- ♦ Communication lines are not supported.
- ♦ The Frame Rate Monitor only displays the back-end frame rate
- ♦ You can no longer run a script at startup (the `-R` command line option).
- ♦ The Object Count toolbar is no longer supported.
- ♦ You can no longer control a MÄK Stealth from a plan.
- ♦ Options for customizing control objects and overlay objects are not supported, such as color, line width, transparency, and force assignment.
- ♦ You cannot customize the toolbars in the front-end. Developers can still add and remove toolbars programmatically.
- ♦ VR-Forces does not display a cross hair when entities lase targets. Lasing of targets is still supported.
- ♦ The Entity Boost plug-in is not available for VR-Forces 4.0 at the time of release, but is expected to be available at a later date. Please contact your MÄK salesperson for further information.
- ♦ VR-Forces 3.x supported Mil-STD 2525A icons using bitmaps. These bitmap icons are not supported in VR-Forces 4.0.

## Migrating Scenarios to VR-Forces 4.0

VR-Forces 4.0 should be able to open scenarios created in previous versions. However, to the extent that a scenario relied upon features that are no longer supported, you may need to edit your scenarios. For example:

- ♦ Plans that included commands for changing the MÄK Stealth eyepoint will need to be edited.
- ♦ Overlay objects will be mapped to the nearest supported vector scene object. These objects are similar to those that would be created by importing shape files.
  - Lines will be mapped to lines.
  - Areal objects will be mapped to areas.
  - Point objects will be mapped to points.
  - Overlay objects that do not have an equivalent, such as symbols will be lost, as will text overlay objects.

## Changes to Internationalization

In previous versions of VR-Forces, if you configured your computer for the character set that you wanted to use (for example, Cyrillic, or Hebrew), conversion of the characters on standard Latin-character keyboards to the non-Latin character set was handled by software. In VR-Forces 4.0, this is no longer the case.

For all characters entered on the keyboard, such as naming new entities or tactical graphics, users who do not want to use the 26-character Latin alphabet must use a keyboard that is specific to their language. For character sets that use 2-byte characters, the maximum number of characters they can use is half of the number of characters allowed for single-byte characters. This means a maximum of 5 characters for entities (half of 11), and for aggregates, 5 characters in HLA and 16 in DIS.



The front-end does not enforce this character limit. If you type more characters than can be supported, the character string is truncated by the back-end.

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Localization of the GUI using QtLinguist continues to be supported as describe in Section 2.6, “[Localizing the Graphical User Interface](#)”, in *VR-Forces Users Guide*.

## API Changes

- The *DtTerrainDatabase* class has been renamed to *DtTerrainInterface* to reflect the fact that there can now be a selection of different underlying terrain implementations (and developers can now add new implementations via a plug-in). The API remains mostly the same -- the same calls can be made to query the terrain and the vector network with some special considerations for paging.

Any existing simulations models which need to be used on a paging terrain need to be updated to cope with the consequences of unavailable terrain. In most cases, a terrain preload controller [insert link to the documentation for *DtMovementBasedTerrainPreloadController* and *DtShapeBasedTerrainPreloadController* here] will take care of making sure the terrain is loaded in advance. But under some conditions the data may not be available when needed and simulation models must deal with this. It's important that any terrain intersection calls made while the simulation is running use a non-blocking call that will allow the simulation to continue while the required terrain is paged in. In many cases certain operations performed by the models will have to be queued until the terrain is available.

## Documentation Updates

The VR-Forces documentation set has been revised as follows:

- As mentioned in the “[New Features and Updates](#),” on page 6, three new manuals have been added – *VR-Forces Scenario Management Guide*, *VR-Forces Front End Developers Guide*, and *VR-Forces First Experience Guide*.
- The Master Index has been incorporated into the *VR-Forces Documentation Center*. This file provides a master table of contents, master index, documentation roadmap, and links to the individual manuals. All references in the master index and table of contents are live links to the appropriate manuals.
- The list of directories in Section 2.3, “[The VR-Forces Directory Structure](#)”, in *VR-Forces Users Guide* assumes that both the VR-Forces Runtime and VR-Forces SDK have been installed.
- *VR-Forces Getting Started Guide* lists the example scenarios that are included with the B-HAVE Module for VR-Forces. One of the scenarios in the list, Rescue Convoy, is no longer included with B-HAVE.
- The Licenses section of the Preface in each manual should include the following:

## Freefont OpenType Font Set

VR-Vantage applications and VR-Forces use the Freefont OpenType font set from the Free Software Foundation. It is covered by the General Public License (GPL). For details, please see: <http://www.gnu.org/licenses/gpl.html>

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- ♦ The VR-Forces class documentation and developers guides have not been fully updated for this release. The VR-Forces development team will update the developer documentation, including tips for migrating from the old 2D GUI to the new VR-Vantage-based GUI, immediately after the release of VR-Forces 4.0. Please contact your MÄK salesperson for details about its availability.
  - ♦ The online tutorials will be updated after the release of VR-Forces 4.0.
  - ♦ There may be minor discrepancies between screen shots and the final VR-Forces graphical user interface.
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## Bug Fixes

This release fixes the following problems that were present in prior releases (with bug-tracking numbers):

- ♦ Munition resources can now correctly trigger resource test conditionals. 43368
- ♦ The ""under fire"" is now correctly cleared for entities after they are destroyed. 43275
- ♦ The attacker ID is now set in the detonation interaction for laser guided missiles. 42443
- ♦ The RPR FOM revision number can now be specified in the VR-Forces Launcher. 42435
- ♦ Entity Destroyed conditions are now correctly trigger for all munition types. 42289
- ♦ IED entities no longer incorrectly explode when set to disarmed. 42254
- ♦ Fixed wing entities can now be placed in the air when using the remote control API call for creating entities. 42220
- ♦ Renaming an entity in a scenario would make the entity impervious to damage. 42126
- ♦ When statements in plans did not operate correctly when their condition was true at the start of a scenario. 42065
- ♦ You can now specify camouflage for air entities in the Set Appearance set data request. 41933
- ♦ The Task menu did not disable tasks that an aggregate cannot perform. 41745
- ♦ Moving an aggregate caused the entities to snap to formation. Now relative positions are preserved. 41705

- ♦ The target selection controller can now be configured to target entities that are known only through spot reports, instead of requiring a sensor on the entity to spot the entity. 41634
- ♦ Aggregates could not be embarked or disembarked. 41346
- ♦ The Move Into Formation task can now be sent as a radio message from another entity. 41325
- ♦ The VR-Forces Launcher can now correctly handle HLA federation name being different from the FED file name. 41321
- ♦ Various problems where aggregation of entities could cause the play button to be disabled have been fixed. 41312
- ♦ Missiles fired away from their targets (such as vertical launch systems) now correctly steer toward their target. 41216
- ♦ The Entity Editor no longer crashes when removing a member of an aggregate. 41128
- ♦ The Patrol Along Route task now correctly starts at the closest vertex of the route rather than the first one. 41101
- ♦ The DIS enumeration for the Avenger has been updated to reflect the most recent DIS Enumerations Document. 40921
- ♦ The *DtScenario* object can now be easily extended with a list of key-value pairs. 40705
- ♦ Taliban entities are now configured with weapons. 40591

## ***Known Problems***

VR-Forces Release 4.0 has the following known problems (with bug-tracking numbers):

- ♦ The front-end will crash if you do the following:  
 In the Application Settings dialog box, on the Performance Options page, if you clear “Enable Smoothing”, then select the “Override Smoothing Period to Be: 0.01second(s)” option, then switch back and select “Use Specified Smoothing Value” option. 43412
- ♦ Ground vehicles and lifeforms will not avoid feature obstructions on geocentric terrains. 43868
- ♦ Some metaflight terrains, such as HarrisAfghanVillageFlatEarthMetaflight and HarrisAfghanVillageGeocentricMetaFlight will not display in the 2D view when first loaded. To see the terrain, change to a 3D view mode, and press the spacebar (center view on terrain) to move the eyepoint to the terrain location. After this, the terrain can be viewed in the 2D view. 43797
- ♦ In HLA, VR-Forces allows you to use embarkation features even when the selected FOM does not support embarkation, such as RPR FOM 1.0. In these cases, visual representations of embarkation will often look poor. 43755

- ◆ Routes created by aggregates when they are moving sometimes create incorrect points in tight turns. 43568
- ◆ When using multiple simulation engines and "Aggregate As", the scenario can get into a state where it cannot be played if you reload or rewind the scenario. This can be worked around by closing the scenario and then opening it again, instead of reloading it when it is already open. 43565
- ◆ When the display of tactical graphics (waypoints and routes) is turned off, and you create a new tactical graphic, the new graphic will not be shown in the display, even though it was created. Turn the display of tactical graphics on to see these objects. 43567
- ◆ When creating some lifeform entities, the 3D model attached to the mouse pointer when placing is inconsistent with the entity type that is being created. The entity that is created, however, is the correct type and does show the correct 3D model after it is created. 43728
- ◆ In some cases, VR-Forces fails to load a scenario if the main window of the GUI application does not have focus. 43547
- ◆ Changing an overlay's name removes all the objects on it and moves them to the default overlay. 43162
- ◆ The road driving feature in VR-Forces requires that the road vectors making the network be connected at their edges. Some data does not have accurate positions for road ends, which will cause them to be disconnected, and the road driving unable to plan a path along those roads. 42895
- ◆ Not all languages can be used to name entity types in the entity editor. 42241
- ◆ When you create entities from the Create menu, sometimes when you first select the Friendly submenu, it does not expand. If you select the Opposing or Neutral submenus and then go back to the Friendly menu, it will expand. 42930
- ◆ When you double-click an area's vertex to edit it, it is possible that you will select the entire area instead of just the vertex. If this happens, double-click the outside of the vertex symbol, rather than towards the center. This should select just the vertex. 43618
- ◆ VR-Forces does not show icons for remote stealth applications.
- ◆ The imagery for the makland terrain database is much larger than the actual terrain data, which is confined to the square inset in the middle of the image. This means that if you try to simulated entities on the outer areas of the image, simulation will fail because there is no terrain data there.
- ◆ If you want to set the altitude of a newly created entity in a global plan, you must add a Set Altitude command after the create entity command. Setting the altitude as part of the create command does not work. 43563
- ◆ The Set DI-Guy Appearance dialog box lists all appearances supported by DI-Guy 10.0. This included skinned characters. However, VR-Forces does not support skinned characters. If you set a lifeform to an appearance that starts with "sk\_", it will not change its appearance.
- ◆ Waypoints are located at the center of the waypoint icon rather than at the base.

- ♦ The intervisibility display does not always reflect what simulated entities perceive in the back-end. For example, the intervisibility does not ignore water surface polygons while entity models do. 2370
- ♦ Occasionally, VR-Forces is unable to load a scenario. When this happens, delete the contents of the `./data/temp` directory and try loading again. 11784
- ♦ The Subordinate Manager allows duplicate entries to exist. 10116
- ♦ Subsurface entities sink to unreasonable depths when destroyed. 10040
- ♦ Avoidance of linear vector features often fails at segment intersections. 10220
- ♦ Auto-generated aggregate formation routes may contain spurious points if the original route contains sharp turns and short line segments. 10233
- ♦ Torpedoes can fly above water in certain circumstances. 10254
- ♦ Fixed-wing entities crash when tasked to move into formation. 10255
- ♦ A disembark statement followed by a set formation statement in a plan does not work. 10683
- ♦ You cannot use the lifeform acquire controller with a missile launcher. 10685
- ♦ Ground entities' speed does not affect turning radius. 10692
- ♦ Entity intervisibility with point features does not work correctly. 10698
- ♦ Rotary-wing terrain avoidance sometimes fails. 10732
- ♦ Putting the `vrfSim` console in select mode freezes the back-end. 10781
- ♦ Rotary-wing entities do not maintain correct altitude in geocentric terrain when moving very large distances. 10931
- ♦ Aggregate subordinates cannot execute their own individual plans. 11120
- ♦ In-frustum sensor geometry does not work for angles greater than 90 degrees. 11557
- ♦ Geometry files referenced by a MetaFlight file must be in OpenFlight format, and not in Vega Prime's binary format (`.usb`). MÄK's terrain libraries do not support `.usb` files. 11772
- ♦ Surface entities are not configured with weapons. 11779
- ♦ Rotary-wing entities are not able to reach moving waypoints or land on moving ships. A rotary-wing entity will approach a given waypoint or landing point, but will never completely reach the goal. 12801
- ♦ Reorganizing an aggregate while it is executing a task may produce unexpected results. The aggregate may be unable to complete its task.
- ♦ When control objects are placed on moving objects (such as a route on a moving aircraft carrier), they produce a flood of network packets. 12047
- ♦ Ground vehicles can climb up unrealistically steep slopes (greater than 70 degrees in some cases). 10672
- ♦ Features cannot be selected on geodetic terrain databases in the TDB Tool. 11556
- ♦ Dead lifeform entities may unexpectedly block line of sight. Their bounding volumes are always upright, regardless of whether or not they are dead. 36648

- ♦ Rotary-wing entities do not avoid other entities. They will fly through one another. 36658
- ♦ The target acquisition and selection model can sometimes get 'stuck' trying to acquire a target. If a target has been selected but is unable to be acquired for some reason, it will continue in a futile attempt to acquire that target, even if there are other more viable targets available. 36828
- ♦ Embarked entities controlled by joystick cannot disembark. For example, if you use a joystick to control a fixed-wing taking off from a carrier, the aircraft will take off, but it will remain in an embarked state. 37175
- ♦ Importation of polygonal terrain elevation data from shapefiles does not work. This does not affect importation of shape feature data.
- ♦ The default radar signature for ground vehicles is 500 meters. This is too short a distance for most fixed-wing aircraft to detect and fire on a ground vehicle. To make ground vehicles vulnerable to aircraft, increase the radar signature to a distance that is appropriate for the aircraft in your simulation. 40513
- ♦ Lifeform entities cannot be configured with multiple weapon systems. 40408
- ♦ Surface entities are not able to come to a stop as quickly as expected. The model does not take into account reverse thrust from engines. 12166