



VR-Vantage 3.0 Release Notes

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Systems Supported and System Requirements

This section describes platform support and system requirements for VR-Vantage. To take full advantage of VR-Vantage'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-Vantage 3.0 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-Vantage libraries.

Table 1. Platforms supported

Operating System	Compiler
Windows 10	Microsoft Visual C++ 15.0 (64-bit)
Red Hat Enterprise Linux 8.0 (64-bit libraries)	default compiler
CentOS – versions that are equivalent to supported versions of Red Hat Linux.	default compiler

3D Video Cards Supported

VR-Vantage 3.0 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-Vantage does not support AMD (formerly ATI) graphics hardware.

 VR-Vantage strives to provide the best 3D scene quality possible and cutting edge visualization effects. To provide this functionality, VR-Vantage 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-Vantage to run in 3D modes.

OpenGL 4.5 is the minimum requirement for rendering a 3D scene in VR-Vantage. 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. For video streaming on Windows, you must use driver 397.44 or later. For video streaming on Linux, you must use driver 387.26 or later.

 If you use an external monitor with your laptop and your laptop is not using the NVIDIA graphics card when running VR-Vantage, 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.

Disk Space Requirements

A full installation of VR-Vantage requires approximately 6.3 GB of disk space and an additional 47 GB for the complete MAK data package.

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-Vantage, 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-Vantage applications using the VR-Vantage Toolkit, you must download and install VR-Link 5.8.

If you plan to build the VR-Vantage 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-Vantage customers. If you need a Qt commercial license, you must purchase the license from Qt.

License Manager

VR-Vantage 3.0 uses FLEXlm 11.17.1. You must install the license management software to run VR-Vantage. If you are upgrading from a version of VR-Vantage 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-Vantage 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-Vantage 3.0 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)
- CIGI - CCL 4.0.4

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-Vantage Users Guide*.

Network Compatibility

VR-Vantage 3.0 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-Vantage, it must use the same operating system and be built with the same compiler.

VR-Vantage 3.0 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

VR-Vantage 3.0 applications and some files are not backward compatible. Specific incompatibilities are as follows:

- Applications from a given release cannot control display engines from a different release. (In other words, a VR-Vantage 3.0 application cannot control a VR-Vantage 2.4 display engine.)
- Plug-ins built against one version cannot be used with the other.
- Model files (MEDF and MEIF) built with one version do not work with the other.

Support for MAK Data Logger Recordings

While VR-Vantage 3.0 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.
- Most new versions of MAK products contain FOM updates. To successfully play logger tapes that were recorded with earlier FOM versions, the matching (earlier) FOM version must be properly configured in each federate. This mean, for example, that HLA Logger recordings in MAK Logger 5.9 require VR-Vantage 3.0 to use the FOM modules that were used to record these files, not the default FOM configuration in VR-Vantage 3.0. The MAK Data Logger is forward compatible, however, so older MAK Data Logger versions can be configured to record and work with VR-Forces 5.0 and VR-Vantage 3.0 FOM. You simply need to copy the FOM files to the older MAK Data Logger installation and configure them correctly. Refer to the *MAK Data Logger Users Guide* for details.

New Features and Updates

VR-Vantage 3.0 has the following new features and updates.

Data

- The MAK data package is now installed in a central location separate from the product installation, allowing MAK products to share data. You no longer install the data separately for each product. Instead, you can install the data packages in a common location—on a machine where multiple products are installed, or a on a network share—to supply 3D models, 2D icons, audio files, terrain configurations, HUDs, overlays, particle systems, and more. This significantly reduces the disk space required when running multiple MAK ONE applications. See "The makData Package" on the previous page.
- Entity and other files are now located in the shared data directory. Refer to the [VR-Forces Users Migration Guide](#) for more information.

Visuals

- VR-Vantage now supports horizon-based ambient occlusion (HBAO). This is enabled by default. See "[Using the Ambient Occlusion Effect](#)" and "[Configuring Ambient Occlusion](#)" in the *VR-Vantage Users Guide*.
- Infrared illumination rounds are visualized accurately in both SensorFX and CameraFX's NVG modes, illuminating the surrounding area and casting light on the ground as they fall to earth.
- You can configure light sources that are specific to a particular sensor mode. On the light source node, add a comment `@dis lightsource SENSOR` where SENSOR is IR, MWIR, LWIR, or NVG.

- CameraFX now has a way to configure light points to be different intensities in different sensor modes. There are 3 new columns in the `./appData/importConfig/Lights_DefaultValues_3_2.csv` file.
- Tank treads now move realistically when tanks turn. When a tank turns right, for example, then the right tread locks up or slows down, depending on the forward motion.
- Height above terrain (HAT) lines now indicate that the height is above ground level (AGL).
- There is now an attribute for windows, Window Stays on Top, to ensure that a window will always be in front of the main window. This defaults to true for sensor windows. You can manage this new setting in the Display Engine Configuration Editor.

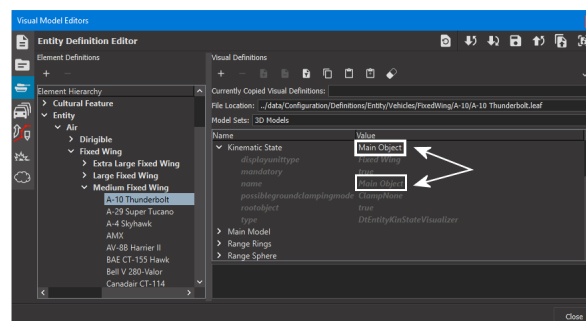
Virtual Reality

- Added support for the XTAL VR headset. See the chapter on [Using Head Mounted Displays for Virtual and Mixed Reality](#) in the *VR-Vantage Users Guide*.
- You can now access a Varjo device's eye-tracking calibration by pressing **F9**.
- Improved the performance of Varjo headsets when in virtual reality mode.
- Added support to configure chroma keying in the mixed reality definition XML file.
- Added the ability to scale the scene rendering resolution in the Virtual Reality Settings. Overlays remain at their native resolution.

Modeling

- The Particle System Editor has been improved. See the chapter [Special Effects \(Particle Systems\)](#) in the *Adding Content to MAK Applications Reference Manual*.
- In the Visual Model Editors, any Visual Definitions with a name attribute now show that name in the Value column (Figure 1).

Figure 1. Visual Definition name



- In the Entity Definition Editor page of Visual Model Editors, there is a new attribute for the Military Symbology Icon definition, `rotateicontoheading`. It overrides the Rotate Entity Military Standard Symbols to Heading option in Entity Display Settings for the entity.

Video Streaming

- You can now specify whether to use CPU or GPU encoding when streaming videos. If you choose GPU encoding, you can specify the encoding format. See "[Configuring Video Streams](#)" in the *VR-Vantage Users Guide*.

Terrains

- You can now use a vertical datum to specify the altitude for mask and feature layers, in addition to elevation layers. For example:

```
<profile srs="wgs84" vdatum="egm96"/>
```
- For layers tagged with `<mapgroup>` in `.earth` files, you can now also specify `<enabled>false</enabled>` to prevent the layer data from loading by default.
- In Ocean Settings, you can now select the ocean spectral model: JONSWAP, Pierson-Moskowitz, or Tessendorf. For more information, see "[Specifying an Ocean Wave Spectrum](#)" in the *VR-Vantage Users Guide*.
- The view of windows and camera structure is now available in the Terrain Information Panel. In the Scene Graph tab, choose Window/Channel Config from the list.
- Added support for indirect rendering to recognize and render/cull ocean extracted polygons entirely on the GPU.
- You can disable a dataset/feature_geom layer from being used by the intersector. See "[Disabling Intersections for a Feature Geometry Layer](#)" in the *Adding Content to MAK Applications Reference Manual*.
- There are a number of improvements to osgEarth that increase map loading times.

Weather

- VR-Vantage can now visualize local sleet, snow, and hail areas. Local weather areas have priority over global weather settings. You can create local weather areas in VR-Forces using weather area tactical graphics. Precipitation shafts display based on the intensity of the precipitation for the weather area, overriding any global settings.
- New controls make it easier to set the wind direction and speed at the lowest level of the atmosphere; changes appear on the Atmospheric Conditions table. In addition, the Atmospheric Conditions table has been reordered so the lowest level of the atmosphere appears at the bottom and the highest level at the top of the table. The table and the wind controls are on the Environment Conditions Settings page of the Scene Settings dialog box. To try them, choose **Settings > Scene** and select the Environment Conditions Settings page.

Configuration and Startup

- New command-line options are now available for VR-Vantage:
 - `--appCacheDir`. Specify the cache in order to run multiple instances of VR-Vantage or remote display engine from the same installation.
 - `--sharedDataDir`, `--sharedDataRoot`, `--sharedDataStem`. Specifies the directory, root, or stem of the shared data directory.
 - `--enableDofConstraints`. Degree of freedom constraints are disabled for simulation objects by default. Use this command-line option to enable degree of freedom constraints.
 - `--limitEntityTextures`, `--limitTerrainTextures`, and `--limitGpuMemoryPercentage`. Use these if you experience crashes with high VRAM.
 - `--limitEntityTexturesExclusions`. Use this to exclude specific textures from the texture reduction limits for indirect.
 - `--enableTracyProfiling`. Enables the Tracy Client when you launch the application.

For details about these and other command-line options, see "[Command-Line Options](#)" in the *VRVantageUsersGuide.pdf*.

GUI

- Dark mode is now the default in the graphical user interface. Light mode, the former standard, is also available. There are also dark mode and retro icon options. See "[Disabling and Enabling Dark Mode](#)" in the *VRVantageUsersGuide.pdf*.
- The Display Units Settings now limit the available measurements to those that are appropriate for each data type.
- In the Display Units Settings, you can specify the measurement units for the 3D compass and also range/bearing lines. Your options are degrees or NATO-MIL.
- The Display Units Settings now allow you to specify Grid as the Heading, in addition to True or Magnetic. You can also specify Grid North in the Observer Settings as the Map Alignment Preference for plan view.
- When entering MGRS coordinates, the easting and northing are now a single text box that supports 4, 6, 8, and 10 digit input.
- Symbol decorations are now hidden when the observer reaches a specified altitude in the plan view. See "[Hiding Symbol Decorations by Altitude](#)" in the *VR-Vantage Users Guide*.

The 2D icons can also appear smaller as the observer rises in altitude. See "[Scaling 2D Icons by Altitude](#)".

Note that heading indicators, when enabled, are always visible regardless of the observer's distance from the entity.

- The symbol decoration settings are now listed alphabetically in the Symbol Decoration Settings page of Display Settings and the Symbol Decoration panel.
- There is now a button on the Display Settings Toolbar to set whether 2D icons should rotate to a simulation object's heading: . (Some other toolbar buttons that were not used often have been removed.)
- The contact information in the About dialog box (**Help > About**) is now easier to read. You can also click the link to the support portal.
- There is a new option in the Unit Display Settings, Show Labels for Ghosted Objects, that allows you to display symbol decorations for ghosted icons. See "[Displaying Ghosted Icons](#)" in the *VR-Vantage Users Guide*.
- Unit Display Settings now default to hiding the bounding volumes and showing ghosted icons.
- The Scene Toolbar was removed.
- The vertices of tactical graphics are no longer shown unless the graphic is selected.

Performance

- Increased the speed of intersections to improve performance.
- All entity textures are now proportionately reduced by default by taking into account the maximum resolution texture in the model. See -- `limitEntityTextures`, above.
- Nahimic software can have a negative impact on performance. VR-Vantage now warns you if the Nahimic service is running. See "[Performance and Display Issues](#)" in the *VR-Vantage Users Guide* to learn how to prevent this issue.

API Changes

The changes below have impacts on existing code. To learn more about the API changes for VR-Vantage 3.0, see the [VR-Forces Users Migration Guide](#).

- Refactored `signal_simulationCreated` to `signal_connectionCreated` and `signal_simulationAboutToBeDestroyed` to `signal_connectionAboutToBeDestroyed`. If you wrote any code using the `DtVrlinkDriver` signals, you must update it.
- Removed the non-const version of `findParameter()`.

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-Vantage 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/FixedDefectsVRV.csv](#) file.

Known Problems

VR-Vantage has the following known problem:

- If you use the settings covered in "[Installing the makData Package](#)" in the *VR-Vantage Users Guide* for the shared data, SensorFX works correctly. If you launch VR-Vantage with SensorFX and see an error about data, however, you can resolve it by setting the JRM_DATA_DIR environment variable to indicate the location where you installed the data. Enter the path to the SensorFX directory in the format *mydata\location*/ModelData/sensorFX where *mydata\location* is the full path to the *./SharedData/16/latest* directory. An example of the full entry is: E:/SharedData/16/latest/ModelData/sensorFX.

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