# VR920 Stereoscopic rendering for Quest3D projects

To decide which stereoscopic method you can use, ask yourself these questions:
- What video card I will use for my scene?
- Will I use heavy post processes techniques?
- Will I need full control over stereoscopy parameters in my scene?

Regarding to possible answers we make such classification when you can use which method.

| **Answer** / **Method** | Old NVidia stereo | iWear            D3D9.dll stereo | Full stereo control |
|---|---|---|---|
| 6xxx, 7xxx GeForce | + | + | + |
| Any other video card | | + | + |
| Post processes | | | + |
| Simple scene | + | + | + |
| Complex scene | | | + |
| Full control over stereo | | | + |
| Additional changes in scene pipeline needed | | | + |

Don't forget to turn VSync on in your videocard drivers for all methods. Here we will describe each method separately.

**NVIDIA stereoscopy**



If you use old NVidia video cards (6xxx, 7xxx GeForce's) and don't use post processes, you can be comfortable with old NVidia stereo-driver (91.31 or 174.76), you will need compatible forceware driver also. Using this driver, you don't need to change anything in your scene, you just need to setup stereo properly and turn it on.

More info about old NVIDIA stereo drivers and they're setup you can read here:
http://www.mtbs3d.com/phpbb/viewforum.php?f=60

**Vuzix iWear stereoscopy**



If you want to use newer hardware, or ATI / AMD cards, and you use simple scene without complex menus or post-processes, you can use iWear D3D9.dll file which is by default located here: *C:\Program Files\Vuzix Corporation\iWear VR920\D3DProxyDrivers\**D3D9.dll***

And use following configuration file ***VR920Dx9Stereo.cfg*** with following parameters:

Method=1,
IPD_View=0.030,IPD_Menu=0.00,Manual_VSync=0,Locking=0,QueryGPU=1,LogFile=0,AutoIPD=0, ExpMax=0.11, ExpRate=0.001, ExpPoint=0.10

When publishing your scene, publish it as installer, then install your published scene, and drop these two files into installed directory.
Change IPD_View parameter to increase or decrease distance between eyes.

You need to clear Z buffer before using CopyImage channel, and apply separate camera before GUI rendering.

## Full control iWear stereoscopy



If you want to have a full control over stereoscopic rendering in your scene, render exactly what you want in each eye, use heavy post process techniques such as SSAO, dynamically change eye-distance in your application, or make stereo for GUI's etc. you will need to use full control method.

For making full controllable stereoscopy based on iWear drivers you will need to reorganize your scene, general idea is shown on following scheme:
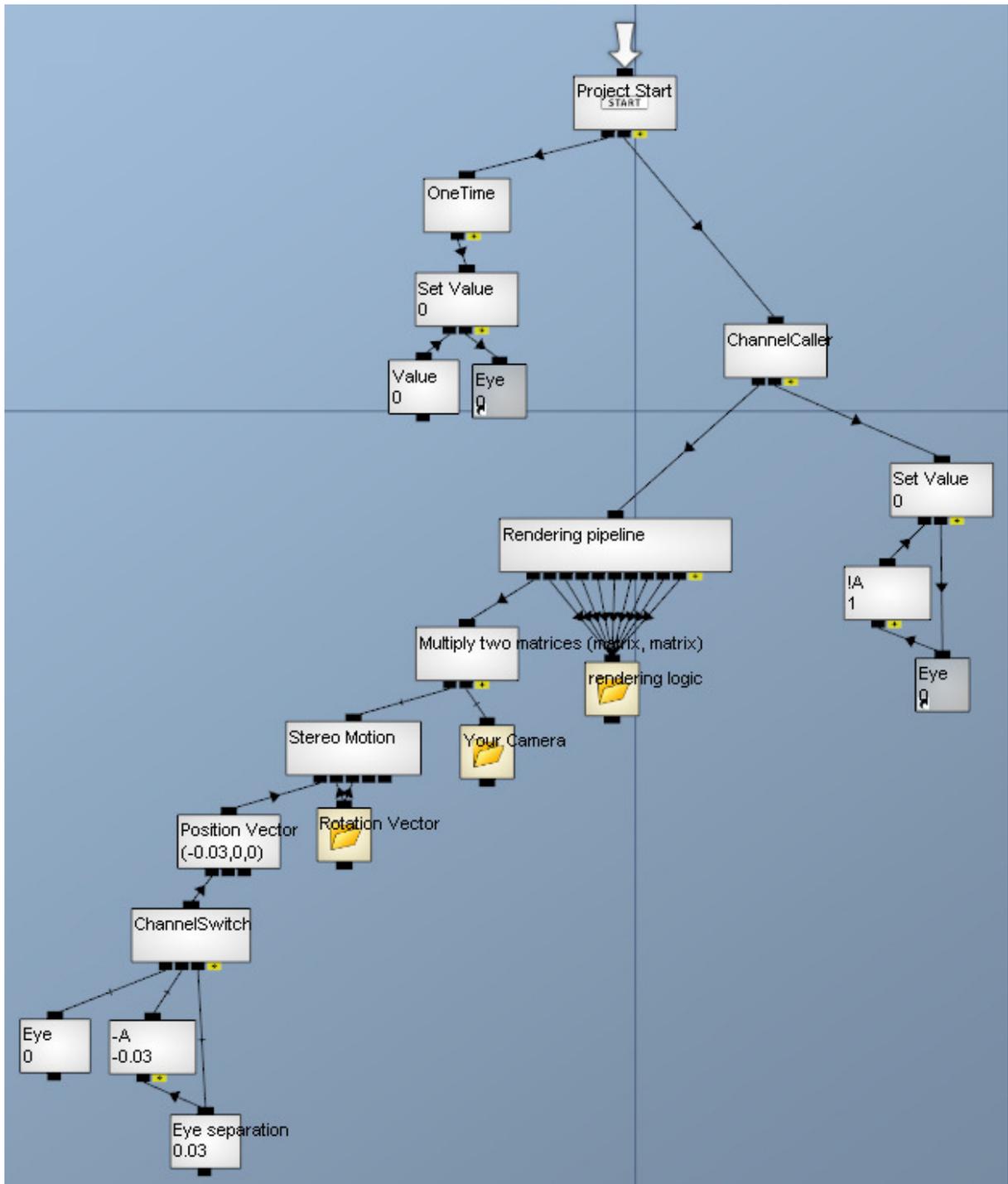
"Stereo Motion" motion matrix is used to offset project's camera, to render whole scene from left or right eye perspective. You will need to multiply this matrix with your camera matrix.
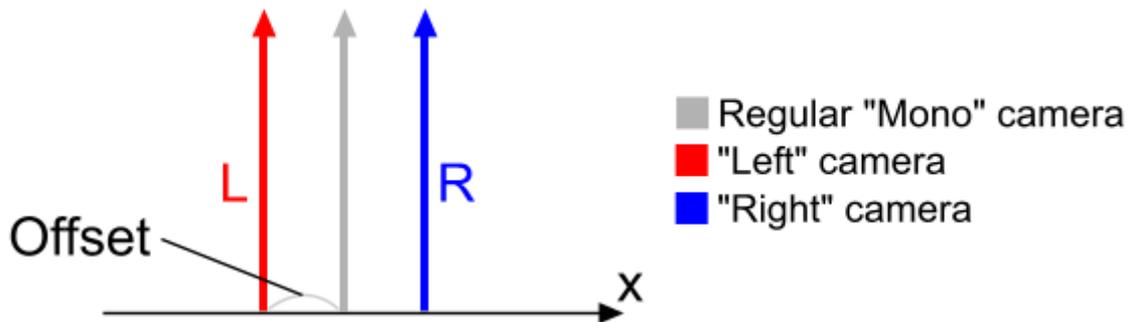


"Eye" value channel controls which eye will be rendered on current render cycle, and after each cycle, eye will be switched to other one. In this way we get "software page flipping" stereo method – stream on left/right/left/right… frames, which will be separated by iWear driver in VR920 HMD for left and right eye respectively.

It is important for synchronization to start rendering frame stream from left-eye perspective, for this "On time"used in the beginning.

Change "Eye separation" value to change virtual distance between eyes, in example this is actually the half of the distance between virtual eyes.

Using such pipeline you can control which eye will receive a particular frame, for example using this method you can draw current time in the corner of right eye, which is nearly impossible using other methods, also you can use any shading and post-process techniques with this.
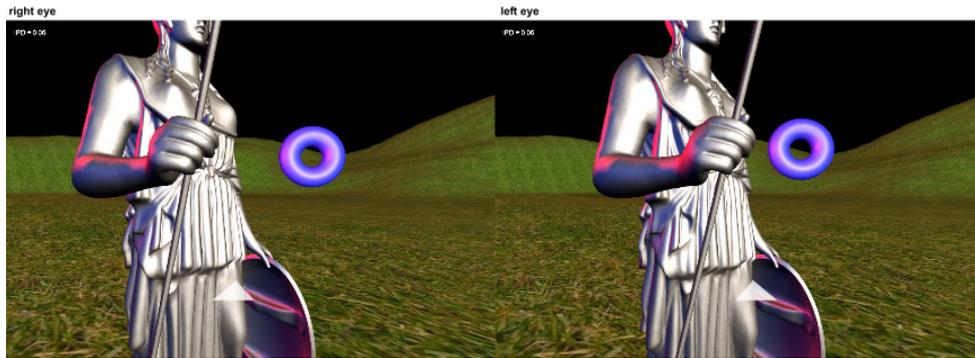
**Left eye camera**                                   **Right eye camera**



*For this illustration we made IPD (Inter-Pupillary Distance) bigger than normal, to make difference more noticeable.*

Using this technique we will receive two viewpoints for left and right eye respectively.

*You can view this picture using eye-crossing technique*

After making eye-switching pipeline in your scene you need to publish it in installer, install, and put **D3D9.dll** and **VR920Dx9Stereo.cfg** files, but now, you need to use following configuration file:

```
Method=2,
IPD_View=0.000,IPD_Menu=.000,Manual_VSync=0,Locking=0,QueryGPU=1,LogFile=
0,AutoIPD=0, ExpMax=0.11, ExpRate=0.001, ExpPoint=2.0
```

Important:
These settings are different to settings used in "Vuzix iWear stereoscopy" method. IPD_View must be set to 0, because now we control eye-separation from inside our scene, iWear D3D9.dll will ensure proper frame-by-frame eye-switching, vSync and other parameters.

Happy stereo! ☺
And don't forget to make pauses during development to avoid tiredness!
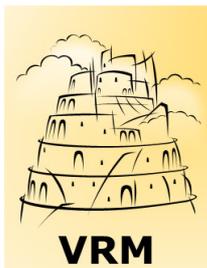

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