Vireio Perception v4 Alpha 3

User Manual

Vireio Perception: Open-Source Stereoscopic 3D Driver

Vireio Perception Version History:
v1.0.0 2012 by Andres Hernandez
v1.0.x 2013 by John Hicks, Neil Schneider
v1.1.x 2013 by Primary Coding Author: Chris Drain
Team Support: John Hicks, Phil Larkson, Neil Schneider
v2.0.x 2013 by Denis Reischl, Neil Schneider, Joshua Brown
v2.0.4 to v3.0.x 2014-2015 by Grant Bagwell, Simon Brown and Neil Schneider
v4.0.x 2015 by Denis Reischl, Grant Bagwell, Simon Brown, Samuel Austin and Neil Schneider

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IMPORTANT NOTE:
Vireio Perception v4 is currently in Alpha stage. That means by using this software you confirm to be a tester of an early version, not the end-user of a detailed product !!

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1 – About

The Vireio Perception drivers were originally written by long time MTBS Moderator Andres Hernandez (Cybereality). Shortly after getting hired by Oculus VR, he decided to release the drivers as open source and make MTBS their official community for development and discussion.

Some follow-up versions were released and co-authored by Neil Schneider, John Hicks, and Phil Larkin. While these original versions got a flurry of media attention and gamer interest, it was determined that the architecture had fundamental problems that got in the way of user comfort, performance, and ease of use.

Chris Drain is credited for updating the software architecture with simultaneous left/right rendering. When his work was complete, we faced a new challenge where much of the functionality hadn't been implemented, and new developers had great difficulty deciphering the code. Steps were taken to document every call so the drivers would be much easier to collaboratively develop and improve upon. And VRBoost was authored by Denis Reischl as the top solution for tracking.

Version 4 of the Driver now has a whole new architecture authored by Denis Reischl. This now is based on a game profile development tool called "Aquilinus – 3D Modification Studio" where Vireio splits into several plugin nodes to the runtime environment of this tool. So this tool allows us to create unique game profiles with special settings and features for different games, adding various VR devices and controller support. This all would not have been possible in a pure hardcoded driver. And this is the first time now Vireio supports DirectX 11.

While we have some big ideas on the horizon to help bridge the gap, this software is not intended as a replacement for native VR support. Instead, Vireio Perception has been developed to bring added VR excitement to countless games that wouldn't have benefited otherwise.

Special thanks to Grant Bagwell, Samuel Austin and Simon Brown for their continued hard work.

The drivers are completely free to download and use.

2 – Version 4: A new Architecture

NOTE: Vireio v4 is a new architecture while v3 architecture is still present and working. Start "Perception_v3.exe" for Vireio v3, "Perception_Win32.exe" or "Perception_x64.exe" for Vireio v4. The configuration for v3 is found in "//perception//cfg" folder, for v4 it is located in "//perception/cfg_v4" !!

Vireio Perception v4 is based on a new architecture. That means that the whole core of the Driver is fully written new.

It is now splitted into several parts, where every single part is its own plugin and acts as a node in a new developed tool called "Aquilinus – 3D Modification Studio". This allows us to only include parts needed into a unique game profile for the chosen game. And it allows us to specialize this game profile depending on the supported hardware and user preference.

With Aquilinus friends of Vireio will be able to create their own game profiles for their favorite games in a node based working area. We will release the tool with a tutorial section with the eventual release of Vireio v4.

Current list of Vireio Perception v4 nodes:

- OculusTracker
- OpenVR-Tracker
- OSVR-Tracker
- OculusDirectMode
- OpenVR-DirectMode
- OSVR-DirectMode
- VireioConstructor
- VireioMatrixModifier
- VireioStereoPresenter
- VireioStereoSplitter
- VireioStereoSplitterDx10
- VireioCinema

2.1) What's new since Alpha 2 ?

- The Vireio Cinema : play any DX9 or DX11 game on big screen in a VR Cinema Gaming Room (DX9 not finished yet)
- Vireio Cinema Stereo game profiles : play 3rd Person or Point'n'Click games in Stereo in the Vireio Cinema as if you would watch a 3D Movie
- Full Immersive Game Profiles : switch from Game Cyberspace to the Vireio Cinema and

back in gameplay for 1st Person games
- Virtual Gaming Room including various great fx from shadertoy.com.. build and customize your game-specific Virtual playing space
- HTC Vive Controller support: full Mouse (laser pointer) and Keyboard emulation... customize any Controller button setting game-specific... Controllers rendered in your VR playing space

3 – Game Profiles

ALPHA 3 RESTRICTIONS: For Vireio v4 Alpha 3 DX9 support is not finished yet. And for Alpha 3 you can only create your own mono cinema profiles, eventually we will release "Aquilinus – 3D Modification Studio", the tool to let you also create stereo profiles. And the cinema hall is also not finished, only the gaming room is available. Steam thumbnail URLs not working now. This all will come with the eventual release of the driver !

Vireio Perception v4 supports Direct3D games, D3D version 9 and 11. Version 4 of the Driver now has unique game profiles, that means you have to choose the profile you want to inject to your favorite game.

Each game profile is listed in "//perception//cfg_v4//profiles.xml". You can add your own game processes to that list, we describe that at the end of this chapter.

Basically Vireio v4 has 3 stages of support for a game : Mono Cinema, Stereo Cinema and Full Immersive.

3.1) The Vireio Cinema

For the new architecture of the Driver Senior Game Artist Oliver Reischl has built a huge Cinema Hall in 3D. This is the base for the new Vireio Cinema.
Beside that new Cinema Hall we also provide a simple VR Gaming Room that comes with enhanced pixel shader fx from shadertoy.com.
Choose to play your games either in the Cinema Hall or in the Gaming Room. Both places are fully customizable, set the sizes and choose the shader fx per-game in the VireioPerception.ini file.
In Mono Cinema stage you can play any DX9 and DX11 game in a VR Cinema. Simply add your desired game to the list in "//perception//cfg_v4//profiles.xml", if no unique game profile is added to the game in that list Vireio will automatically load the standard mono cinema profile for your chosen HMD.

3.2) Stereo Cinema Profiles

In Stereo Cinema stage you can play certain DX9 and DX11 games in stereo in a VR Cinema. Vireio will load the profile set in "profile_path" in "//perception//cfg_v4//profiles.xml".
Remember to use "Perception_Win32.exe" for 32bit profiles, "Perception_x64.exe" for 64bit profiles.
Stereo Cinema profiles are especially for Point'n'Click, 3rd Person or Top-Down camera games, they do not have options to take control over the in-game camera.

3.3) Full Immersive Game Profiles

The third stage, Full Immersive, now also starts in the Vireio Cinema. That means as long as the gameplay does not start (intro, game menues,..etc) you are in the cinema. Once the gameplay start you can instantly "warp" into game cyberspace and play the game having full head and position tracking done by Vireio Percpetion

(VRBoost).
Switch back to the Cinema whenever you need to go through menues or sort your inventory or whatever can be done easier there.
Vireio will load the profile set in "profile_path" in "//perception//cfg_v4//profiles.xml".

If you now want to add own games to the game profile list please fill in following xml attributes:

game_name	The name of the game to be shown in the Vireio selection box.
game_exe	The exact name of the game process executeable.
cpu_architecture	The architecture of the game process, either "32bit" or "64bit".
dx_version	The DX version ("11" for D3D11). If no DX version is provided Vireio assumes DX9.
image_url	The url of a steam thumbnail image (184x69 pixels)
time_delay	The delay, in miliseconds, before Vireio fully gets active in the game process.
repetition	The number of injection repetitions. Some games need a second injection.
profile_path	The path to the unique game profile. Note that the keyword "HMD" must be present, it will be replaced by the chosen HMD api name. If no unique profile is available for that game Vireio will load the standard mono cinema profile.

4 - How to load and inject a Game Profile

NOTE: "Perception_v3.exe" is Vireio Perception v3, this is not described here !!

Before you start to inject, please setup the chosen game for Vireio Perception : Disable any overlay or recording software. Tools like "FRAPS" work in a very similar way like Vireio v4 so both cannot work together. If you want to record your gameplay you can try to start these tools after the game has started using Vireio.

Full list of known incompatible software:

- Steam Overlay
- Steam Desktop Game Theatre
- FRAPS

IMPORTANT NOTE: Always (!) turn off V-Sync in your game settings. This can give huge performance boost for Vireio Perception. Try to set a monitor resolution with at least 75 Hertz !

For the mono cinema profiles please read the section about the Vireio Cinema (section 3.1).

Commonly the games launcher, if present, should be loaded before you load a unique game profile using Vireio. Start "Perception_Win32.exe" for 32bit games and "Perception_x64.exe" for 64bit games. Select your desired game and your HMD api. (OSVR for Razer HDK, OpenVR for HTC Vive, LibOVR for Oculus Rift) Press the big "profile" button, it's border should now switch to yellow. Start the game. The border around the profile button should get green once the profile is injected.

Please read section Troubleshooting (7) if this does not work. You can close the Vireio Perception app once the border turned to green.

NOTE: You can also try to play OpenVR profiles on OSVR and LibOVR devices, this is not tested

now !

If your desired game has an inbuild benchmark tool please write down your benchmark result first without Vireio, then with Vireio Mono Cinema and eventually with the unique game profile, if present. Please post some of your results in the official Vireio Perception forums on MTBS3D to help us improve Vireio !!

5 - The VireioPerception.ini file

For every game you play using Vireio Perception the Driver will create an init file called "VireioPerception.ini" at first startup. Here you can customize the Vireio Cinema and change all options for Vireio and your choosen HMD.

Here is a full list of all basic parameters, for HMD specific parameters please read next chapter "Supported HMDs and Controllers" : (contact us in the official Vireio Perception forums for further information)

[Stereo Presenter]

fFoV	->	Field of View setting
fFoVADS	->	Field of View ADS setting
fIPD	->	Interpupillary distance
fWorldScale	->	The stereo separation setting. Only affects the cinema screen, immersive mode uses game profile setting !
fConvergence	->	Convergence screen distance in physical meters. Only affects the cinema screen, no convergence for HMDs !
fVSD	->	Immersive mode virtual screen distance in physical meters.
bConvergence	->	0 no Convergence 1 Convergence Only affects the cinema screen, no convergence for HMDs !

[Stereo Cinema]

sCinemaRoomSetup.sLightDirection(wxyz)	->	Light direction... currently only affects the HTC Vive Controllers
sCinemaRoomSetup.sColorAmbient(argb)	->	Ambient light... currently only affects the HTC Vive Controllers
sCinemaRoomSetup.sColorDiffuse(argb)	->	Diffuse light... currently only affects the HTC Vive Controllers
sCinemaRoomSetup.fScreenWidth	->	Playing room screen width in physical meters
sCinemaRoomSetup.fScreenLevel	->	Playing room screen vertical level (center) in physical meters
sCinemaRoomSetup.fScreenDepth	->	Playing room screen depth in physical meters
sCinemaRoomSetup.ePixelShaderFX_Screen	->	ShaderToy fx used for the cinema screen

		(use index as described here in "Cinema Screen:")
sCinemaRoomSetup.ePixelShaderFX_Wall_FB[0..1]	->	ShaderToy fx used for front/back walls (use index as described here in "Front/Back/Left/Right wall:")
sCinemaRoomSetup.ePixelShaderFX_Wall_LR[0..1]	->	ShaderToy fx used for left/right walls (use index as described here in "Front/Back/Left/Right wall:")
sCinemaRoomSetup.ePixelShaderFX_Floor[0..1]	->	ShaderToy fx used for top/bottom floor (use index as described here in Top/Bottom floor:")
sCinemaRoomSetup.bPerformanceMode	->	Set to "1" to disable walls/floor. (default = 0)
sCinemaRoomSetup.bImmersiveMode	->	Set to "1" to start the game in full immersive mode (default = 0)
sCinemaRoomSetup.fGamma	->	Gamma correction value for the Cinema screen (default = 1), a lower value means a brighter image, a higher value a darker one
unMouseTickCount	->	Time in milliseconds the mouse cursor is drawn to the screen when the mouse is not moved. Set to "0" to disable the mouse cursor.

Pixel shader fx from shadertoy.com :
(read licence.pdf for credits to the authors of these fx !!)

Cinema screen:
0 simple lighting, draws mouse laser pointer

Top/Bottom floor:
0 "String Theory" effect from shadertoy.com
1 "Bubbles!" effect from shadertoy.com
2 "C64 plasma" effect from shadertoy.com
3 "Worley Algorithm (Cell Noise)" effect from shadertoy.com
4 "Tileable Water Caustic" effect from shadertoy.com
5 "Planets" effect from shadertoy.com
6 "Hypnotic Disco" effect from shadertoy.com
7 "Voronoi smooth" effect from shadertoy.com

Front/Back/Left/Right wall:
0 "String Theory" effect from shadertoy.com
1 "Bubbles!" effect from shadertoy.com
2 "Toon Cloud" effect from shadertoy.com
3 "Worley Algorithm (Cell Noise)" effect from shadertoy.com
4 "Tileable Water Caustic" effect from shadertoy.com
5 "Planets" effect from shadertoy.com
6 "Voronoi smooth" effect from shadertoy.com

6 - Supported HMDs

6.1) HMDs

6.1.1) Oculus Rift – LibOVR

For Oculus Rift you do not need to copy dlls. Start Oculus Home and inject your chosen game profile as described.

Do not forget to disable Steam Overlay. (Steam->Library->Game->Properties)

In some cases games crashed at startup when the Oculus tracker initialized. Add a time delay to your chosen game profile in that case (see "time_delay" in Chapter "Game Profiles" (3)).

In the "VireioPerception.ini" file you can set following [LibOVR] parameters :

afPositionOrigin[0..2]	-> X..Z	Origin of your tracking device
bShowMirror	-> 0...	Do not show mirror on game screen.
	-> 1...	Do show mirror on game screen.
ePerfHudMode	-> 0...	ovrPerfHud_Off = Turns off the performance HUD
	-> 1...	ovrPerfHud_PerfSummary = Shows performance summary and headroom
	-> 2...	ovrPerfHud_LatencyTiming = Shows latency related timing info
	-> 3...	ovrPerfHud_AppRenderTiming = Shows render timing info for application
	-> 4...	ovrPerfHud_CompRenderTiming = Shows render timing info for OVR compositor
	-> 5...	ovrPerfHud_VersionInfo = Shows SDK & HMD version Info
	-> 6...	ovrPerfHud_Count = internal Count of enumerated elements.

6.1.2) HTC Vive – OpenVR

For HTC Vive (or SteamVR) you need to copy "openvr_api.dll" from "//Steam//SteamApps//common//bin" to your games executeable folder.

NOTE : Choose the 32bit subfolder for 32bit games, the 64bit folder for 64bit games !!

Locate the game executeable (f.I. "//Program Files (x86)//Steam//SteamApps//common//Batman Arkham City GOTY//Binaries//Win32//" for "BatmanAC.exe") and copy the file.

Before you start Vireio Perception and the chosen game SteamVR must be started and running. Do not forget to disable Steam Desktop Game Theatre and the Steam Overlay. (Steam->Library->Game->Properties) Confirm "Ok" on the small warning screen : "{Game} does not support VR. It will appear on your desktop and may affect VR performance."

In the "VireioPerception.ini" file you can set following [OpenVR] parameters :

6.1.3) Razer HDK – OSVR

For OSVR devices you need to copy a handfull of dlls from your OSVR server folder to your games executeable folder.

NOTE : Use 32bit runtime dll files for 32bit games, 64bit files for 64bit games !!

Locate the game executeable (f.I. "//Program Files (x86)//Steam//SteamApps//common//Batman Arkham City GOTY//Binaries//Win32//" for "BatmanAC.exe") and copy following files:

- glew32.dll
- osvr*.dll
- SDL2.dll

If that does not work please also try to copy "d3dcompiler_47.dll".

Do not forget to disable Steam Overlay. (Steam->Library->Game->Properties)

In the "VireioPerception.ini" file you can set following [OSVR] parameters :

afPositionOrigin[0..2]	-> X..Z Origin of your HMD
nHotkeySync	-> Hotkey VK code (string) to syncronize yaw angle.
eMethod	-> 1...use DX11 game device
	-> 2..create own DX11 device
bUseHotkeyF11	-> 0...instantly start direct mode
	-> 1...start direct mode by pressing F11

6.2) Controllers

6.2.1) HTC Vive Controller – OpenVR

NOTE: We also plan to add Xbox Gamepad emulation for the HTC Vive Controllers but cannot promise to have that finished soon.

Starting any Vireio Perception game profile on OpenVR you will see that the driver renders both HTC Vive Controllers and Tracking Base Stations.

Use your HTC Vive controller N° 0 as a mouse laser pointer on the cinema screen. And you can fully setup your HTC Vive controller buttons and axis to emulate

keyboard and mouse button input for any game profile.

Customizing the HTC Vive Controller to your own needs can be as extensive as customizing the Steam Controller.

For the trackpad you can customize both axis directions pressed and unpressed and you can assign a hotkey for just pressed.

In the "VireioPerception.ini" file following [OpenVR] parameters are relevant for the HTC Vive Controllers:

aaunKeys[0..1]	-> Controller index 0/1
[Index_EButton_System]	-> Button >System<
[Index_EButton_ApplicationMenu]	-> Button >Menu<
[Index_EButton_Grip]	-> Button >Grip<
[Index_EButton_Axis0]	-> Button >Trackpad<
[Index_EButton_Axis1]	-> Button >Trigger<
[Index_EButton_Axis0_Below_X]	-> Button >Trackpad X Axis- Touched< Set this to WM_MOUSEMOVE to get the whole trackpad to emulate the mouse
[Index_EButton_Axis0_Above_X]	-> Button >Trackpad X Axis+ Touched<
[Index_EButton_Axis0_Below_Y]	-> Button >Trackpad Y Axis- Touched<
[Index_EButton_Axis0_Above_Y]	-> Button >Trackpad Y Axis+ Touched<
[Index_EButton_Axis0_Below_Pressed_X]	-> Button >Trackpad X Axis- Pressed<
[Index_EButton_Axis0_Above_Pressed_X]	-> Button >Trackpad X Axis+ Pressed<
[Index_EButton_Axis0_Below_Pressed_Y]	-> Button >Trackpad Y Axis- Pressed<
[Index_EButton_Axis0_Above_Pressed_Y]	-> Button >Trackpad Y Axis+ Pressed<
aafAxisScopeOrFactor[0..1][0]	-> Controller index 0/1 Axis index 0 = Trackpad For Button mapping this is the inner scope whithout events. (default = 0.8) For Mouse emulation (WM_MOUSEMOVE set) this is the factor the trackpad finger movement will be multiplied to mouse movement. Set this negative to invert an axis. (default = 10.0)

LINK: https://msdn.microsoft.com/enus/library/windows/desktop/dd375731(v=vs.85).aspx for a list of virtual keyboard codes, for mouse emulation set WM_MOUSEMOVE

7 – Troubleshooting

It may seem to some of you that v4 of the driver is not as stable as v3 but that is not true. Once we know all possible causes of profiles not injecting we're sure that the new, unique profiles for v4 are the better solution at all.
We know that dll injection can be hard the first time but hope to improve and ease up that in future.

Q: Game profile not working, game crashes.

First try to restart your HMDs api server or service.

Try to set a time delay in "//cfg_v4//profiles.xml" : Set "time_delay" to "10000" for 10 seconds delay.

Please post in the official forums if the problem persists. We know that there are still troubles on OSVR for unknown reason and hope for the help of the community to solve this.

Q: Game profile not working, game works as usual.

Q: Game profile not working, game does not start.

You may have forgot to copy the dlls to the games executeable folder. Dll copy is needed for OpenVR and OSVR. Please read "Supported HMDs and Controllers" (6).

Q: Game crashed, driver won't work again.

In this case the game process is still running, start the task manager and end the game process.

Q: Performance is bad / worst.

Important : disable Vsync !!

Start benchmark tests in games with and without Vireio. For the mono cinema you should only face ~15% performance loss (Performance Mode), for unique game profiles there should only be ~35% performance loss.

NOTE: The more fps you have without Vireio the higher will be your loss on frames.

The Vireio Gaming Room shader fx (from shadertoy.com) are really beautiful to watch but they also cost performance. Customize the settings in "VireioPerception.ini" to use fx with lower impact on performance or set "sCinemaRoomSetup.bPerformanceMode = 1".

Please try several game profiles in the mono cinema and compare performance for different games. We know that the intel threading classes some games use (tbb.dll) can impact performance for HMD libraries.

Benchmark test "TombRaider" HTC Vive / Mono-Cinema-Profile / AMD R9 390 + 8350:
settings "low" without Vireio: ~259 fps..... with Vireio (Performance Mode): ~125 fps
settings "ultimate" without Vireio: ~77 fps.... with Vireio (Performance Mode): ~60 fps

Q: Fallout 4 works but left image is screwed up.

Turn off "Depth of Field" using the Fallout 4 tweaker. This setting sometimes changes back to default "on", so you need to turn it off again.

8 – Supported Games: Instructions

Lords of the Fallen (Stereo Cinema Profile)

NOTE : This is a very early game profile. Some geometry still does not separate correctly (mountains, some lights,...). And we did not fully find out how to optimize that game for VR.We tried to install the game to SSD but even here we faced some extensive framerate drops. Help the community in the official Vireio forums by sharing your own experience and your own ini tweaks !!

1) Start "Perception_x64", set Game and HMD, start the Game and press the Profile button before the game window appears. (Don't forget to copy dlls for OSVR and OpenVR)

2) If it does not inject use ALT+TAB to go back to Vireio, hit the Profile button again, ALT+TAB to switch back to game.

3) After the first launch instantly exit the game and head to the games executeable directory, open "VireioPerception.ini".
Change following parameters to the values shown :
"sCinemaRoomSetup.fGamma=0.5"
"fWorldScale= -10.0"
(set gamma, world scale and convergence to your own needs, convergence should match the distance in meters from your virtual head to the Cinema Screen in virtual space – default is 3 meters)

4) After the first launch please also head to "{user}//documents//Lords of the Fallen", open "settings.ini" and change following parameters to the values shown to avoid graphical flaws:
"display_enemy_health_bars = false"
"quality_postprocessing = Off"
"quality_shadows = Off"
"vsync = false"
(please verify in the games options in "Advanced Settings" that "Postprocessing" is "Disabled" !!)

TotalWar: Rome2 (Stereo Cinema Profile)

NOTE: (OSVR) For OSVR we unfortunately got bad performance here. Rome2 had always a bad framerate, with and without Vireio, whenever the OSVR server was running. We assume this comes since Rome2 uses the "tbb" threading classes (file tbb.dll – Intel Threading Building Blocks) and this threading classes do not incorporate with OSVR. Please post on the Vireio or OSVR forums if you find a solution to this.

1) Load the TotalWar-Launcher, start "perception_win32.exe" and load the cinema profile accordingly to your HMD. Start the game.

2) To use the mouse laser pointer on the right location the game must run in fullscreen.

3) Start the "Rome2" benchmark. For best VR experience you should get 90 fps. If you do not

get this even on low settings consult the Vireio forums on MTBS3D.

Batman: Arkham City (Mono Cinema Profile)

NOTE: We already have this game working in stereo on some PCs. Unfortunately we face extensive flaws on other PCs. We work on that !! (Meanwhile mono)

1) Ensure the game runs in DX11, not in DX9 : go to BatmanLauncher->Settings and enable all DX11 settings. (there are two DX11 settings, enable both) Game window name now should be "Batman: Arkham City (32-bit, DX11)".

2) Disable V-Sync !!

3) Load the stereo cinema profile for this game and your HMD, click "play" on your Steam library page.

4) This game is 32bit, please use "perception_win32.exe". Don't forget to copy dlls for OSVR and OpenVR.

Civilization V (Mono Cinema Profile)

1) Start the game without Vireio and select a resolution with at least "75 hz". The main menu maybe still uses 60 hertz but in-game this should improve performance.

2) Head to "{User}//Documents//my games//Sid Meier's Civilization 5" and open "GraphicsSettingsDX11.ini". Set "AllowSM41 = 0" and "AllowSM41 = 0". At the end of the file set "WaitForVSync = 0".

3) Load the "Civilization V"-Launcher, start "perception_win32.exe" and select the cinema profile accordingly to your HMD. ***First*** select "Sid Meier's Civilization V – DirectX 10 & 11", ***then*** instantly push the Vireio Perception "Load Profile" button to inject before the game window appears.

4) The profile has a time delay of 10 seconds, it will not start before the main menu of the game appears !! ("//perception//cfg_v4//profiles.xml"->time_delay="10000")

   NOTE : For some reason "Civilization V" does not render the HTC Vive Controllers and the Base Stations. We do not know why... However, the input from the devices should work.

Tomb Raider (Mono Cinema Profile)

1) Before you start the game open the registry, type "regedit" in the Windows search bar. Head to "\HKEY_CURRENT_USER\SOFTWARE\Crystal Dynamics\Tomb Raider\Graphics" and set "FullscreenRefreshRate" to "120" (="0x078" hex), set "VsyncMode" to "0".

   NOTE : Be careful while editing the registry, do not change anything else !! The "Tomb Raider" launcher settings editor eventually restores the default settings here.

Banished (Mono Cinema Profile)

1) Start the game without Vireio and select a resolution with at least "75 hz".

9 – Credits

Vireio Perception v4 Alpha 3

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