

Vortex Studio 2018a Release Notes



WHAT'S NEW

Welcome to the first Vortex Studio release of 2018! We keep working on the interface of the software to make it more powerful and ever easier to use. New features and improvements have also been added, as well as general performance increases.

To better showcase that it delivers a complete next-generation simulation development environment, Vortex Dynamics was renamed Vortex Studio in 2017, with version numbering replaced by year of release to simplify maintenance. It features a slick, easy-to-use interface, streamlined content design workflow, and built-in functionalities that reduce system integration time.

Vortex Studio Platform

Many new additions have been made to the core platform, including:

General Enhancements

There have been many changes to improve the general performance and usability of the software:

- The new **B-Spline** feature allows users to create a path in a scene that can be used to animate or otherwise move objects.
 - Reference points can be placed individually via the manipulators
 - Behaviors such as pause or input speed can be set for each reference point
 - The animation can loop, or play once
- Gamma Corrected views, typically referred to as **Gamma Correction**, are now being applied to the visuals.
 - The mathematics for lighting, blending and materials are now done in linear space
 - This provides better-looking graphics, especially with regards to specular highlights, night-time lighting, multiple-light-blending and transparency effects
- **Multi-Monitor Support** now includes Qt Display as well as 3D Display extensions.
- A content extension called a **Joystick Controlled Point** is now available.
 - It moves a point in 3D space through gamepad controls
 - A common use case for this extension is to easily set-up and control a viewpoint or camera
- A number of **automated Python vehicle verification scripts** are now available to test vehicles created with Vortex Studio.

Dynamics Module Enhancements

There have been improvements made to the Dynamics module:

- The lock position of a locked controllable constraint coordinate is now provided as an Output.
 - This allows implementing logic based on the current target position (i.e., lock position) of a moving lock
- A change in the treatment of contacts with adaptive cables has led to a significantly reduced number of contacts.
 - This simplifies the calculation and increase dynamics performance with little or no loss of fidelity
 - Using the "Adaptive" option in flexible segments can now lead to drastic dynamics simulation speed-ups for scenes with cables in collision with other surfaces, such as the terrain
- Improvements have been made to the Hooking extension.
 - Hooks and loops can now be attached at the start of a simulation
 - A new API with several utilities for easy hooking and attraction of objects has been introduced to the VxDynamics library to allows developing hooking tools from scratch

Graphics Module Enhancements

There have been several changes and improvements made to the Graphics module:

- The mathematics for lighting, blending and materials is now done in linear space – what is known as **Gamma Correction**.
- The **FBX Importer** in the Graphics Gallery has been improved.
 - It will now create extra nodes for 3ds Max's geometric transforms, if these are present in the model
- The **OBJ Importer** in the Graphics Gallery has been improved.
 - Large models with many small triangle fans or strips are common in older file formats such as .OBJ files. The OpenSceneGraph 3D model importer has been optimized to better handle this
- **Single-Node Multi-Monitor Support** has been simplified.
 - In the Setup document, if using the "Automatic" mode to place the "Display" objects, you should now create only one Node for all the "Display" objects that will run on a given physical computer
- Improved **Multi-Monitor support** now includes Qt Display as well as 3D Display extensions.
 - Using the new "Qt Display" extension in the Setup document, it is now possible to place the UI monitors for a simulator in physical space
 - The "Qt Display" is used together with the existing "Qt Window" extension: the window will be moved to the display according to its configuration. The "Qt Display" extension supports the physical space placement functionality of the "3D Display"
 - If using NVidia Surround, you can enter exclusive mode for a multi-monitor simulator that includes UI elements as well as 3D elements by placing the displays properly
- The visuals for the **Propeller Wash** and the **Hull Wake** effect on the Ocean object have been massively improved.

Vortex Studio Editor

There have been several changes and improvements made to the Vortex Studio Editor.

- **World-Space Labels** is a new system for adding readable text to items in a scene.
 - The Labels are placed using the Editor manipulator, appear in world-space and are merged in the Graphics Module for better performance
 - The position, orientation, size, color, font and text content can be customised as required. Scripting can be used for this purpose
 - This extension is recommended to model container ID labels, vehicle license plates, door identification panels, etc.
- The type of the "Active" field in **Intersection Sensors** and **Sensor Triggers** has been changed from Parameter to Input.
 - This means that these extensions can now be activated or deactivated at run-time during a simulation.

Cable Systems

Cable Systems have been expanded to bring these improvements:

- It is now possible to trade collision accuracy for simulation speed with the new **Low Precision Contacts** option
 - This option is located in the Advanced Parameters container of flexible segments
 - When selected, contact forces applied to isolated objects (for example, a static terrain) colliding with the corresponding cable segment will be less accurate, but will be calculated in less time, yielding a performance boost
- Waypoints can now be reordered in a flexible cable.
 - A common use case would be to add a new waypoint between existing ones

Earthwork Systems

Earthwork Systems have been expanded to bring these improvements:

- When pushing even very narrow soil ridges with a significantly wider blade, a corresponding cutting force is now calculated and applied to the blade.
- The Bucket has been replaced by the new **Dynamics Bucket** in the Toolbox.
 - The recent introduction of the Screen Space Mesh technology (to improve the visuals) had made many components of the Bucket redundant or obsolete
- The option to display only a percentage of the active soil particles has been removed from the dynamics child extension in the Soil Particles object.
 - Use the "**Particle Display Percent**" parameter under the graphics child of the Soil Particles object instead

Vortex Marine

Vortex Marine has been expanded to bring these improvements:

- We have improved the visuals and interfaces for the **Propeller Wash** and the **Hull Wake** effect. This allows users to rapidly create wash and wake effects that are closer to the real behavior of the vessel being modeled.
 - Both effects come with a basic texture that can be overridden with a user-created version
 - Parameters such as speed, width, spread, lifetime and others can be adjusted at runtime via scripting to correctly represent visual water interactions due to ship speed, heading changes, increased throttle, etc.
- When using the **Buoy** extension, the "yaw" rotation is now considered a free axis. If the user rotates the extension, the rotation will be transferred to its IMobile-children.
- The default Silt particle graphic has been improved.

Vortex Human

Vortex Human has been expanded to bring these improvements:

- A new version of the **Vortex Human library** is now available.
 - It contains a new character type, the Anchor Deck Worker
 - New animations include dragging, stepping over low walls, and more
 - New hand accessories include hook, pins and heavy hammer

SYSTEM REQUIREMENTS

Supported Platforms

Vortex Studio runs on the following platforms:

- Microsoft Windows 10 (x64)
- Ubuntu 14 LTS (x64)
- CentOS 7 (x64)

Note: the Vortex Studio Editor and Player are only supported on Windows 10 in 64bits.

Hardware Requirements

Vortex Studio requires the following at a minimum:

- CPU 3.4GHz (Recommended Intel i7-47xx or better)
- RAM 8GB (Recommended 16GB) for runtime and Vortex Studio Player
16GB (Recommended 32GB or more) for Vortex Studio Editor
- GPU NVIDIA GeForce GTX 7xx, 9xx or 10xx series (GTX770 or higher recommended),
NVIDIA 400 series (~2010), ATI Radeon HD 5000 series (~2009),
Intel HD Graphics in Intel Haswell processor (~2011), and newer

Supported Compiler

Vortex Studio 2018a supports the following C++ compiler:

- For Microsoft Windows Platform, Microsoft Visual Studio Version 2010 (VC10)
- For Linux Platform, GCC 4.8.5

Supported Graphics

Vortex Studio supports NVIDIA GTX and Quadro video cards, as well as AMD and Intel video cards that fit the requirements (OpenGL 4.3 compliance in the driver).

The following cards have been tested at CM Labs:

- NVIDIA GTX 570 and above are tested regularly at CM Labs with driver series 364 and above.
- NVIDIA Quadro 4000 and M4000 were tested at CM Labs with driver series 372.
- AMD HD 7770 and RX 480 were tested at CM Labs with driver version 16.11.2.
- Intel HD 4400 and HD Graphics 530 were tested at CM Labs with driver version 15.40.

Depth Range

- AMD and Intel video cards have restrictions on depth range, so their view-space is clipped in Vortex Studio to [1m, 1000m].
- NVIDIA video cards support the inverted floating-point depth range, so we offer a deeper ViewSpace with less Z-fighting, [0.01m, 100,000m].

Ocean Surface

- AMD and Intel video cards use the CPU to compute the ocean surface.
- NVIDIA video cards use CUDA to compute the ocean surface. This should provide better performance for similar ocean surface quality.

Terrain Capture (required for Earthwork Zones)

- Intel video cards are sometimes not able to produce proper terrain capture textures when used with invisible windows only. It works normally when tested in the Vortex Studio Player or Editor.

*Note: on computers that have multiple graphics cards (e.g., laptops with integrated Intel card and dedicated NVIDIA graphics card), the default configuration of these systems is to auto-select the card to run the application, which might prevent Vortex from running. Using the NVIDIA Control Panel, select **Manage 3D Settings** and change the **Preferred graphics processor** to **High-performance NVIDIA processor**.*

Python

Python 2.7.13 is supported. The corresponding Anaconda distribution 4.3.0.1 allows for an easy integration of Vortex on various platforms.

Simulink/Matlab

Matlab 2015b is supported.

Licensing

Vortex uses RLM by Reprise Software™ for licensing and can provide node-locked, dongle-based, networked, and multi-user server-based licensing.

COMPATIBILITY NOTICE

We recommend that you back up your assets before migrating to the latest version. If saved, it will not be possible to open them again in their original version.

From any version of Vortex Studio 2017

Files from these versions should open with no issue in the newest release.

From Vortex 6.6, 6.7 and 6.8

Files from these versions should open in the newest release. Some features may have been updated or deprecated, requiring adjustments to content.

Between any Vortex version

Record-and-Playback as well as Keyframe files created with previous versions may not work with Vortex Studio 2018a.

END-OF-LIFE NOTICE

Since Vortex Studio 2017

To import assets created before Vortex 6.6, please convert them with a supported version of Vortex first. Note that Vortex Studio 2018a will be the last version to support files created with any version of Vortex 6.

Since Vortex 6.5

CM Labs recommends that you port your Vortex-based projects from x86 to x64. Vortex 6.5 was the last release with dedicated x86 binaries and installers.

Since Vortex 6.3

VxVehicle and VxCable are no longer supported. If you have been using these APIs, please convert your assets using Vehicle Systems and Cable Systems instead.

Microsoft Visual Studio 2010

Vortex Studio will be moved to Microsoft Visual Studio 2015 (VC14) sometime in early 2018. If you are still using VC10, please consider upgrading now to continue to benefit from the frequent Vortex Studio updates and new features.

FIXED ISSUES

Summary	Description
Vortex Human Stepping	Stepping during a moving action made the human move forward.
Disappearing contacts between convex meshes	When the penetration of certain contacts between convex meshes would go below a certain threshold, they would disappear. The contacts now correctly remain in simulation.
Batch Decompress	Issue of texture decompression when multiple texture items were selected was fixed.
RPRO parameters have no effect	The RPRO parameters are now fixed.
IMobile Transform Issue	In the Editor, it was impossible to connect inputParentTransform.
Camera navigation movement speed cannot be changed	Adjustment of the camera navigation movement speed has been fixed.
Mechanism not found by file manager	A mechanism added with attribute list can now be found by name from simulation file manager.
Error in <i>makeRotationFromQuaternion</i>	The translation of the transform was actually not set, even though this was otherwise specified in the function documentation.
Error in <i>VxTransform::rotateSelf</i>	Instead of rotating the transform by the provided quaternion, the orientation of the transform was set to the provided quaternion.
VortexDirector does not warn user when the NetworkBroker could not be properly started	VortexDirector does not warn the user when the NetworkBroker could not be properly started.

KNOWN ISSUES

Summary	Description
Mirror Far Distance is NVidia only	Until we can upgrade to OpenGL 4.5, the support for the "Far Distance" field in the Mirror extension remains available to users with NVidia video cards only. The Intel and AMD video cards will not obey the distance and will show more objects than expected.

DEPRECATIONS

The followings were deprecated in release 2018a:

- Removed the use of *VxEventDispatcher* in *KeyFrameList*.
- Removed the *VxGraphics::SceneGraph* class.
 - After the introduction of Cyclone (our new image generator) as a declarative engine, the functionality of the *VxGraphics::SceneGraph* class was mainly to iterate over all the extensions with the type *VxGraphics::IGraphic*. This functionality was moved to the *VxGraphics::GraphicsModule* class and the *VxGraphics::SceneGraph* class was removed
- The Earthwork Systems' Bucket has been deprecated and replaced by the new Dynamics Bucket in the Toolbox.
- The option to display only a percentage of the active soil particles has been removed from the dynamics child extension in the Soil Particles object (*Soil Particles.Dynamics*).
 - Instead, this option is now available in the graphics child extension of the Soil Particles object. Use the "Particle Display Percent" parameter under *Soil Particles.Graphics* to achieve the same effect
- The way through which 3D windows are created and managed has been fully replaced.
 - New *VxGraphics::Window* and *VxGraphics::Viewport* classes have been introduced
 - The *VxGraphics::Context* and *VxGraphics::ContextService* classes have been marked as deprecated
 - *VxGraphics::ControlsManager* was renamed *VxGraphics::ViewportManager*
 - 3D windows should now be created using *VxGraphics::WindowingSystem* class
 - *VxGraphics::Viewport* are created using *VxGraphics::ViewportManager* class
- *VxTransform::makeRotationFromQuaternion* is now deprecated.
 - Instead, *VxTransform::makeRotation(VxQuaternion)* and *VxTransform::setRotation(VxQuaternion)* are available, which make a transform a pure rotation or set the orientation component based on the provided quaternion, respectively