



VR-Forces 5.0.1 Release Notes

This release note contains the following release-specific information for VR-Forces 5.0.1.

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Systems Supported and System Requirements

This section describes platform support and system requirements for VR-Forces. To take full advantage of VR-Forces's visualization capabilities and optimize performance, you must use a modern game computer with a high quality NVIDIA graphics card.

For the most up-to-date information about systems supported, see the Product Versions page on the MAK web site at: <https://www.mak.com/support/product-versions>. For hardware requirements, see <https://www.mak.com/support/hardware-recommendations>.

VR-Forces 5.0.1 is available for the platforms listed in Table 1. 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 10	Microsoft Visual C++ 15.0 (64-bit)
Red Hat Enterprise Linux 8.0	default compiler
(64-bit libraries)	

3D Video Cards Supported

VR-Forces 5.0.1 supports NVIDIA graphics cards that support OpenGL 4.5 or above. While we support NVIDIA Quadro cards, we strongly recommend GeForce cards. If you use a Kepler Series Quadro card, read the instructions in "Using Kepler Series Quadro Cards" on the facing page. VR-Forces does not support AMD (formerly ATI) graphics hardware.



VR-Forces strives to provide the best 3D scene quality possible and cutting edge visualization effects. To provide this functionality, VR-Forces takes advantage of OpenGL features that may not be supported on older video cards. When this is the case, you can disable these features, allowing VR-Forces to run in 3D modes.

OpenGL 4.5 is the minimum requirement for rendering a 3D scene in VR-Forces. For the best visual quality and highest performance, you should use the most recent NVIDIA GeForce card. The minimum recommended card is 2070 or better.

Some laptops have an NVIDIA graphics card and an Intel graphics card. You must configure your computer to use the NVIDIA card. To do so:

1. Open the NVIDIA Control Panel (in the System Tray).
2. Select Manage 3D Settings.
3. Select Global Settings.
4. Select Preferred Graphics Processor.
5. Select High-performance NVIDIA Processor.



You should always try to use the latest drivers available for your video card.



If you use an external monitor with your laptop and your laptop is not using the NVIDIA graphics card when running VR-Forces, try setting the main display to be the laptop's built-in monitor instead of an external monitor.

Using Kepler Series Quadro Cards

There is a known issue with the Quadro drivers on Kepler series Quadro cards. NVIDIA says it's related to the fact that the default profile optimizes for a fixed eyepoint (for applications like CAD). To run on these cards, you must change the global profile for the driver, as follows:

1. Open the NVIDIA Control Panel.
2. Select the Manage 3D Settings page.
3. Select the Global Settings tab.
4. In the list of driver profiles, select Workstation App - Dynamic Streaming.

We are working with NVIDIA to have their drivers recognize our applications and apply this profile automatically. In the meantime, for Kepler series Quadro you must make this change manually.

Compiler Compatibility on Windows

MAK provides versions of product releases that have been compiled with different versions of Microsoft Visual C++ (for example, 12.0 and 15.0). When you run MAK 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. The exception to this is that products built with VC 14 and VC 15 are binary compatible.

Required Software for Toolkit Users

If you plan to build VR-Forces applications using the VR-Forces Toolkit, you must download and install VR-Link 5.8.

If you plan to build the VR-Forces GUI, you must download and install Qt 5.15.2 (Windows VC 15 and Linux Red Hat 8). You can download it at:

<http://www.mak.com/support/bonus-material>.

Qt is also available as a free download under the LGPL version 2.1 license at <https://www.qt.io>. This version should be satisfactory for most VR-Forces customers. If you need a Qt commercial license, you must purchase the license from Qt.

MAK Product Compatibility

To build VR-Forces applications, you must link with VR-Link 5.8. If you are building for HLA and want to link with the MAK RTI, use MAK RTI 3.x or later, although we recommend use of the latest release. If you are building for HLA Evolved, you must

use MAK RTI 4.0.4 or later.

License Manager

VR-Forces 5.0.1 uses FLEXlm 11.17.1. You must install the license management software to run VR-Forces. If you are upgrading from a version of VR-Forces that used an older version of FLEXlm, you must upgrade your license management files. You do not need a new license. Licenses are forward compatible.

The License Manager files are not part of the VR-Forces installer. You can download them at:

- Windows: <http://ftp.mak.com/out/MAKLicenseManager-win64-setup.exe>
- Linux: <http://ftp.mak.com/out/MAKLicenseManager-linux64-setup.tar.gz>

A license manager FAQ is available at <https://www.mak.com/support/license-support>.

Third-Party Libraries Supported

VR-Forces 5.0.1 uses the indicated versions of the following libraries:

- VR-Link 5.8
- Qt 5.15.2 (VC 15 and Red Hat 8)
- OpenSceneGraph 3.6.4
- Boost 1.63.0
- FreeGlut 2.4.0 (Windows), 2.6.0 (Linux)
- GL-Studio 7.0 (VC 15)
- DI-Guy 13.6 (development version)
- Triton 4.43
- Silverlining 6.20
- SpeedTree 6.3.2
- CDB API 2.2 (Windows), 2.1 (Linux)
- osgEarth 3.2
- CUDA 9.2 (Windows), 10.2 (Linux)

Using MAK Products on Virtual Machines

You can run MAK products on virtual machines. For more information, see the Cloud & Virtualization page on our website at <https://www.mak.com/learn/cloud-virtualization>.

The makData Package

As of this release, the data installation is separate from the product installation. MAK applications can share the same data package, so you no longer need to install it separately for each product. For instructions on installing the data, see "[Installing the makData Package](#)" in the *VR-Forces Users Guide*.

Network Compatibility

VR-Forces 5.0.1 is compliant with RPR FOM 1.0 and RPR FOM 2.0 and includes FOM mappers for many draft versions of the RPR FOM. It is compliant with RTIs that support the HLA 1.3 specification, the SISO DLC HLA API 1516 version of the IEEE 1516 specification (SISO-STD-004.1-2004), or HLA Evolved. MAK recommends HLA Evolved.

To use an RTI with VR-Forces, it must use the same operating system and be built with the same compiler.

VR-Forces 5.0.1 supports DIS 4, 5, 6, and 7, and can therefore interoperate with DIS applications of any of these versions. MAK recommends DIS 7.

Backward Compatibility

The VR-Forces 5.0.1 APIs are largely compatible with earlier VR-Forces 4.x versions, however some changes are required to migrate to 5.0.1. See the *VR-Forces Migration Guide* for more information.

Scenarios created with recent releases should be forward compatible. Updates to tasks, systems, and terrain reasoning may change how simulation objects behave. See "New Features and Updates" on the next page to learn whether there are any changes that might impact scenarios created in previous versions.

Support for MAK Data Logger Recordings

While VR-Forces 5.0.1 works with all recent versions of the MAK Data Logger, please know:

- Versions of the MAK Data older than 5.5.1 (released in May 2018) have known problems with the encoding of DIS 7 Attributes, which can cause crashes in MAK products.
- VR-Forces 5.0.1 default HLA configurations use updates to various default FOM modules since VR-Forces 4.10. To record logger files, ensure that the MAK Data Logger instance you are using is configured to use the updated FOM Modules. In MAK Data Logger 5.9 and earlier, those FOM Files must be copied from the VR-Forces 5.0.1 install into the MAK Data Logger install and configured correctly. Refer to the *MAK Data Logger Users Guide* for details.

To play logger files recorded with an earlier version of VR-Forces, you must insure that your VR-Forces 5.0.1 version is configured to correctly use the FOM files distributed with the MAK Data Logger and used to record the Logger file. Refer to the *VR-Forces Users Guide* for details.

RPR FOM Versions Supported

VR-Forces 5.0.1 has built-in support for versions 1.0 and 2.0 (drafts 6, 17, and 20) 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 5.0.1 uses RPR FOM 2.0.

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 `DtFedAmbWrapper` 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 5.0.1 relies on the Controlling and ViewControl custom MAK extensions.

New Features and Updates

VR-Forces 5.0.1 has the following update.

- The *VR-Forces Developers Guide* has been updated. It provides better information for developers using the VR-Forces toolkit, and also includes examples and links to the class documentation.

For the features included in the 5.0 release, see the [VR-Forces 5.0 Release Notes](#) (`./doc/VRF5.0ReleaseNotes.pdf`).

Documentation Updates

Documentation has been updated for this release. The guides are provided as PDF files in the `./doc` directory. Online help is available from the VR-Forces Help menu. You can also find the most current PDFs at <https://www.mak.com/support/product-user-guides>. (You must be able to log in to the web site.)

Fixed Bugs

Problems identified in previous releases have been fixed. For a summary, please see the [./doc/FixedDefectsVRF.csv](#) file.

Known Problems

VR-Forces has the following known problem:

- If you have a setup that includes multiple monitors with different scale factors, such as one 4K monitor set to more than 100%, you might experience layout issues in the VR-Forces GUI. VRF-5665
- You can now save scenarios with entity's paths already planned. If you then edit the terrain, such as putting a prop in the entity's path, the entity will move through it because it does not recalculate its path. VRF-4370

For information on other issues that you might encounter while using VR-Forces, see the [Troubleshooting](#) appendix in the *VR-Forces Users Guide*.