

Release Notes for CaraVR 1.0v5

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Release Date

April 2017

Minimum System Requirements

- A version of Nuke 9.0v9, or above, Nuke 10.0v6, or above, Nuke 10.5v1, or above on:
 - Mac OS X 10.9 (Mavericks) or 10.10 (Yosemite)
 - Windows 7 or Windows 8 (64-bit only)
 - CentOS/RHEL 5 or CentOS/RHEL 6 (64-bit only)
- Foundry Licensing Tools (FLT 7.0v2 or later) for floating licenses.

Requirements for GPU Acceleration

To take advantage of GPU acceleration, you must have, either:

- An NVIDIA GPU with compute capability 2.0 (Fermi) or above. A list of the compute capabilities of NVIDIA GPUs is available at www.nvidia.co.uk/object/cuda_gpus_uk.html



NOTE: The compute capability is a property of the GPU hardware and can't be altered by a software update.

With graphics drivers capable of running CUDA 4.2 or above.

- On Windows and Linux, CUDA graphics drivers are bundled with the regular drivers for your NVIDIA GPU. Drivers from April 2012 onward support CUDA 4.2.
Go to <http://www.nvidia.com/Download/Find.aspx?lang=en-us> for more information.
- On Mac, the CUDA driver is separate from the NVIDIA graphics driver and must be installed, if you don't have it already. The minimum requirement for CUDA 4.2 is driver version 4.2.5 which can be downloaded from www.nvidia.com/drivers.



NOTE: If your computer enters sleep mode, the CUDA drivers cannot recover and you must restart Nuke to use GPU acceleration.



TIP: We recommend using the latest graphics drivers, where possible, regardless of operating system.

- an AMD FirePro GPU on late 2013 Mac Pro 6,1 and mid 2015 Mac Pro 11,5, running OS X 10.9.3 'Mavericks', or later (see the [Blink API](#) documentation for caveats on CPU/GPU result consistency on Mac Pros).

New Features

Autopano Importer

A new Autopano importer has been added to the CaraVR 1.0 menu allowing you to import **.kava** files directly from Autopano Video and Autopano Video Pro.

See the CaraVR [Online Help](#) for more information.



NOTE: You can import **.pano** files from Autopano Pro and Autopano Giga as normal using the rig **Preset** dropdown in the C_CameraSolver node's **Properties**.

C_CameraSolver

A new **Back to Back** option has been added to the list of available rig presets. This preset is designed to solve two camera fisheye rigs with a field of view greater than 180°.

See the CaraVR [Online Help](#) for more information.

C_Stitcher and C_STMap Position Pass

You can now choose to export ppass data from C_Stitcher nodes and use ppass data in C_STMap nodes, in addition to the existing stmap options.

Position Pass maps are a new representation for image warping in CaraVR, specifically tailored to work in the latlong, or spherical, domain. The advantage of using a **ppass_map** over a standard **stitch_map** is that latlong continuity is naturally preserved, reducing or even eliminating artifacts along latlong discontinuities.

C_STMap Inversion

A new **output** option has been added to the C_STMap node, allowing you to invert the input map or to warp the input according to the same inverted map. Optionally, you can select the **interpolate** tick box to reconstruct missing values when visible discontinuities are generated.

C_GenerateMap

A new gizmo has been added allowing you to generate **stitch_map** and **ppass_map** channels. The **stitch_map** UV channels represent the absolute pixel positions of an image normalised between 0 and 1, whereas the **ppass_map** XYZ channels represent the normalised 3D coordinates of a latlong image ranging between -1 and 1.

C_GenerateMap has one optional input to set the format of the map. If nothing is connected to the src input, the **Project Settings > full size format** is used.

Nokia OZO Toolset

A Nokia OZO toolset has been added under **CaraVR 1.0 > Toolsets**, allowing you to quickly extract depth information from the Nokia OZO metadata for point cloud creation and other depth-dependent workflows.

See the CaraVR [Online Help](#) for more information.

SteamVR Beta for Linux

A beta version of SteamVR for Linux is currently available, which is intended to allow developers to start creating SteamVR content for Linux platforms. Limited hardware support is provided, and pre-release drivers are required. Linux support is currently only available in the "beta" branch - make sure you are using SteamVR[beta].

See <https://github.com/ValveSoftware/SteamVR-for-Linux> for more information on requirements to use the beta.

You also need to configure your environment properly to run the **vrserver** from Steam. The CaraVR installer adds a **steamvr.sh** script to your install directory to do this for you. By default:

```
/usr/local/Nuke/<version>/plugins/CaraVR/1.0/steamvr.sh
```

From the terminal, enter:

```
source steamvr.sh
```

And then run Nuke from the same session to access the SteamVR beta.

Feature Enhancements

- BUG ID 222204 - C_CameraSolver: CaraVR now displays a warning if there are insufficient matches to solve or refine the cameras.

Bug Fixes

- BUG ID 210017/217023 - C_CameraSolver: The undo stack did not include **Reject** matches or **Reset** cameras.
- BUG ID 217026 - C_CameraSolver: The undo stack did not include changing the rig **Preset**.
- BUG ID 219329 - C_CameraSolver: User matches could not be removed from specific camera zoom views.
- BUG ID 226178 - C_CameraSolver: The undo stack did not include manual camera moves in the Viewer.
- BUG ID 231507 - C_Stitcher: The progress bar displayed **calculating vectors** even when the vectors had already been cached.
- BUG ID 250913 - C_SphericalTransform: Applying a spherical transform to images containing high colour values produced artefacts.
- BUG ID 253456 - C_CameraSolver: Solving cameras using Read nodes piped into TimeOffset nodes caused the Viewer to display black.
- BUG ID 266596 - C_CameraSolver: Manually editing the **focal** value of the first camera in the **Cameras** table altered the focal length of all cameras.
- BUG ID 266694 - Linux only: The CV1 headset flickered during playback and after a control was changed in the node **Properties** panel.

Known Issues and Workarounds

Installation

Windows only: Delete the **CaraVR** installation folder, if it exists, prior to installation. The folder resides here:

```
C:\Program Files\Common Files\Nuke\<<nuke_version>\plugins\
```

Stitching

Projections in Nuke's 3D system expect rectilinear footage, which is inherently limited to a 180° field of view. As a result, C_CameraSolver's manual 3D workflow, which relies on projections, only projects the central 180° from material shot on wider lenses, such as the Nokia OZO.

Preview

- Windows only: Although CaraVR supports both SteamVR (OpenVR) and the Oculus Runtime for the Oculus Rift headset, we recommend selecting only one during a single session. Switching between the two outputs can cause the Oculus Rift to render black frames with the current version of SteamVR.

If you require both SDKs on your machine, please set the `FN_CARA_VRCOMPOSITOR_QUIT` environment variable to 1, which forces SteamVR to restart when you switch between outputs.

For more information on setting environment variables, see the Nuke [Online Help](#).

- When using the Oculus Rift CV1 on Windows, we recommend using the official Oculus Rift SDK rather than SteamVR.

We recommend using the OculusVR Runtime instead of SteamVR wherever possible, as SteamVR is currently less stable for CaraVR operations.



NOTE: Closing SteamVR while Nuke is running with an HMD as an active Viewer causes Nuke to close. To avoid this, save and close Nuke before closing SteamVR.

- When using the Oculus Rift CV1 on Linux, be aware that:
 - Unlike the Oculus DK2, the CV1 displays black until you turn it on inside Nuke's Viewer settings.
 - The CV1 does not appear in the list of available screens in Gnome/Kde, it is displayed with the supported devices in Monitor Output.
 - When you initially turn on Monitor Output, all available monitors display black for a few seconds as the OS adjusts to the new configuration.
 - The CV1 remains on until you close Nuke, which causes all available monitors to display black for a few seconds as the OS adjusts to the new configuration.
- On Mac OS X, with the EoL official Oculus SDK installed, the monitor out plug-in cannot open the device as the SDK locks it. Possible workarounds include uninstalling the SDK, or preventing the OVRServer running at startup, using the `launchctl load/unload` commands (you can read about the specifics and implications of working with Mac OS X `launchd` [here](#)).

- On Windows, the monitor out plug-in routinely notifies about the health and safety implications of use of the Oculus headset. This is a function of the SDK and in newer versions (such as the one we employ) cannot be suppressed or shortened.
- Many facilities lock down USB access for security, which impacts Oculus Rift support. Some customers found that authorising devices using a udev rule allowed them to use the DK2 on both CentOS 6 and CentOS 7, while still blocking USB storage devices. Thanks to Digital Domain for the following example:

```
ACTION!="add", GOTO="deauthorize_end"

SUBSYSTEM!="usb", GOTO="deauthorize_end"

TEST!="authorized", GOTO="deauthorize_end"

## make hubs deauthorize all devices by default

TEST=="authorized_default", ATTR{authorized_default}="0", GOTO="deauthorize_end"

## whitelist specific devices

ENV{ID_VENDOR_ID}=="2833", ATTR{authorized}="1", MODE="0777"

LABEL="deauthorize_end"
```

Miscellaneous

- Nuke Write nodes, when writing multi-view **.exr** files, only write out the set of channels present in the first view for all the other views. For example, if you write out the C_Stitcher's output, because there's only rgba in the rendered **main** view, the individual camera views do not output their vector channels.

To work around this, insert a vector channelset in the first view, even if it contains no data, using the AddChannels node.

- Nuke 9 only: When **Project Settings > Views > View selection uses buttons?** is disabled, the views dropdown menu does not allow you to change views.

As a workaround, use the keyboard shortcuts ; (semicolon) and ' (apostrophe) to cycle backwards and forwards through the available views or enable the **View selection uses buttons?** control.

Release Notes for CaraVR 1.0v4

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Release Date

February 2017

Minimum System Requirements

- A version of Nuke 9.0v9, or above, Nuke 10.0v6, or above, Nuke 10.5v1, or above on:
 - Mac OS X 10.9 (Mavericks) or 10.10 (Yosemite)
 - Windows 7 or Windows 8 (64-bit only)
 - CentOS/RHEL 5 or CentOS/RHEL 6 (64-bit only)
- Foundry Licensing Tools (FLT 7.0v2 or later) for floating licenses.

Requirements for GPU Acceleration

To take advantage of GPU acceleration, you must have, either:

- An NVIDIA GPU with compute capability 2.0 (Fermi) or above. A list of the compute capabilities of NVIDIA GPUs is available at www.nvidia.co.uk/object/cuda_gpus_uk.html



NOTE: The compute capability is a property of the GPU hardware and can't be altered by a software update.

With graphics drivers capable of running CUDA 4.2 or above.

- On Windows and Linux, CUDA graphics drivers are bundled with the regular drivers for your NVIDIA GPU. Drivers from April 2012 onward support CUDA 4.2.
Go to <http://www.nvidia.com/Download/Find.aspx?lang=en-us> for more information.
- On Mac, the CUDA driver is separate from the NVIDIA graphics driver and must be installed, if you don't have it already. The minimum requirement for CUDA 4.2 is driver version 4.2.5 which can be downloaded from www.nvidia.com/drivers.



NOTE: If your computer enters sleep mode, the CUDA drivers cannot recover and you must restart Nuke to use GPU acceleration.



TIP: We recommend using the latest graphics drivers, where possible, regardless of operating system.

- an AMD FirePro GPU on late 2013 Mac Pro 6,1 and mid 2015 Mac Pro 11,5, running OS X 10.9.3 'Mavericks', or later (see the [Blink API](#) documentation for caveats on CPU/GPU result consistency on Mac Pros).

New Features

Nuke 10.5 Support

CaraVR is now available for Nuke 10.5 on Mac OS X, Windows, and Linux.

C_Blur

C_Blur allows you to apply blur to a latlong image and produce a sensible result across the entire frame, as if the blur was applied to a rectilinear image all around. C_Blur includes GPU acceleration and has replaced the LatLong_Blur toolset.

Headset FOV Control

A new environment variable has been added to set the field of view (FOV) in VR headsets. The FN_CARA_HMD_FOV variable accepts a numeric value representing the angle you want to set as the FOV in the headset. There's no minimum, but values over 110° can produce unexpected results.

For more information on setting environment variables, see the Nuke [Online Help](#).

Headset Resolution Selection

You can now choose the resolution of the latlong sent to headsets through the Viewer Monitor Output controls in Nuke, ranging from 1K to 8K output.

Feature Enhancements

C_Stitcher and C_Blender

A new **Suppression** control has been added to allow you to control the amount of blending applied between adjacent views when using **Multi-Band** blending. Lower values can help balance colour and exposure between blended images, higher values are closer to the result from the default **Alpha** blending mode.

C_STMap

A **Channels** selector and **mask** controls have been added to C_STMap.

Linux Oculus Rift CV1 Support

Support for the Oculus Rift CV1 has been added, but there are some additional installation steps required:



WARNING: Do not plug the CV1 headset in or start Nuke before performing these steps.

1. Ensure there are no legacy Oculus drivers installed. If there are, uninstall them.
2. Make sure your user ID belongs to the group **plugdev**. Review your Linux distribution's documentation for information on how to add user IDs to groups.
3. As root, create a udev system rule using the following commands, supplied by OpenHMD:


```
echo 'SUBSYSTEM=="usb", ATTR{idVendor}=="2833", MODE="0666",
GROUP="plugdev"' > /etc/udev/rules.d/83-hmd.rules
udevadm control --reload-rules
```

This rule allows user IDs belonging to the **plugdev** group access to the Oculus device.

4. Restart your machine.
5. Plug in the CV1 headset and start Nuke.

Windows Only

Oculus Rift and HTC Vive performance has been improved, producing smoother playback of 360 content from Nuke Studio. The refresh rate has also been improved in NukeX.

Export Presets

The preset node trees created by the **Export** control in C_CameraSolver, C_Stitcher, and C_ColourMatcher have been improved for clarity and accuracy.

Bug Fixes

- BUG ID 207608 - C_CameraSolver: Connecting square format footage to C_CameraSolver displayed an exception in the Viewer.
- BUG ID 215684 - C_Blender: Connecting footage with differing formats to C_Blender caused Nuke to crash.
- BUG ID 224269 - C_CameraSolver: Mask generation was incorrect when the FOV was too large.
- BUG ID 228546 - C_Stitcher: Four camera solves did not create stereo output correctly.
- BUG ID 233334 - C_Stitcher: Exporting STMaps connected the required BlackOutside node identically, whether the C_Stitcher was selected or not.
- BUG ID 233554 - Working with footage in proxy or downrez modes was occasionally unstable.
- BUG ID 235609 - C_Tracker: Tracking footage in proxy resolution caused erratic panning.
- BUG ID 244958 - C_Blender: The output from C_Blender was incorrect when the output format was different to the source format.
- BUG ID 252393 - Windows only: In command line mode, C_Blender did not work as expected unless a C_CameraSolver was present in the script.
- BUG ID 253210 - C_Tracker: Connecting a C_Tracker to a script occasionally caused Nuke to display a kernel error or crash.
- BUG ID 253559 - Windows only: Running SteamVR with no headset plugged in caused Nuke to crash on startup.

Release Notes for CaraVR 1.0v3

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Release Date

November 2016

Minimum System Requirements

- A version of Nuke 9.0v9, or above, or Nuke 10.0v4, or above on:



NOTE: CaraVR is not currently available for Nuke 10.5v1.

- Mac OS X 10.9 (Mavericks) or 10.10 (Yosemite)
- Windows 7 or Windows 8 (64-bit only)
- CentOS/RHEL 5 or CentOS/RHEL 6 (64-bit only)
- Foundry Licensing Tools (FLT 7.0v2 or later) for floating licenses.

Requirements for GPU Acceleration

To take advantage of GPU acceleration, you must have, either:

- An NVIDIA GPU with compute capability 2.0 (Fermi) or above. A list of the compute capabilities of NVIDIA GPUs is available at www.nvidia.co.uk/object/cuda_gpus_uk.html



NOTE: The compute capability is a property of the GPU hardware and can't be altered by a software update.

With graphics drivers capable of running CUDA 4.2 or above.

- On Windows and Linux, CUDA graphics drivers are bundled with the regular drivers for your NVIDIA GPU. Drivers from April 2012 onward support CUDA 4.2.

Go to <http://www.nvidia.com/Download/Find.aspx?lang=en-us> for more information.

- On Mac, the CUDA driver is separate from the NVIDIA graphics driver and must be installed, if you don't have it already. The minimum requirement for CUDA 4.2 is driver version 4.2.5 which can be downloaded from www.nvidia.com/drivers.



NOTE: If your computer enters sleep mode, the CUDA drivers cannot recover and you must restart Nuke to use GPU acceleration.



TIP: We recommend using the latest graphics drivers, where possible, regardless of operating system.

- An AMD FirePro GPU on late 2013 Mac Pro 6.1, running OS X 10.9.3 'Mavericks', or later (see the [Blink API](#) documentation for caveats on CPU/GPU result consistency on Mac Pros).

New Features

Google Jump Rigs

C_CameraSolver now supports Google Jump rigs, which employ additional camera metadata from a **.json** file. To import the metadata:

1. Select **Google Jump** from the **Preset** dropdown and then click **Setup Rig**.
2. Browse to the location of the rig **.json** file and click **Open**.

CaraVR populates the **Properties** panel with all the camera data relevant to the rig.

Google Jump Toolset

A Google Jump toolset has been added under **CaraVR 1.0 > Toolsets**, allowing you to quickly extract depth information from the Google Jump metadata for point cloud creation and other depth-dependent workflows.

C_STMap

A new node, C_STMap, has been added. This new node is a GPU accelerated version of the standard STMap node in Nuke.

Write

CaraVR now adds a tab to the **Properties** panel of Nuke's Write node allowing you quickly select groups of views such as **stereo** and **cams** when rendering previews or stitches. You can still select

views manually using the **views** dropdown, but **View Presets** can make the process faster.

Feature Enhancements

- C_CameraSolver, C_Stitcher, and C_Blender now blend all channels in the stream rather than just **rgba**.
- C_Stitcher: A new **Blend** mode, **Spherical Multi-Band**, has been added. Spherical blending performs more accurately at the poles, looking up and down, of a stitch.
- 34179/234181 - C_RayRender: The improvement work done on Nuke's RayRender node has been applied to C_RayRender, including new controls on the **AOVs** tab in the **Properties** panel.

Bug Fixes

- BUG ID 221721 - Exports: Deleting a node with **Export** controls, such as C_CameraSolver, and then undoing the action duplicated the options in the **Export** dropdown.
- BUG ID 222261 - C_SphericalTransform: Adjusting the image quality using the Viewer **downrez** control caused controls in the **Properties** panel to change when zooming in the Viewer.
- BUG ID 225693 - C_SphericalTransform: Setting the **Width** to a high value caused a kernel error.
- BUG ID 228082 - C_CameraSolver: Adding and removing a camera in the left or right views of a stereo stitch occasionally caused Nuke to become unresponsive.
- BUG ID 230442 - C_CameraSolver: Adding another C_CameraSolver during matching caused Nuke to crash.
- BUG ID 233526 - C_Stitcher: Setting the **Vectors > Temporal Window** control to a value other than 0 occasionally rendered black frames.
- BUG ID 229557 - C_RayRender: Rendering a customer multi-object **.abc** file filled the RAM, causing the machine to become unresponsive.
- BUG ID 233984 - STMap: Viewing a C_Blender node downstream of exported STMaps from the C_Stitcher produced different results to viewing the C_Stitcher directly.
- BUG ID 235741 - C_SphericalTransform: In **Rotation > Look** mode, the look **Direction** was incorrect with proxy or downrez enabled.
- BUG ID 241640 - C_DisparityGenerator: Setting **Mask** to **Source Alpha** in stereo scripts displayed a **Source is missing** error in the Viewer and connecting a multi-view Roto node to the **Mask** input created an infinite render loop.

Release Notes for CaraVR 1.0v2

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Release Date

September 2016

Minimum System Requirements

- A version of Nuke 9.0v9, or above, or Nuke 10.0v4, or above on:
 - Mac OS X 10.9 (Mavericks) or 10.10 (Yosemite)
 - Windows 7 or Windows 8 (64-bit only)
 - CentOS/RHEL 5 or CentOS/RHEL 6 (64-bit only)
- Foundry Licensing Tools (FLT 7.0v2 or later) for floating licenses.

Requirements for GPU Acceleration

To take advantage of GPU acceleration, you must have, either:

- An NVIDIA GPU with compute capability 2.0 (Fermi) or above. A list of the compute capabilities of NVIDIA GPUs is available at www.nvidia.co.uk/object/cuda_gpus_uk.html



NOTE: The compute capability is a property of the GPU hardware and can't be altered by a software update.

With graphics drivers capable of running CUDA 4.2 or above.

- On Windows and Linux, CUDA graphics drivers are bundled with the regular drivers for your NVIDIA GPU. Drivers from April 2012 onward support CUDA 4.2.
Go to <http://www.nvidia.com/Download/Find.aspx?lang=en-us> for more information.
- On Mac, the CUDA driver is separate from the NVIDIA graphics driver and must be installed, if you don't have it already. The minimum requirement for CUDA 4.2 is driver version 4.2.5 which can be downloaded from www.nvidia.com/drivers.



NOTE: If your computer enters sleep mode, the CUDA drivers cannot recover and you must restart Nuke to use GPU acceleration.



TIP: We recommend using the latest graphics drivers, where possible, regardless of operating system.

- An AMD FirePro GPU on late 2013 Mac Pro 6.1, running OS X 10.9.3 'Mavericks', or later (see the [Blink API](#) documentation for caveats on CPU/GPU result consistency on Mac Pros).

New Features

C_CameraSolver

Support has been added for multi-view inputs, allowing you to define which views to use per input, and assign them to the left or right output view for stereo stitching in C_Stitcher.

Feature Enhancements

Stitching

C_CameraSolver

The camera views are now created in the **knob_changed** call, where possible, to improve script stability.

C_Blender

- A new multi-blend merging option has been added to improve stitch results by matching low frequency colour changes over the course of the blend region.
- C_Blender now includes a control to specify which views to blend together. Any set of views can be selected, provided that they match in format.

C_Stitcher

- A new multi-blend merging option has been added to improve stitch results by matching low frequency colour changes over the course of the blend region.

- Enabling **Stitch** > **Enable Stereo Stitch** in C_Stitcher's properties now generates a left and right view for each camera, allowing more export flexibility for stereo stitches.

C_CameraSolver/C_ColourMatcher/C_Stitcher

Caching has been improved to reduce memory usage, particularly on Linux platforms.

C_Blender/C_CameraSolver/C_ColourMatcher/C_Stitcher

Various performance improvements have been implemented, including minimised code paths and improved knob handling.

C_CameraSolver/C_ColourMatcher/C_Stitcher/C_MetaDataTransform

Global rig rotation is now written as a separate metadata key/value pair, rather than cooked into the individual rig cameras. This change allows for the separation of rig movements and camera layout, as well encoding further rig level parameters with a matching metadata name space.

Bug Fixes

Compositing Workflows

C_RayRender

Rendering in terminal mode caused Nuke to crash.

CameraTracker

CaraVR-specific exports were not available in the **Export** dropdown in Nuke 10.

Review

HMD review using SteamVR has been updated to the latest version 1311417.

Release Notes for CaraVR 1.0v1

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Release Date

July 2016

Minimum System Requirements

- A version of Nuke 9.0v7, or above on:
 - Mac OS X 10.9 (Mavericks) or 10.10 (Yosemite)
 - Windows 7 or Windows 8 (64-bit only)
 - CentOS/RHEL 5 or CentOS/RHEL 6 (64-bit only)
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New Features

This section will describe new features in later versions.

Feature Enhancements

This section will describe feature enhancements in later versions.

Bug Fixes

This section will describe fixed bugs in later versions.