



VR-Vantage 2.7 Release Notes

This document provides the following release-specific information for VR-Vantage™ 2.7:

Systems Supported and System Requirements	2
Third-Party Libraries Supported	3
3D Video Cards Supported	3
Required Software for Toolkit Users	4
Compiler Compatibility on Windows	5
License Manager	5
Using MAK Products on Virtual Machines	5
Network Compatibility	6
FOM Support	6
Backwards Compatibility	6
Support for MAK Data Logger Recordings	7
New Features and Product Updates	7
Documentation Updates	13
Fixed Bugs	13
Known Problems	13

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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 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

The VC 14 build is binary compatible with all MAK VC 15 products.



YOU MUST INSTALL THE VR-VANTAGE DATA PACKAGE.

It is not optional. It contains data that VR-Vantage applications require.

Third-Party Libraries Supported

VR-Vantage uses the indicated versions of the following libraries:

- ♦ VR-Link 5.6
- ♦ Qt 5.10.1 (VC 15), Qt 5.14.0 (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 13.4 (development version)
- ♦ Triton 3.73
- ♦ Silverlining 5.086
- ♦ SpeedTree 6.3.2
- ♦ Oculus Rift Development Kit 1.26
- ♦ CDB API 2.2 (Windows), 2.1 (Linux)
- ♦ osgEarth 3.0
- ♦ CUDA 9.2 (Windows), 10.2 (Linux).
- ♦ CIGI - CCL 4.0.4

3D Video Cards Supported

VR-Vantage 2.7 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 page 4. VR-Vantage does not support AMD graphics hardware.

i

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 the 9xx series.

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 its 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, to use Kepler series Quadro, you must make this change manually.

Disk Space Requirements

A full installation of VR-Vantage requires approximately 35 GB of disk space.

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 5.6.

If you plan to build the VR-Vantage GUI, you must download and install QT 5.10.1 (VC 15) or 5.14.0 (Red Hat 8). You can download it at:

<https://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.

If you plan to extend CIGI functionality, you must use the CIGI Class Library 4.0.3.2 (CCL) provided in your installation of VR-Vantage (in *./packages*). Even if you are not working with CIGI 4, you must use this version of the CCL.

Compiler Compatibility on Windows

MAK provides versions of product releases that have been compiled with different versions of Microsoft Visual C++. When you run MAK products together on the same computer, for example, the Logger and a VR-Vantage application, we strongly recommend that you run versions compiled with the same compiler. Mixing products compiled with different versions of the compiler on the same computer can result in program instability. The exception to this is that products built with VC 14 and VC 15 are binary compatible.

License Manager

VR-Vantage 2.7 uses FLEXlm 11.13.0.2.



You must update your License Manager software for this release. You can continue to use old licenses if maintenance is up to date.

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>

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>.

Network Compatibility

VR-Vantage 2.7 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.

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

VR-Vantage 2.7 supports DIS 4, 5, 6, and 7, and can therefore interoperate with DIS applications of any of these versions.

FOM Support

VR-Vantage 2.7 has built-in support for versions 0.5, 0.7, 0.8, 1.0, and 2.0 (drafts 6, 14, 17, 20 and the final version) of the RPR FOM. It also supports VR-Link's ability to support alternative FOMs through the FOM Mapper.



Please see a known problem regarding MAK Logger recordings that use HLA Evolved ([“Known Problems,”](#) on page 13).

Backwards Compatibility

VR-Vantage 2.7 applications and some files are not backwards 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 2.7 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

VR-Vantage 2.7 works seamlessly with MAK Data Logger 5.5.1 and later. Older versions of the Logger may have two problems:

- ♦ There are known issues with DIS 7 extended attribute packets. These have been fixed in VR-Forces 4.6 and later, VR-Vantage 2.3 and later, and MAK Data Logger 5.5.1 and later. When using an older Data Logger with either VR-Forces 4.6 and later or VR-Vantage 2.3 and later, DIS 7 configurations can lead to crashes.
- ♦ There have been minor updates to the FOMs that are distributed with VR-Forces 4.6 and later or VR-Vantage 2.3 and later. These FOMS are available with MAK Data Logger 5.5.1 and later, but were not available in older Loggers. Older Loggers work, but you must configure the Logger to use the correct FOM, which should be copied from the newer VR-Vantage or VR-Forces.

Users using MAK Data Logger 5.5.1 will have no problems.

New Features and Product Updates

VR-Vantage 2.7 has the following new features and updates:

Data

- ♦ makData version 13 has a different structure from previous versions. As in previous releases, you must install the packages because they contain information that VR-Vantage requires. The SensorFX package is required only if you have VR-Vantage with SensorFX.

The installation directory is also different from what it was in previous releases. See Section 2.2, “[The VR-Vantage Directory Structure](#),” in *VR-Vantage Users Guide*.

- ♦ Entity configuration has been broken up into many files (one for each entity). This is a precursor to more data packages that are optional and install only a portion of the data at any given time. See Section 2.1, “[File Locations](#),” in *VR-Vantage Migration Guide* to learn about changes you might need to make.

Weather

- ♦ In the Environment Conditions Settings page of Scene Settings, you now set the wind direction using numbered headings instead of selecting a direction. This allows for more nuanced wind settings.
- ♦ Also in the Environment Conditions Settings page, you now specify the precipitation intensity as a measure of mm per hour (rather than percentages). You can also choose a preset intensity. See Section 11.4.3, “[Specifying Precipitation Type and Intensity](#),” in *VR-Vantage Users Guide*.

- With VR-Vantage Stealth, you can now visualize localized areas of blowing snow by adding a Blowing Snow layer in the Cloud Cover Editor page of Scene Settings. The Wind Speed defined in the Environment Conditions Settings page determines how much the snow blows in the defined area. To learn about cloud covers, see Section 11.5, “[Creating and Editing Cloud Covers](#),” in *VR-Vantage Users Guide*.
- With VR-Vantage Stealth, you can now visualize localized areas of blowing sand and dust by adding the appropriate layers in the Cloud Cover Editor page of Scene Settings. The Wind Speed defined in the Environment Conditions Settings page determines how much the sand or dust blows in the defined area. To learn about cloud covers, see Section 11.5, “[Creating and Editing Cloud Covers](#),” in *VR-Vantage Users Guide*.

Terrain and Simulation Objects

- VR-Vantage now uses OSG 3.6.4.
- osgEarth now supports the *.glb* format for 3DTiles and glTF.
- You can now remove feature layers using the Terrain Editor by right-clicking on the layer and choosing Remove.
- The Terrain Contents page has been removed from Terrain Settings. Manage terrain contents using the Terrain Editor panel. See Section II, [Terrain](#), in *Adding Content to MAK Applications Reference Manual*.
- Persistent Tracks from VR-Forces can be visualized in VR-Vantage. See Section 17.6, “[Configuring Persistent Tracks in Model Definitions](#),” in *Adding Content to MAK Applications Reference Manual*.
- New DIS keyword values have been added that match the SISO enumeration standard. (DIS keywords represent articulated parts in OpenFlight-format model files.) The older keyword values still work, but where you used, for example, “left_weapon_bay_door”, you can now also use “left_door_of_primary_weapon_bay”. For details, see Section 18.8, “[DIS Keyword Values](#),” in *Adding Content to MAK Applications Reference Manual*.
- VR-Vantage can now load archive files in *.3tz* format. 3tz archives can include glTF-format 3D tiles.
- Used in conjunction with VR-Forces, VR-Vantage now supports rotor wash on grass from rotary wing entities. Grass is driven by land cover data. The rotor wash is enabled or disabled based on whether the engine is on or off as well as by the embarked and destroyed states.

Bing Maps Data in Terrains

Terrains can now make use of high-resolution imagery data from Microsoft’s Bing Maps API. Imagery data is cached locally for 24 hours before it expires and VR-Vantage queries the Bing Maps API for updated data.

You can see Bing Maps imagery by loading a new terrain called MAK Earth Bing Maps (online) or by configuring your own terrain to access the Bing Maps API.

There are a couple of ways to modify a *.earth* file to enable a terrain to get Bing Maps imagery:

- ♦ Insert the MAK Bing imagery layer:

```
{% include imagery.worldwide.BingMaps.online.xml %}
```

- ♦ Create your own Bing imagery layer:

```
<BingImage name="Bing Imagery">  
  <imagery_set>Aerial</imagery_set>  
</BingImage>
```

Both methods use MAK's API key to access the imagery data in the Bing Maps API.

Virtual Reality HMDs

- ♦ Varjo headsets.
 - VR-Vantage supports Varjo headsets, and has been tested with the XR-1 and VR-2. SensorFX also works with the Varjo headsets. For details on the system requirements for the Varjo, please see <https://varjo.com/user-center/getting-started/system-requirements>.
 - Added support for tracking Varjo visual markers and supply method to allow you to query visible markers and create an offset applied to the headset pose.
- ♦ You now have the option to disable the depth warp for some headsets. See Section 9.4, “[Configuration Options for Virtual Reality](#),” in *VR-Vantage Users Guide*.
- ♦ Select the new check box, Enable Mixed Reality, when you want to use mixed reality. You can also choose the XML configuration file for the mixed reality. See Section 9.4, “[Configuration Options for Virtual Reality](#),” in *VR-Vantage Users Guide*.

Third-Party Software and HUDs

- ♦ VR-Vantage is now built against GL Studio 7.0 and supports HUDs built using GL Studio 7.0. HUDs built against GL Studio 5.x are no longer supported by VR-Vantage.
- ♦ GL Studio HUDs now render after post processing effects such as HDR, SensorFX, and depth of field. This improves how the HUDs appear when these effects are active. Use the `RenderAsOverlay` parameter on the cockpit model definitions to have a cockpit use the old behavior.

GUI

- ♦ The items in the View menu have been rearranged into alphabetical order.
- ♦ You can now dock toolbars vertically, displaying text labels for each button. See Section 36.1.3, “[Docking a Toolbar Vertically](#),” in *VR-Vantage Users Guide*.

- ♦ In PVD mode, the zooming behavior of the scroll wheel has changed. In previous releases, scrolling forward zoomed in on the center of the screen; now scrolling forward zooms in on the point under the mouse cursor. Hold down the **Alt** key and scroll forward to zoom on the center of the screen.
- ♦ If the observer in the 2D view is oriented north, you can now indicate whether the observer should be oriented to true or magnetic north. See Section 15.8.1, “[Specifying True or Magnetic North](#),” in *VR-Vantage Users Guide*.
- ♦ The compass now has two needles: the straight one indicates true north and the arrow indicates magnetic north. Depending on where the observer is in the world, they can be close together or wide apart ([Figure 1](#)).

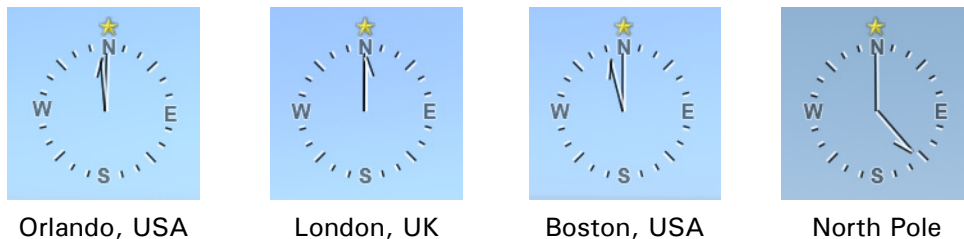


Figure-1. Compass

- ♦ Degrees Decimal Minutes (DDM) is now supported as a coordinate system. See Section 36.6, “[Specifying Display Units](#),” in *VR-Vantage Users Guide*.
- ♦ Degrees are now shown, by default, as three digits with no decimal places. For example, 90 degrees displays as 090.
- ♦ Grid lines in the 2D view are now more customizable, allowing you to specify whether the labels are detailed as well as the color for the lines. See Section 25.2.1, “[Configuring Grid Lines](#),” in *VR-Vantage Users Guide*.
- ♦ There are a number of improvements to the display of symbol decorations in the 2D (plan) view:
 - When you mouse over or select a simulation object, the symbol decoration text (if displayed) changes from white to bright green. There is also a box around the text and, if there is any overlapping text from other simulation objects, that text is hidden.
 - The symbol decoration data now displays in a simple column instead of a table format, using less real estate. There are no longer redundant labels such as “speed” and “altitude”. In addition, altitude above mean sea level displays for all entities except surface (aircraft, space, ground vehicle, subsurface, and life form), while altitude above ground level displays only for aircraft, space, and life form entities.
 - The spacing of symbol decoration text in the 2D view is also improved. It no longer has extra padding at the top.
 - The default size for 2D icons is smaller. You can still change the size of 2D icons using the Simulation Object Icon Scale slider in Entity Display Settings.

- ♦ In the 2D view, when you place the cursor over an icon or select a simulation object in the Objects List, the icon is highlighted. If that icon is under other icons, it now displays at the top of the pile while selected.

Configuration and Settings

- ♦ Dynamic lighting is now enabled by default in 3D (stealth) view.
- ♦ There are several enhancements to display units. To learn how to set the display units, see Section 36.6, “[Specifying Display Units](#),” in *VR-Vantage Users Guide*.
 - You can now specify display units by object (aircraft, vehicles, ships, and so on) and weather, as well as the application.
 - For the application, you can specify whether to use True North or Magnetic North. By default, heading and orientation indicators show T or M, but you can choose to suppress the M if that should be the assumed heading and show the T only when using True North.
 - You can also set the coordinate system for sensor views separately from the application.
- ♦ When you specify decimal places for a unit type, they are now associated with the grid line type. For example, the decimal precision for degrees can be different for Lat/Lon (Dec), Lat/Lon (DDM), and Lat/Lon (DMS). See Section 25.2.1, “[Configuring Grid Lines](#),” in *VR-Vantage Users Guide*.
- ♦ There are no longer separate `./appDataSensorFx` and `./factorySensorFx` directories for SensorFX plug-in data. That information is installed and used in the `./appData` and `./factory` directories.

SensorFX and CameraFX

- ♦ SensorFX and CameraFX now use the same settings file.
- ♦ You can now convert EMAT textures to MEIF files using the `medfTool` and then use them with SensorFX. See Section 17.15, “[Compressing Model Files](#),” in *Adding Content to MAK Applications Reference Manual*.
- ♦ SensorFX NVG now supports emissive textures and light maps.
- ♦ SensorFX’s environment settings use the new Display Unit Settings (see above).

Performance

- ♦ Entities are now rendered using the indirect rendering engine instead of the instancing render engine. Performance of rendering entities is significantly improved, particularly when there are a significant number of different model types loaded.
- ♦ The Tracy Client is now supported on Linux. See Section 5.2.3, “[Using the Tracy Client](#),” in *VR-Vantage Users Guide*.
- ♦ You can now specify the maximum number of paged LODs for `osgEarth` terrains using the Terrain Editor. For details, please see Section 10.6, “[Specifying the Maximum Number of Paged LODs](#),” in *Adding Content to MAK Applications Reference Manual*.

- ♦ If you change the following properties in the Terrain Editor, you can now save them using the standard Save Terrain procedure:
 - Terrain description.
 - Maximum paged LOD (osgEarth terrain only).
 - Height of an ocean layer.
 - LOD distance of an ocean layer.
- ♦ The Terrain Editor now has a debug mode that displays terrain tile boundaries. For details, please see Section 10.3.1, “[Viewing a Terrain in Debug Mode](#),” in *Adding Content to MAK Applications Reference Manual*.
- ♦ Speed scaling no longer intersects osgEarth features. This improves performance when flying around the scene and avoids jerky camera movements when they camera flies over buildings. Intersecting features can be turned back on using a plug-in, which sets `DtObserverObject::setScalingIntersectionTerrainSkinOnly(false)`.

CIGI Support

- ♦ Added the Symbol Surface Definition, Symbol Text Definition, Symbol Circle Definition, Symbol Line/Polygon Definition, and Symbol Control Packets. Please see Chapter 32, *[CIGI Packets Supported](#)*, in *VR-Vantage Users Guide*.
- ♦ Added support for rendering and reordering channels from the CIGI View Definition. See “[View and View Group Component Controls](#)” under Section 29.3.1, “[Component Control Message Formats](#),” in *VR-Vantage Users Guide*.
- ♦ Added more support for the Sensor Packet, and also added the Sensor Response and Sensor Extended Response Packets. Please see Chapter 32, *[CIGI Packets Supported](#)*, in *VR-Vantage Users Guide*.
- ♦ Added a component control packet for the sensor acquisition box. See Section 29.3.1, “[Component Control Message Formats](#),” in *VR-Vantage Users Guide*.

API Changes

- ♦ You can now specify the order of symbol decorations in the 2D view using `DtSymbolDecorationVisualizer::setLabelIndexForDecorationByName`. See `exampleSymbolDecoration` to learn how to use it.
- ♦ *DtOverlaySpiderWebModel* has been enhanced. The spider web now supports rings, with an empty inner ring and spokes that extend past the outermost ring. You can also set the opacity for the spider webs. For details, see *VR-Vantage Developers Guide*.
- ♦ `boost::signals::signal` is no longer used. Instead, the thread safe `boost::signals2::signal` is used.

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>.

Fixed Bugs

Problems identified in previous releases have been fixed. For a summary, please see the `./doc/FixedDefectsVRV.csv` file.

Known Problems

- ♦ There are a few issues that require you to add the application name to the *BlackApps.dat*:
 - Under certain circumstances, opening VR-Vantage on a second display prevents the program from starting.
 - In addition, launching from the main display and then moving the mouse cursor to the other monitor causes the program to freeze and not respond.

If you experience any of these issues, edit the nahimic *BlackApps.dat* file and add the application name (for example, `vrVantage.exe`) to the list. This file might be found in `C:\ProgramData\A-Volute\A-Volute.Nahimic\Modules\Scheduled\Configurator`, or `C:\ProgramData\A-Volute\A-Volute.28054DF1F58B4\Modules\ScheduledModules\Configurator`, or something similar. You can search `C:\ProgramData` for *BlackApps.dat* to locate it.

- ♦ There is a known problem with VR-Vantage and CentOS 8 running out of memory. When the OS runs out of memory or starts using the swap memory, it can become unresponsive. Here are some potential solutions:
 - Adjust the terrain being loaded in VR-Vantage to have fewer osgEarth layers and simpler models to reduce the memory consumption.
 - Add more RAM to your computer.
 - Upgrade the Linux kernel to at least version 5.7. We have found that the default kernel of 4.18 becomes unresponsive when the swap is being used but the 5.7 kernel does not have this problem.
- ♦ On Linux machines, when you use the built-in screen capture feature, the screenshot is not adjusted for gamma corrected. It appears dark in the default image viewer on Linux but displays correctly in other applications.
- ♦ When using Reverse Z Buffering in conjunction with Reduce Z Fighting Near Far Clip Policy (the default) and Triton dynamic ocean, significant performance slowdowns sometimes occur. Changing the Near Far Clip Policy to Fixed will resolve the issue; when Reverse Z Buffering enabled, the Reduce Z Fighting policy is unneeded.

- ♦ The first time you stream video using GStreamer, it generates a message indicating a critical error. This is a bug in GStreamer. There is no critical error. Subsequent uses of GStreamer do not generate this error.
- ♦ GStreamer as delivered does not work on some builds of Linux. Please see Section 8.1, “[Streaming Video](#),” in *VR-Vantage Users Guide* for more information.
- ♦ There is an occasional issue with some earth files that causes the wrong LOD to show up on the terrain. If this occurs, delete the cache in `./appData/cache` and add the following to the terrain section of your earth file: `progressive="true"`.
- ♦ Indirect rendering and MetaFlight terrains have problems with holes appearing as LODs are paging in. The workaround is to disable indirect rendering for MetaFlight terrains.