



VR-Vantage 2.6 Release Notes

This document provides the following release-specific information for VR-Vantage™ 2.6:

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Document ID: VRV-2.6-3-200708

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 is required by VR-Vantage applications.

Third-Party Libraries Supported

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

- ♦ VR-Link 5.5
- ♦ Qt 5.10.1 (VC 15), Qt 5.14.0 (Red Hat 8)
- ♦ OpenSceneGraph 3.4.0
- ♦ Boost 1.63.0
- ♦ FreeGlut 2.4.0 (Windows), 2.6.0 (Linux)
- ♦ GL-Studio 5.1.2 (VC 15)
- ♦ DI-Guy 13.4 (development version)
- ♦ Triton 3.73
- ♦ Silverlining 5.64
- ♦ 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 2.6 supports NVIDIA graphics cards that support OpenGL 4.4 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.

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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.

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, Kepler series Quadro you must make this change manually.

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 2.6 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 2.6 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 2.6 supports DIS 4, 5, 6, and 7, and can therefore interoperate with DIS applications of any of these versions.

FOM Support

VR-Vantage 2.6 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 21).

Backwards Compatibility

VR-Vantage 2.6 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 2.6 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 2.6 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 2.6 has the following new features and updates:

osgEarth

- ♦ VR-Vantage now uses osgEarth 3.0. To learn more, please see *VR-Vantage Migration Guide*. You need to make edits to your earth files; please refer to Chapter 1, [Migration to VR-Vantage 2.6](#), in *VR-Vantage Migration Guide* for guidelines.
- ♦ There is now support for unzipping large osgEarth files (over 2 GB).
- ♦ The lightmap osgEarth layer extension is no longer supported. Instead, you should use the effectmap extension. For details, see Section 1.1.7, [“Effectmap Extension Replaced Lightmap Extension,”](#) in *VR-Vantage Migration Guide*
- ♦ Added support for osgEarth feature fading to indirect rendering system. For details, see Section 3.15, [“Specifying Fading in earth Files,”](#) in *Adding Content to MAK Applications Reference Manual*.
- ♦ You can now add specular maps to osgEarth image layers to add realism to bodies of water. For details, please see Section 3.8, [“Specular Reflections on Water,”](#) in *Adding Content to MAK Applications Reference Manual*.

Terrain

- ♦ The terrains that ship with VR-Vantage have been updated for this release. For the detailed list see Section II, [Terrain](#), in *Adding Content to MAK Applications Reference Manual*.
- ♦ Geocentric terrain now supports MGRS coordinates when users are zoomed in close to the terrain in Plan View (PVD) mode.
- ♦ VR-Vantage can now generate procedural power lines from OSM data ([Figure 1](#)).

- ♦ Grass is driven by land cover data and blows in the wind ([Figure 1](#)).
- ♦ Aerodromes now support effect textures such as normal and emissive maps.
- ♦ The separate cache tool for generating streaming terrain cache data has been replaced by functionality found in the VR-Vantage application. To learn how to use this feature, see Section 10.1.2, “[Caching earth File Terrain Data](#),” in *Adding Content to MAK Applications Reference Manual*.
- ♦ The new Terrain Editor Panel, which you can access by choosing **View** → **Terrain Editor Panel**, allows you to generate an osgEarth cache and edit the osgEarth profile. (These features were previously found in the Terrain Contents page of the Terrain Settings.)
 - To generate a cache, go to the Tools tab in top of the Terrain Editor and click Generate Cache.
 - For profile items, use the Runtime Options tab at the bottom of the terrain editor.
- ♦ Earth files have a new <ThreeDTiles> element that supports streaming 3D tiles. For an example, examine the file `./userData/servers/Test-3DTiles.earth`.
- ♦ You can specify different layers based on the simulation’s time of year. For example, you might want to have trees with snow cover in the winter and lush leaves in the summer. Please see Section 3.14, “[Changing Visible Layers Based on the Date](#),” in *Adding Content to MAK Applications Reference Manual* to learn more.
- ♦ You can now set terrain layers like SpeedTree trees, light points, and specular maps to fade instead of popping into view. See Section 3.15, “[Specifying Fading in earth Files](#),” in *Adding Content to MAK Applications Reference Manual*.
- ♦ The terrain is automatically redrawn to show craters when VR-Vantage receives the appropriate update message. See Section 7.6, “[Craters](#),” in *Adding Content to MAK Applications Reference Manual*.
- ♦ The speedtree_catalog attribute’s features element has been replaced by the ogrfeatures element. See Section 5.2.4, “[Configuring the GeoTypical \(GT\) Dataset \(101\)](#),” in *Adding Content to MAK Applications Reference Manual* for an updated example.
- ♦ The dynamic lighting system has been enhanced, improving the performance on scenes that include more than 50 lights. Other enhancements to how lighting is generated also improve performance.
- ♦ Added a new type of shader-based effects map, the Sensor Texture map. This is a three-channel texture that adds the red, green, or blue channels as appropriate when the observer is in an NVG CameraFX or IR mode. See Section 10.4, “[Using Shader-based Effect Maps](#),” in *Adding Content to MAK Applications Reference Manual*.
- ♦ The ocean height can now be set to a negative value in the Terrain Editor.

- ♦ Ocean masking allows you to mask out the ocean where the ground level is below sea level. By default, this applies to the Dead Sea and Death Valley. You can mask out other areas by editing the *ocean-mask-texture.tif* file or providing your own geotiff texture, which as of this release must be a world texture and a mercator projection extending the full expanse of the earth [-90,90] [-180,180]. For details, please see Section 10.12, “[Masking the Ocean](#),” in *Adding Content to MAK Applications Reference Manual*.

Weather

- ♦ Rain effects on the ground and puddles are now supported. The terrain appears slightly shinier and specular. The puddles are also specular and, if there is rain in the scene, there are ripples in the puddles ([Figure 2](#)).
 - Masking features enable you to define whether puddles will accumulate in areas. For details, please see Section 10.4, “[Using Shader-based Effect Maps](#),” in *Adding Content to MAK Applications Reference Manual*.
 - The Environment Conditions page of Scene Settings now includes a setting for rain accumulation. To learn about the rain setting, please see Section 11.4.4, “[Setting Rain Accumulation](#),” in *VR-Vantage Users Guide*.
- ♦ Snow on the ground is now supported.
 - Masking features enable you to define areas as either ground or roads to reflect different depths (for example, plowed roads or runways versus ground). For details, please see Section 10.4, “[Using Shader-based Effect Maps](#),” in *Adding Content to MAK Applications Reference Manual*.
 - The Environment Conditions page of Scene Settings now includes settings for snow. To learn about the snow settings, see Section 11.4.5, “[Setting Snow Depth and Elevation](#),” in *VR-Vantage Users Guide*.
 - When there is snow on the ground and wind is blowing, snow can blow across roads. Please see Section 11.4.5, “[Setting Snow Depth and Elevation](#),” in *VR-Vantage Users Guide*.
- ♦ If you have SensorFX, there is an additional *.ms* file in the *sensorFX* data folder, *environmental.ms*. This contains the value used for the snow material we blend towards, displaying snow correctly with SensorFX (NVG, MWIR, LWIR). Only the first value in the file is currently used.
- ♦ Hail is now available as a type of precipitation. For details, see Section 11.4.3, “[Specifying Precipitation Type and Intensity](#),” in *VR-Vantage Users Guide*.
- ♦ The Ground Fog cloud layer has been improved ([Figure 1](#)). The classes that begin with *DtGroundFog* were added, along with shader changes and support code. To learn about using cloud layers, see Section 11.5, “[Creating and Editing Cloud Covers](#),” in *VR-Vantage Users Guide*.
- ♦ The Sandstorm cloud layer has been improved. To learn about using cloud layers, see Section 11.5, “[Creating and Editing Cloud Covers](#),” in *VR-Vantage Users Guide*.



Figure 1. Power lines, ground fog, and grass



Figure 2. Rain puddles

Modeling

- ♦ The Objects List now shows icons and force indicators for any simulation objects. The list is grouped by force.
- ♦ The context menu for simulation objects now gives you access to the Model Definition Editor and Element Definition Editor. Simply right-click on the simulation object and then choose the desired option. The Visual Model Editor opens to the relevant tab.
- ♦ VR-Vantage now allows an entity to be configured with multiple models that can be offset in position and orientation from the scene object to which they are attached.

- ♦ The Visual Model Editors dialog box has multiple improvements and additions. Now you can:
 - See the saved file location for element and model definitions, as well as type mappings, for easier access and export.
 - Use options to save all definitions at once.
 - Change a definition’s file location using a drop-down list.
 - Filter definitions by their file location.
 - Copy visual definitions from one definition and paste them in another.

The entity type mapping filtration system has also been fixed, in addition to the file location filter.

Please see Section III, [Visual Models in MAK Applications](#), in *Adding Content to MAK Applications Reference Manual*.

- ♦ DI-Guys can now float in water and bob up and down on waves. This requires some edits in the Visual Model Editors:
 - In the Model Definition editor, set the waterlineOffset (-1.55 is approximately correct for adult males).
 - In the Entity Definition editor’s Kinematic State definition, set possiblegroundclampingmode to ClampWater, then add isAmphibious and set it to True.

Please see Section 14.7, [“Editing a Model Definition,”](#) and Section 15.6, [“Editing an Element Definition,”](#) in *Adding Content to MAK Applications Reference Manual*, to learn how to edit entity definitions.

- ♦ DI-Guy Character Viewer is now included with the tools that are part of the VR-Vantage installation. See Section IV, [DI-Guy](#), in *Adding Content to MAK Applications Reference Manual*.
- ♦ Supply and expendable kinds can support a parachute appearance state. To learn about these and other DIS appearance statuses, please refer to Section 18.7, [“DIS Keyword Values,”](#) in *Adding Content to MAK Applications Reference Manual*.

Display Settings

- ♦ Shadows are now bypassed by default on moonless nights for performance. Shadow casting by moonlight is now a configuration setting, and can be disabled for performance reasons, if desired. To learn about adjusting the shadow settings, see Section 13.10, [“Displaying Shadows \(3D Only\),”](#) in *VR-Vantage Users Guide*.
- ♦ You can enable and disable wheel rotation on vehicle models. See Section 21.14, [“Enabling and Disabling Wheel Rotation,”](#) in *VR-Vantage Users Guide*.
- ♦ There is now a check box in the High Dynamic Range Settings, Enable Exposure Correlation, that controls whether all the channels share the same auto exposure adjustment. See Section 13.9, [“Using High Dynamic Range Lighting,”](#) in *VR-Vantage Users Guide*.

- ♦ When pinning the labels for entities, you will now see a pin icon to indicate whether each entity's label is pinned. For more information, see Section 19.2.3, “[Pinning 3D Text Labels to the Window](#),” in *VR-Vantage Users Guide*.

Pinning labels also pins symbol decoration in the 2D (plan) view.

- ♦ You can specify a distance at which DI-Guy characters stop animating, unless they are changing posture.
- ♦ You can specify a timeout value for track history segments. For details, see Section 21.4.1, “[Configuring Track History Segments and Timeout](#),” in *VR-Vantage Users Guide*.
- ♦ You can change the color of an entity's track history ribbon ([Figure 3](#)). See Section 21.4.2, “[Coloring an Entity's Track History](#),” in *VR-Vantage Users Guide*.

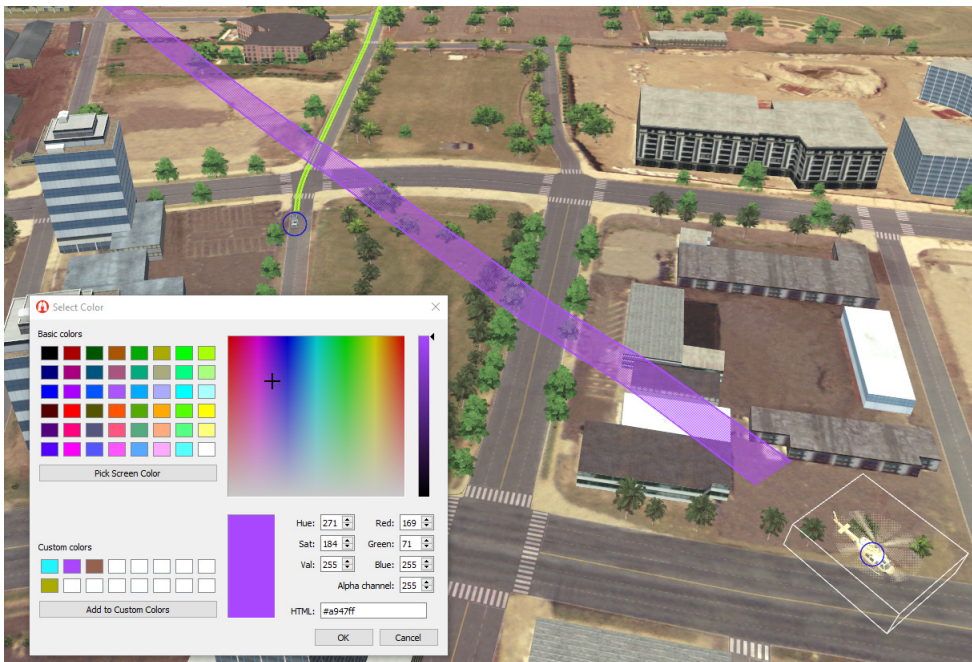


Figure 3. The track histories of a truck (top center in green) and a helicopter (top left to bottom right in purple) with custom colors.

Particle Effects

- ♦ The new Particle System Editor allows you to create, edit, and remove particle systems (special effects) such as smoke, fire, and weather effects. Please refer to Chapter 20, [Special Effects \(Particle Systems\)](#), in *Adding Content to MAK Applications Reference Manual* to learn about this feature. (In IPB2, most of the particle systems were the same as in previous releases. They were updated in IPB3.)

- ♦ Particle systems (special effects) are enhanced. This includes improvements to global forces, wind volumes, air resistance, collision objects, particle transparency, and more. To learn how to preview and edit particle systems using the Particle System Editor, please see Chapter 20, [Special Effects \(Particle Systems\)](#), in *Adding Content to MAK Applications Reference Manual*.
- ♦ Used in conjunction with VR-Forces, VR-Vantage now supports rotor wash for rotary wing entities. This support introduces a particle rotor wash for dirt and snow, in addition to the existing Triton rotor wash for water ([Figure 4](#)). 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.

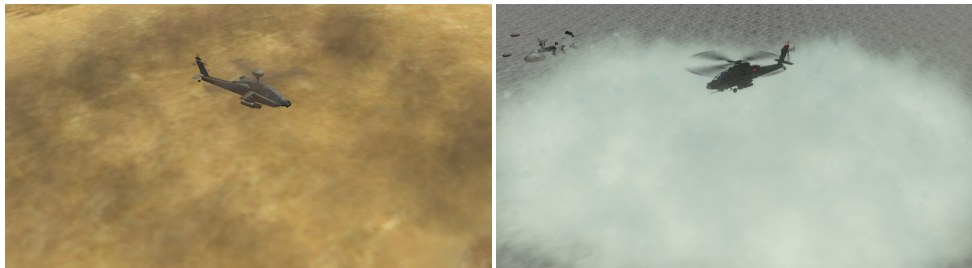


Figure 4. Rotor wash

SensorFX

- ♦ The installation process now allows you to install SensorFX at the same time as VR-Vantage, if you have a license for SensorFX,
- ♦ SensorFX now supports indirect rendering, which significantly improves performance.

Performance and Configuration

- ♦ You can change the default installation directory by setting up a `MAK_INSTALL_DIR` environment variable. See [“Default Windows Installation Directory”](#) under Section 2.1.1, [“Installing VR-Vantage on Windows,”](#) in *VR-Vantage Users Guide*.
- ♦ VR-Vantage has added support for high resolution displays. The user interface, including icons and text, stay visible on 4K monitors rather than becoming smaller at higher resolutions.
- ♦ The Performance Statistics and Function Profiler Overlays have been combined with an improved user interface. Please see Section 5.2, [“Displaying Performance Statistics,”](#) in *VR-Vantage Users Guide*.
- ♦ VR-Vantage now ships with the Tracy Client, which enables you to collect performance statistics in a file to send to our technical support team for help in tracking down problems. For details, see Section 5.2.4, [“Using the Tracy Client,”](#) in *VR-Vantage Users Guide*.

- The Developer Debug Overlay now includes a check box that allows you to enable the osgEarth Network Monitor. To learn more about using the overlay, see Section 5.11, “[Using the Developer Debug Overlay](#),” in *VR-Vantage Users Guide*.
- VR-Vantage shaders are now cached in a binary shader program cache in `./appData/cache/VirtualProgram`. This speeds up terrain loading and paging after the first time a particular installation of VR-Vantage loads that terrain or area of paging terrain.
- VR-Vantage performance has been greatly improved by shader optimization. For example, night scenes with many lights being cast can be up to 100% faster than in previous releases.
- SpeedTree performance while moving the camera or with multiple channels has been improved.
- The rendering of procedurally generated image splatting for MAK Earth terrains has been greatly improved.
- Improved performance for terrains with SensorFX MOD layers when not using SensorFX.
- VR-Vantage now supports articulated part smoothing for instanced entities. See Section 21.2.2, “[Configuring Articulated Part Smoothing](#),” in *VR-Vantage Users Guide*.
- By default, when the observer view is zoomed in, VR-Vantage now performs a screen intersection on the area the observer is looking at and improves the LOD at that area and not in other areas. To learn how to configure this feature, see Section 15.6.6, “[Configuring the LOD Center in the Observer Mode](#),” in *VR-Vantage Users Guide*.
- You can adjust the LOD Scale Factor from the Observer Control Panel, which allows you to scale the distance used to determine the level of detail.
- We now verify that agent calls are made only in the thread that created the agent. If not, the `DtCorruptedState` exception is thrown.
- The new `--loadObserverViews` command-line option replaces the `--loadObservers` option. Its function is the same. There is another related command-line option, `--disableTerrainObserverViews`, which prevents the terrain-specific observer views from loading and terrain loads will not clear the list of observer views.
- The default number of decimals for distance, altitude, velocity, acceleration, and rotation velocity is now 0.
- The new command line option `--disableErrorDialog` prevents an error dialog from displaying when a terrain is missing and instead prints the error to the console.
- The performance of human characters (DI-Guy) has been greatly improved. VR-Vantage can now render many thousands of humans in a 60 Hz scene.
- Human character performance has also been improved through the use of adaptive tick rates. Human characters far in the distance that are about a pixel in size are no longer be fully updated every frame. This greatly increases the total number of characters that can be rendered in a 60 ftp scene.

Observer and Video Streaming

- ♦ You can move the observer to a particular address or set of coordinates. See Section 15.12, “[Using the Go To Location Panel](#),” in *VR-Vantage Users Guide*.
- ♦ The following Video Streaming metadata fields calculation have been modified for UAS Datalink Local Set and Minimum Metadata Set:
 - 18 (Sensor Relative Azimuth Angle)
 - 19 (Sensor Relative Elevation Angle)
 - 20 (Sensor Relative Roll Angle)and these fields only for (UAS Datalink Local Set)
 - 26-33 (Offset Corner)

API Changes

- ♦ The VR-Vantage API now supports specifying a location or some entity to use as the audio system’s listener (which still defaults to the current observer).
- ♦ Added a view control packet for specifying the default color/intensity of point light groups when they are created. All of the View Control packets can be found in `./include/vrvControlToolkitDataTypes.h`.
- ♦ The *DtRadioCommsVisualizationManager* and *DtRadioCommsVisualizationManagerCommunicator* classes now allow you to set the style of communication lines using the `setStipplePattern` and `setStippleRepeatFactor` functions. See the *VR-Vantage API Class Documentation*.
- ♦ There are new classes that enable you to draw 2D overlay arcs, window arcs, sectors (wedges), and spider webs. See the *VR-Vantage API Class Documentation*.
 - To create a 2D overlay arc, use *DtOsgOverlayArcModel*, *DtOsgOverlayArcModelAgent*, and *Dt2DArcFacade*.
 - The class API you use to create a window arc is *DtOsgWindowArc*.
 - To create a sector, use *DtOsgOverlayWedgeModel* and *Dt2DWedgeFacade*.
 - To create a spider web, use *DtOsgOverlaySpiderWebModel* and *Dt2DSpiderWebFacade*.
- ♦ There is now an accessor for the `parentId` member of *DtWidget*. When a widget is used in conjunction with a *DtProjectWidgetModel* (for example, entity icons) the parent ID is the ID of the scene object to which the model (and therefore the widget) is attached.
- ♦ VR-Link connections now have a `queueDriverFunction()` method that provides a thread-safe way to request the execution of a method in the render thread.

- ♦ There are updates to 2D graphics API:
DtWindowObject, *DtWindowPolygon*, *DtWindowLine*, *DtWindowText*, and *DtWindowEllipse*.

There is now support for child/parent 2D objects, as well. These changes were added through the base class *DtWindowObject*.

There are two new examples in the *VR-Vantage Developers Guide*, *exampleWindowObjectHud* and *exampleWindowObjects*, to show you how to use these features.

CIGI 4.0 Support

- ♦ VR-Vantage now supports CIGI 4.0. We continue to support CIGI 3.2 and 3.3. For details on all of the supported packets, please see Chapter 32, *CIGI Packets Supported*, in *VR-Vantage Users Guide*.
 - Added CIGI support for RotorWash Diameter Component Control, Rotor-Wash Windspeed Component Control, Maritime Surface Conditions Control, Wave Control, HAT/HOT Extended Response packets. For detailed information on the new CIGI support, see Chapter 32, *CIGI Packets Supported*, and “Entity Component Controls,” in Section 29.3.1, “Component Control Message Formats,” in *VR-Vantage Users Guide*.
 - Added CIGI support for Sensor Control packet. (The Sensor Response packet is not supported.) For detailed information on CIGI support, please see Chapter 32, *CIGI Packets Supported*, in *VR-Vantage Users Guide*.
 - The Short Component Control packet supports attaching a view or view group to an articulated part. Please see “View and View Group Component Controls,” in Section 29.3.1, “Component Control Message Formats,” in *VR-Vantage Users Guide*.
 - Added support for DI-Guy gesture control to the CIGI implementation. See Section 32.2, “DI-Guy Packet Extensions,” in *VR-Vantage Users Guide*.
- ♦ Python utilities are supported for both CIGI 3.x and 4.x. The *./tools/CigiUtilities* directory now has separate folders for these versions. See Chapter 31, *CIGI Utilities*, in *VR-Vantage Users Guide*.
- ♦ There are now two CIGI host emulators, one for CIGI 3.x and one for CIGI 4.x. To learn to use the emulators, see Chapter 30, *CIGI Host Emulator Tutorial*, in *VR-Vantage Users Guide*.
- ♦ There is a new check box in the CIGI Connections page of Simulation Connections. The Return DIS/RPR-ROM Connection Object IDs check box allows you to return DIS/RPR-ROM connection object IDs from CIGI requests that collide or intersect with those objects, rather than returning the CIGI ID. This is useful when there is an intersection with an object that does not have a CIGI ID. Please see Section 4.2.3, “CIGI Connection Settings,” in *VR-Vantage Users Guide*.

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>.

Terrain and modeling information has been moved to the new *Adding Content to MAK Applications Reference Manual*. References in other guides direct you to relevant topics in that guide.

The SensorFX documentation is now included in *VR-Vantage Users Guide* and online help, rather than being separate.

Fixed Bugs

VR-Vantage 2.6 fixes the following problems that were present in previous releases:

- ◆ Procedural imagery and vegetation now respond correctly to view magnification. 5261
- ◆ Fixed issue where opening a new stealth window in MAK Earth sometimes caused issues with dynamic lights. 59876
- ◆ The virtual program accept callback for osgEarth did not always run. This is resolved. 60003
- ◆ Grid pattern no longer forming from textures in Procedural OSM. Texture edges now blend correctly. 62447
- ◆ Triton Wakes now work correctly when there are more than two windows open. 63667
- ◆ Fixed an issue that occurred when there were one or more new stealth windows, where enabling tidal stream wakes and then setting the tidal current speed to anything but zero would display black areas in the new stealth windows. 63562
- ◆ Ship wake spray now displays when multiple windows are open. 63668
- ◆ Procedural textures are now available in a fully cached terrain. 63786
- ◆ Fixed an issue where the number of paged LODs was incorrect after a terrain patch was removed. 64109
- ◆ Shadows now display with high magnification. Previously, they would not display when the observer was zoomed in on a location from far away. 64655
- ◆ Improved SensorFX performance by making sure the cloud and sky objects were not added multiple times for the same scene. 64970
- ◆ Paged LOD is now Terrain. 65040, 65748
- ◆ Video stream size now correctly resets when using hardware video encoding. 65063
- ◆ If VR-Vantage was connected to VR-Forces and VR-Vantage then disconnected from the DIS/HLA connection after dynamic terrain was switched from the defaults, it could get out of sync with VR-Forces. This is fixed.. 65368

- ♦ Fixed the taxiway signs on the procedural airports so they do not disappear when the camera rotates and is immediately next to the sign. 65451
- ♦ When configuring video streams, you can now omit overlays when HDR is enabled. 65481
- ♦ The Clear Instancing Cache button now correctly clears models. 65238
- ♦ *Bdesign3dNevada (online).mtf* no longer has a black square at the location of the inset when it is viewed from a distance. 65500
- ♦ Fixed VR-Vantage when running on Linux so that `Ctrl+Enter` will take a window out of full-screen mode when it is not embedded. 65506
- ♦ More information is provided when an Entity Definition has a bad model definition. 65507
- ♦ DI-Guy sensor textures are fixed so that they look correct in IR modes when using SensorFX. 65539
- ♦ Fixed a crash in the audio system. 65550
- ♦ The `--bindObservers` command line option now works on Linux. 65543
- ♦ Fixed problem with handling multiple observers and the `--bindObservers` command-line option. 65583
- ♦ Fixed a problem with reverse-z when toggling between PVD and 3D views. 65595
- ♦ The audio system now correctly adjusts the volume for all sounds, not only newly created sounds. 65599
- ♦ `exampleCreator` has been removed; it is duplicated (as a plug-in) in `exampleChannelPlugin`. 65609
- ♦ Fixed a bug that could cause a crash if a GUI element was removed that had been previously tabbed on a dock widget. 65623
- ♦ Fixed a crash with `exampleEmbedded` on startup. 65636
- ♦ Fixed a problem where procedurally generated buildings would disappear if windows were removed and then re-added. 65661
- ♦ Trees no longer appear under the terrain along skirt boundary. 65667
- ♦ Fixed a problem where EMM textures would not render correctly. 65691
- ♦ Fixed an issue where procedurally generated terrains sometimes rendered the terrains incorrectly. 65700
- ♦ Fixed crash when quickly moving between distant eye points on procedural terrains. 65701
- ♦ Fixed incorrect orientation of Cloud billboards. 65759
- ♦ Changing window parameters sometimes caused CDB terrains to not render correctly. This is fixed. 65769
- ♦ `SpeedTrees` now load with SensorFX if the terrain is loaded from the command line. 65797
- ♦ Added an example to show how to send a custom view control packet. 65962
- ♦ Fixed crash in the audio system where misconfigured sounds caused a crash. 65970
- ♦ The video stream no longer fails if any other channel is destroyed. 65991
- ♦ Simulating STANAG 4609 stream tag2 timestamp is now updated correctly. 66011

- ♦ The metadata from the video stream's field 48-13 (Object Country Codes) now streams correctly to UTF16 (not UTF8). 66105
- ♦ Fixed possible crash on exit in DtSceneObjectUpdater and DtSymbolDecorationUpdater. 66120
- ♦ Fixed possible crash when entities are deleted. 66135
- ♦ Fixed a crash when loading a *.medf* file as a terrain patch. 66160
- ♦ Fixed a potential crash in SpeedTrees. 66175
- ♦ Fixed issue where humans were occasionally placed with the wrong orientation. 66179
- ♦ Enabling Crepuscular Rays (sun rays) no longer breaks lighting. 66181
- ♦ Fixed issue with skating/freezing/sliding, where DI-Guy character locomotion animations would freeze when the entity was still moving along the ground. 66183
- ♦ Using Stratified Poison Disk Sampling scheme with Exponential Shadow Maps or Variance Shadow Maps for shadows no longer causes rendering issues. 66198
- ♦ VR-Vantage no longer crashes when you remove all channels. 66219
- ♦ The command-line option `--pseudoFullScreen` was always opening on the primary monitor instead of the selected monitor. It now correctly opens full screen on the current screen (instead of screen 0). 66244
- ♦ Fixed an issue where Target Point and Point of Interest tactical graphics in a VR-Forces scenario were displaying as white instead of red. 66292
- ♦ Fixed issue where indirected textures would disappear if you opened a new Stealth Window. 66299
- ♦ Fixed crash associated with human characters that occurred when you enabled shadows while building were loading. 66342
- ♦ Articulated and simple models are now scaled correctly. 66351
- ♦ When audio was enabled, the Fish entity could be heard making the sounds of a submarine. This is fixed. 66380
- ♦ Fixed issue where pressing `]` to change the observer view while pressing a movement key (`W`, `A`, `S`, `D`, etc.) would perpetuate the movement in the new view, even while the movement key was no longer pressed. 66383
- ♦ Trajectory histories now use model definitions. 66420
- ♦ Fixed issues with the destroyed models for the Taxicab and Police Cruiser. 66481, 66483
- ♦ Fixed a problem associated with Jitter in the gimballed sensor model. 66521
- ♦ Fixed track history problems when network was disconnected and then reconnected. 66522
- ♦ If you were in full-screen mode and tried to exit, the cursor would be invisible when it was over the confirmation dialog. This is fixed. 66525
- ♦ If you were in full-screen mode when you exited VR-Vantage, all the toolbars and panels would be closed the next time you opened VR-Vantage. This is fixed. 66526
- ♦ Improved lighting on weapons fire below soldiers. 66478
- ♦ The sensory view is now in the correct location when attached to an articulated part. 66513

- ♦ Fixed an issue in Display Settings where resetting the Render Settings page to factory would clear the Enable Shadows check box in the Shadow Settings page. 66528
- ♦ Fixed an issue that prevented the setColor() method of DtOsgWidget from working. 66588
- ♦ The mouse event signals from the DtWidgetSignaler are now public. 66589
- ♦ The Fiat 124 model no longer has a transparent roof when viewed from the interior. 66594
- ♦ Sun specular lighting now takes into account full deck cloud overcast condition. 66605
- ♦ Fixed a potential crash bug when a request to load a terrain was made while certain feature objects were currently paging in. 66645
- ♦ If a user chose an environment condition in the Scene Settings dialog box and then pressed either R or S, the Rain or Snow radio button would be selected, respectively. This is fixed, and pressing those keys no longer affects the weather conditions. 66661
- ♦ Fixed an issue that prevented users from minimizing VR-Vantage when there were a number of overlapping Panels open. 66679
- ♦ Custom CIGI packets would not be recognized if not registered with the CIGI connection. This bug is fixed. 66734
- ♦ Fixed an issue when switching to snowy weather conditions that would cause a bright white environment reflection. 66812
- ♦ Fixed an issue where snow or rain could display in space. 66813
- ♦ Star rendering for NVG is now disabled at a lower altitude. This fixes a problem where the stars were displaying in front of the terrain. 66819
- ♦ Height above terrain lines were sometimes displayed in error. This has been corrected. 66861, 66862
- ♦ Local coordinate rates now work in CIGI. 66882
- ♦ Fixed issue where DI-Guys would appear to dance when placed in an HLA scenario while it was playing. 66893
- ♦ Entities configured to be amphibious were displaying buoyant motion all the time, even when on land. This has been fixed. 66896
- ♦ Waterline Origin Offset & Amphibious Indicator now work through CIGI. 67081
- ♦ Fixed an exception that was happening when a .DCX file was loaded that had a zoom magnification that was not 1. The exception was unnecessary; it simply needed to return. 67256
- ♦ Improved performance on view magnification. 67367
- ♦ SensorFX now applies specific sensor material properties to patchy ground fog and sandstorms. 67454
- ♦ When streaming more than one video with local data, the offset corner values were calculated using the current observer and not the observer in the video stream. The offset corner values are now fixed when streaming more than one feed. 67493
- ♦ Improved performance when a high number of tiles are paged in. 67582
- ♦ Improved the configuration of the Rhone Valley terrain. 67679

- ♦ Improved performance for shadows. 67758
- ♦ Improved performance of speed tree shadowing. 67856
- ♦ Terrain load time has been improved. 67948
- ♦ VR-Vantage object lists are now sorted logically such that, for example, "M1A2 3" displays before "M1A2 10" even though "M1A2 10" is lexicographically less than "M1A2 3". 68021
- ♦ Fixed a bug that caused the Sensor View pitch angle to be incorrect if the platform had a roll element and the sensor azimuth was non-zero. 68241
- ♦ Added support for detecting ALT and CTRL key presses. 68282
- ♦ Resolved issue where muzzle flash particle animations did not display correctly on geocentric terrains. 68310
- ♦ Fixed occasional crash on exit due to a bug in the Audio manager. 67740
- ♦ Fixed an issue with reloading terrains which caused strange intensity for the roads when SensorFX plug-in is being used. 68456
- ♦ Changed the default polygon offset for the first shadow cascade to 128. This allows entities with shadows to display more realistically rather than appearing to float. 68530
- ♦ Effect textures like normal maps and light maps work correctly on CDB databases. VRV-1664
- ♦ Fixed the environment map to ensure that one side of the cube did not have the wrong silverlining settings. This was causing an issue where some of the terrain/reflections would look bright when switching to an overcast cloud cover. VRV-1725

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.