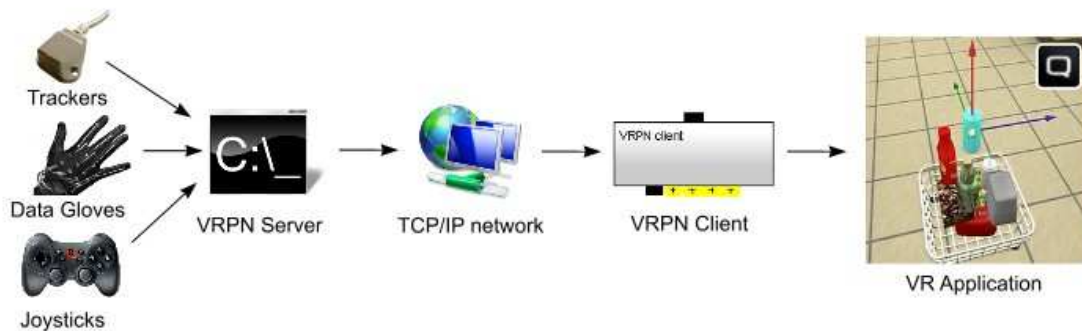# Setting up VRPN

VRPN

VRPN (Virtual Reality Peripheral Network) is an open source network service to interface an application to a wide range of peripherals such as trackers, fly-sticks and other devices. The 3DEXPERINECE platform utilizes VRPN to allow for a maximum flexibility when connecting to existing hardware.

For more information about VRPN and an exhaustive list of supported devices please visit WWW.VRPN.ORG.

Installing VRPN

On the machine you are running the 3DEXPERIENCE platform unpack the content of the VRPN archive into an empty directory of your choice. Besides a bunch of service files, the package contains:

- **vrpn_server.exe**   The VRPN executable
- **vrpn.cfg**   The VRPN configuration file
- **vrpn_SAMPLE.cfg**   A configuration file containing sample configurations
- **vrpn_print_devices.exe**   A utility to print device raw-data
- **vrpn_print_dtrack.bat**   A batch-file to print DTrack raw data

The configuration of VRPN is suited for ART™ DTrack devices as they are most commonly used. For other trackers you need to change the **VRPN.CFG** file. Sample configurations for various devices are contained in the **VRPN_SAMPLE.CFG**.

To make VRPN receive data from DTrack, you need to enter the address of your machine in the receiver list of the DTrack software (Output settings).

NOTE: In this document we assume that VRPN is running on the same machine as your 3DEXPERIENCE platform.
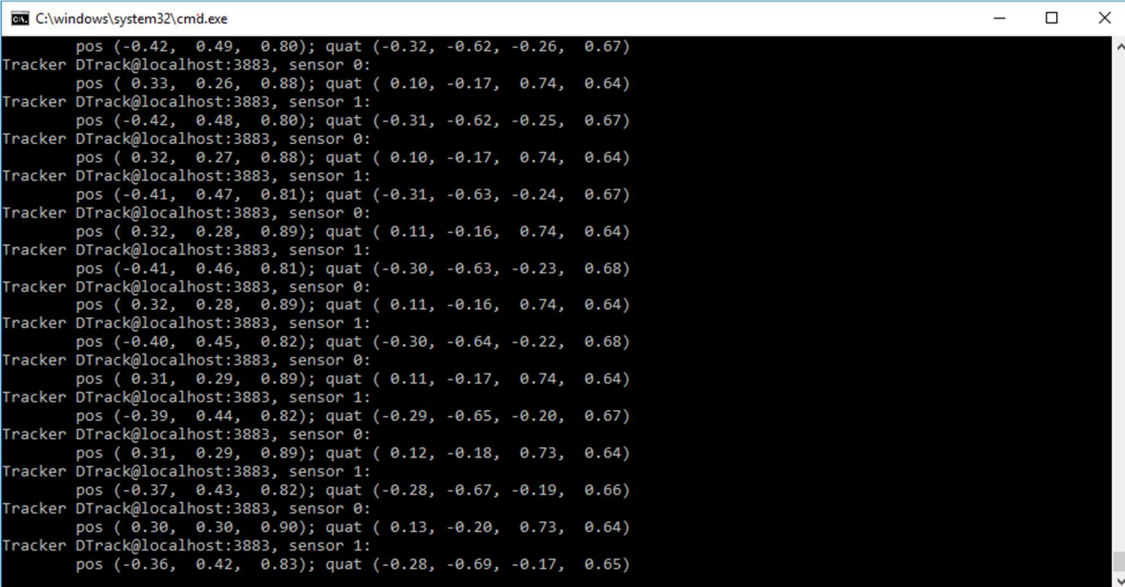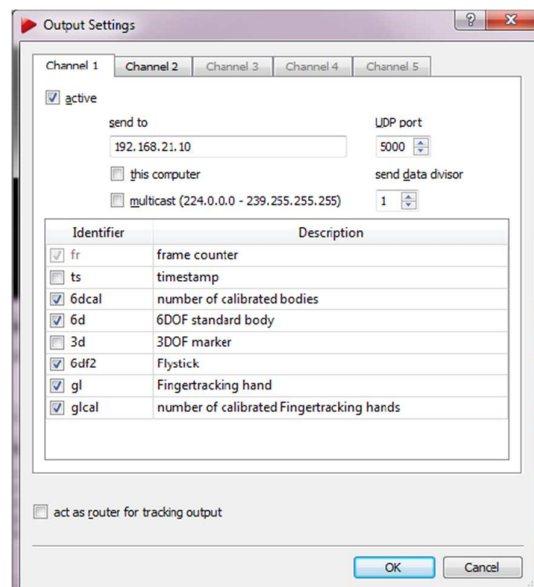
Testing VRPN

To test the VRPN service perform the following steps:

- Make sure your tracking is running and the machine running the 3DEXPERIENCE platform is added to DTracks output list.
- Double-click **VRPN_SERVER.EXE** to start the VRPN service
- Double-click **VRPN_PRINT_DTRACK.BAT** to print-out the trackers raw-data

The console-window of the VRPN print-utility should look like this:

```
C:\windows\system32\cmd.exe                                          —  □  ✕
        pos (-0.42,  0.49,  0.80); quat (-0.32, -0.62, -0.26,  0.67)
Tracker DTrack@localhost:3883, sensor 0:
        pos ( 0.33,  0.26,  0.88); quat ( 0.10, -0.17,  0.74,  0.64)
Tracker DTrack@localhost:3883, sensor 1:
        pos (-0.42,  0.48,  0.80); quat (-0.31, -0.62, -0.25,  0.67)
Tracker DTrack@localhost:3883, sensor 0:
        pos ( 0.32,  0.27,  0.88); quat ( 0.10, -0.17,  0.74,  0.64)
Tracker DTrack@localhost:3883, sensor 1:
        pos (-0.41,  0.47,  0.81); quat (-0.31, -0.63, -0.24,  0.67)
Tracker DTrack@localhost:3883, sensor 0:
        pos ( 0.32,  0.28,  0.89); quat ( 0.11, -0.16,  0.74,  0.64)
Tracker DTrack@localhost:3883, sensor 1:
        pos (-0.41,  0.46,  0.81); quat (-0.30, -0.63, -0.23,  0.68)
Tracker DTrack@localhost:3883, sensor 0:
        pos ( 0.32,  0.28,  0.89); quat ( 0.11, -0.16,  0.74,  0.64)
Tracker DTrack@localhost:3883, sensor 1:
        pos (-0.40,  0.45,  0.82); quat (-0.30, -0.64, -0.22,  0.68)
Tracker DTrack@localhost:3883, sensor 0:
        pos ( 0.31,  0.29,  0.89); quat ( 0.11, -0.17,  0.74,  0.64)
Tracker DTrack@localhost:3883, sensor 1:
        pos (-0.39,  0.44,  0.82); quat (-0.29, -0.65, -0.20,  0.67)
Tracker DTrack@localhost:3883, sensor 0:
        pos ( 0.31,  0.29,  0.89); quat ( 0.12, -0.18,  0.73,  0.64)
Tracker DTrack@localhost:3883, sensor 1:
        pos (-0.37,  0.43,  0.82); quat (-0.28, -0.67, -0.19,  0.66)
Tracker DTrack@localhost:3883, sensor 0:
        pos ( 0.30,  0.30,  0.90); quat ( 0.13, -0.20,  0.73,  0.64)
Tracker DTrack@localhost:3883, sensor 1:
        pos (-0.36,  0.42,  0.83); quat (-0.28, -0.69, -0.17,  0.65)
```

For each sensor, you'll receive the sensor-id and the transformation data. In this example we do have two trackers attached, one with ID 0 (typically the head) and one with ID 1 (typically the FlyStick).

IMPORTANT NOTE: While DTrack start the enumeration of the trackers at 1, VRPN starts at 0. Thus "Target 1" in DTrack becomes "Sensor 0" in VRPN!

Adjusting the XML configuration file

The IDs of your tracker targets need to be adjusted in the XML configuration. To do so, open the "**XXX_..._VRPNTRACKING.XML**" in a suitable editor and in the "*InputDevices*" section, set the ID of the head and hand-tracker as reported by the VRPN print-utility:

```
<IVConfiguration name="myIVConfigFile" version="0" xmlns:xsi="http

    <InputDevices>
        <Device
            name="DTrack"
            type="VRPNDevice"
            vrpnAddress="DTrack@127.0.0.1:5000"
            physicalReferential="euler_zxy(90.0, 90.0, 0.0)" >

        <Sensor type="tracker" devId="0" name="trackerHead"/>
        <Sensor type="tracker" devId="1" name="trackerHand"/>

        <Sensor type="button"  devId="5" name="Bumper"/>
        <Sensor type="button"  devId="4" name="BLeft"/>
        <Sensor type="button"  devId="3" name="BMiddleLeft"/>
        <Sensor type="button"  devId="2" name="BMiddleRight"/>
        <Sensor type="button"  devId="1" name="BRight"/>
        <Sensor type="button"  devId="0" name="Trigger"/>
```

Arrange your screen layout

Make sure your screen layout is arranged as needed. Typically, the layout consists of a (primary) desktop-screen (connected to your desktop display) and one or more projector-screens (connected to the respective projector):
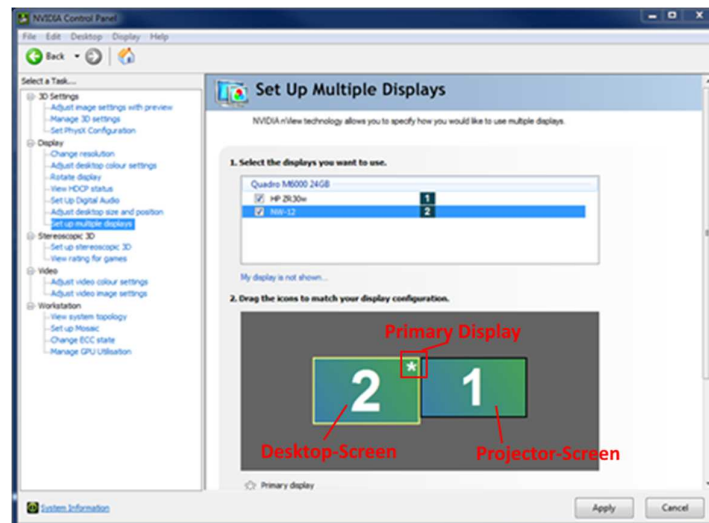
Layout for a desktop and one projector screen

Please make sure, that the desktop-screen is configured as the primary display as shown above.

NOTE: The layout of the windows screens needs to match the configuration in the scenario-XML. If in doubt, check with the creator of the configuration file.
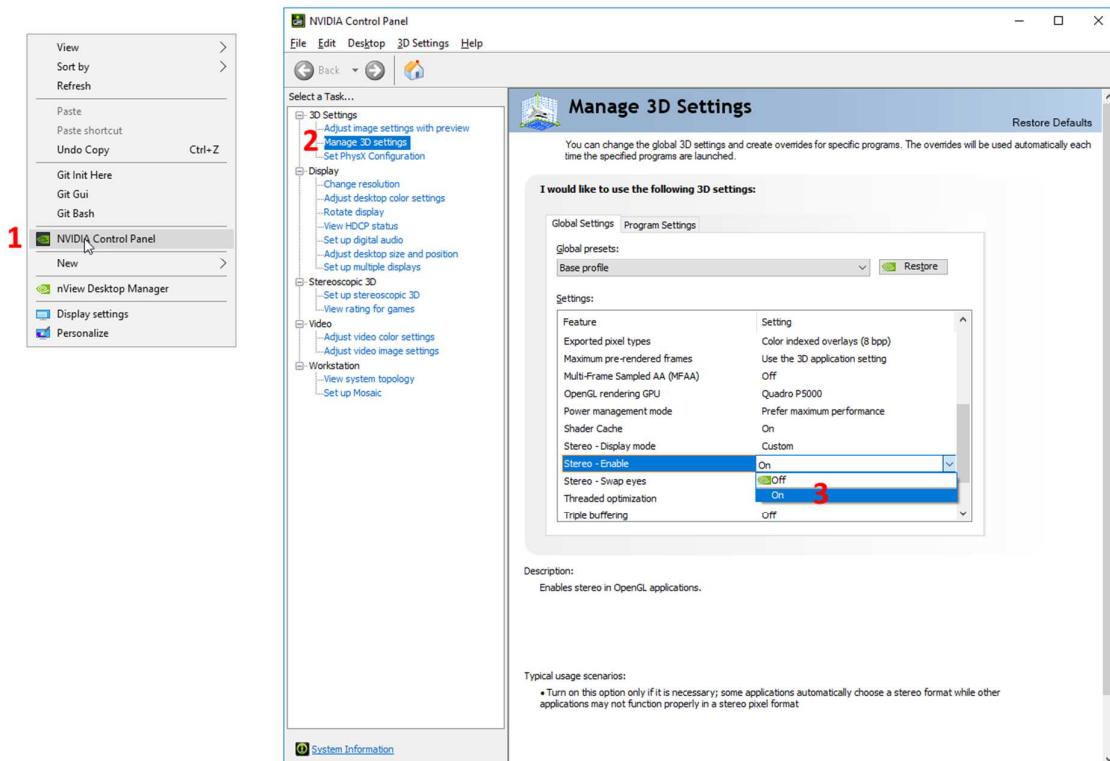
Activate the stereoscopic display

In order to use a stereoscopic display with your 3DEXPERIENCE platform, you need to activate it in the preferences:
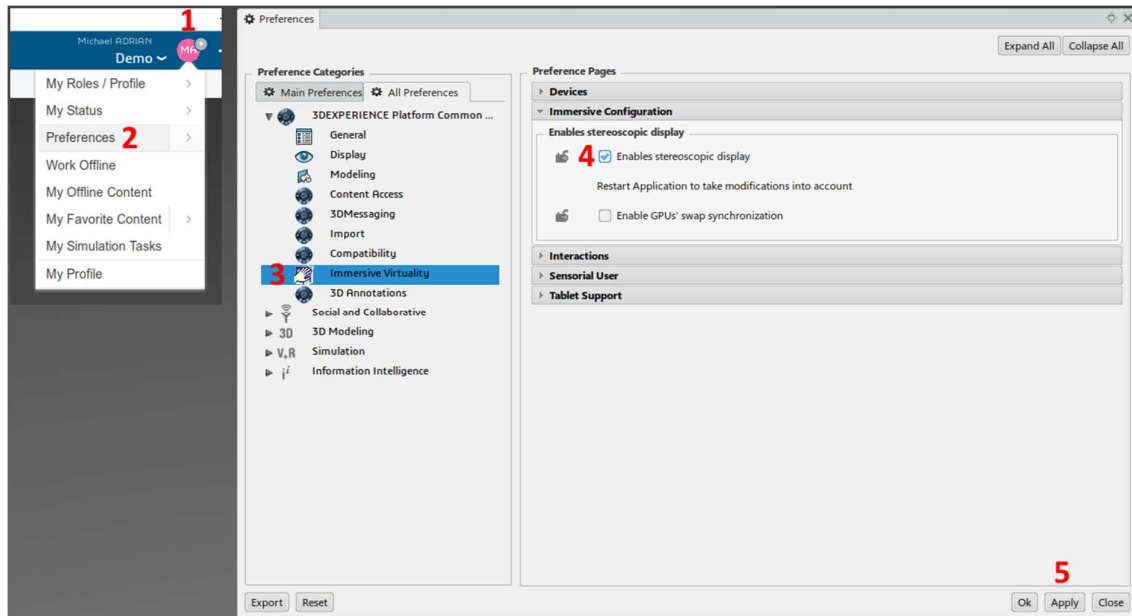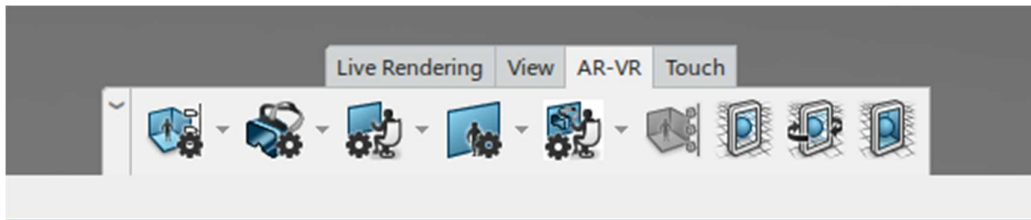

NOTE: The session needs to be re-launched for the change to take effect.

If you are about to use active-stereo, you also need to enable it in your GPU-Driver:
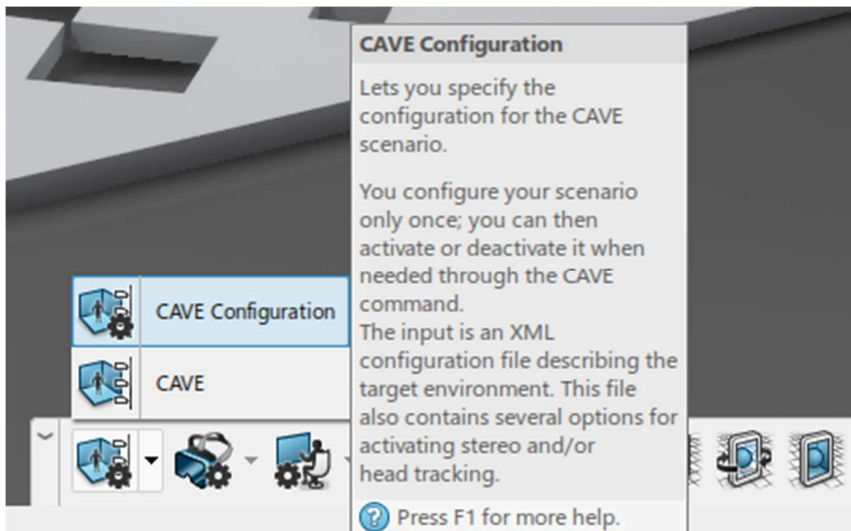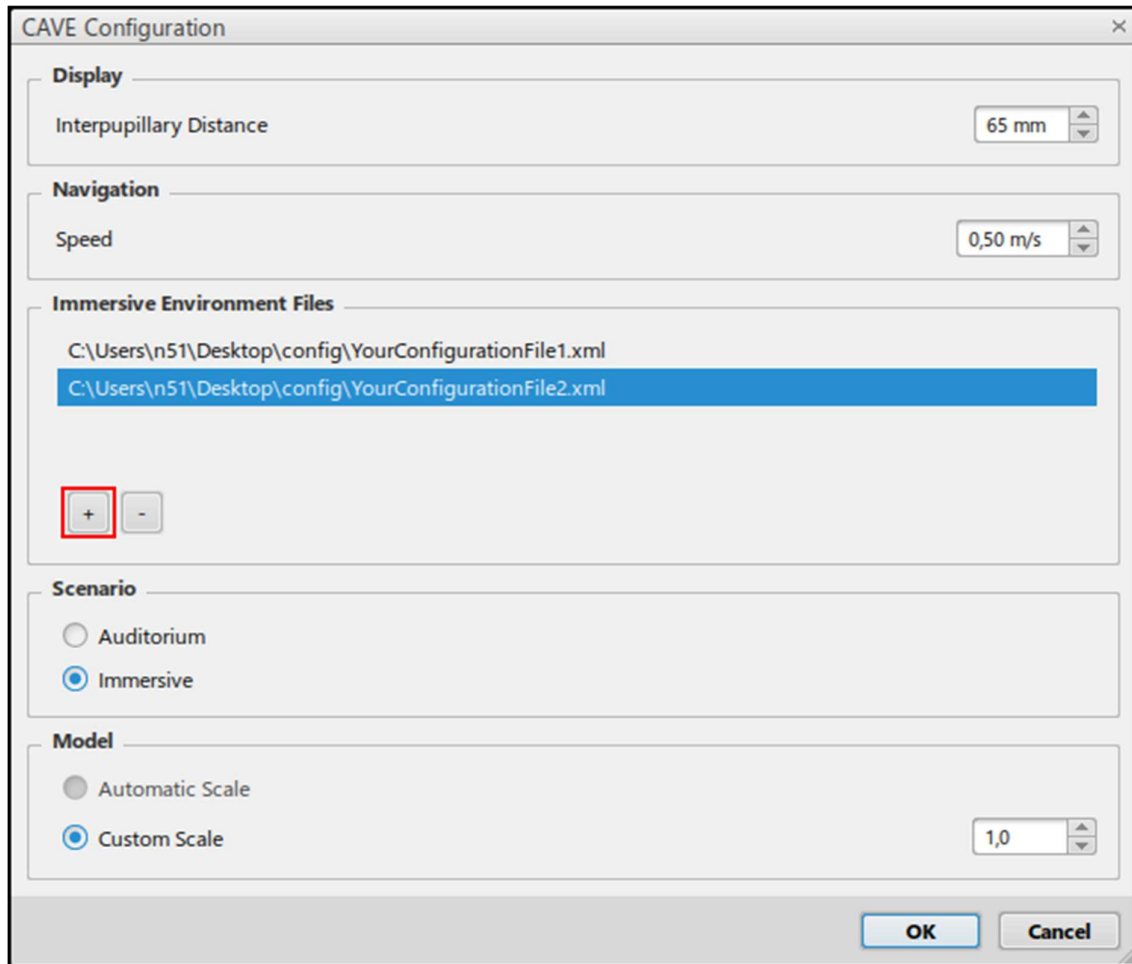
CAVE Configuration

From the action-bar of your 3DEXPERIENCE app locate and select the **VR/AR** tab:

In the **CAVE** Scenario select **CAVE Configuration**:

In the configuration window, click the "*+*" button and populate the Immersive Files list with your configuration file(s):


CAVE Configuration ✕

Display

Interpupillary Distance   65 mm

Navigation

Speed   0,50 m/s

Immersive Environment Files

C:\Users\n51\Desktop\config\YourConfigurationFile1.xml

C:\Users\n51\Desktop\config\YourConfigurationFile2.xml

+   -

Scenario

○ Auditorium

◉ Immersive

Model

○ Automatic Scale

◉ Custom Scale   1,0

OK   Cancel

Ramp-Up Procedure

Basic Test (only for active-stereo configurations)

From the configuration list select "`XXX_PW_MONO_NOTRACKING`" from the list above, make sure the "*SCENARIO*" selector is set to "*AUDITORIUM*" and launch the *CAVE* scenario. You should get a non-stereo picture of your scenario. You should be able to navigate the scenario from your desktop window.

NOTE: If the desktop window and the projection screen are somehow messed up, try to switch the primary screen in your desktop configuration to the screen that is supposed to show your desktop window:
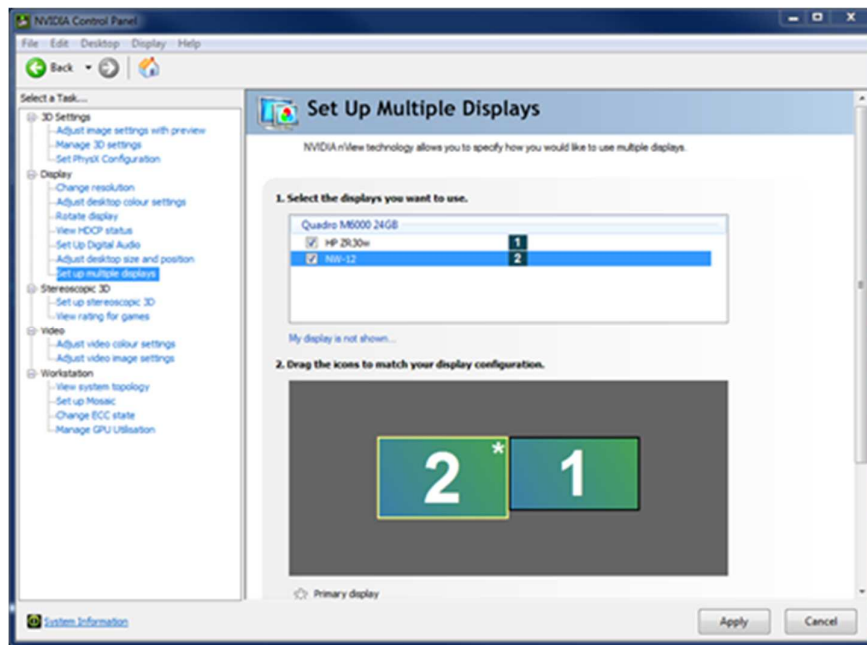

Stereo Test

Select "`XXX_PW_ACTIVESTEREO_NOTRACKING`" or "`XXX_PW_PASSIVESTEREO_NOTRACKING`" from the list above, make sure the "*SCENARIO*" selector is set to "*AUDITORIUM*" and launch the *CAVE* scenario. You should now see a stereoscopic picture of your scenario. The sweet-spot for the ideal perspective is set to 1.80 meter height in a distance of 2.0 meters in front of the wall. You should be able to navigate the scenario from your desktop window.

Full Test with tracking

Select "`XXX_PW_ACTIVESTEREO_VRPNTRACKING`" or "`XXX_PW_PASSIVESTEREO_VRPNTRACKING`" from the list of configurations, make sure the "*SCENARIO*" selector is set to "*IMMERSIVE*" and launch the *CAVE* scenario. You should now see a stereoscopic picture of your scenario. The scenario should adopt to your head-movements. You should be able to navigate the scenario with your flight-stick. You cannot navigate the scenario from your desktop.

NOTE: Due to the various configuration options of the DTrack it might be possible that devices or axes need to be swapped. This is subject to further optimizations.
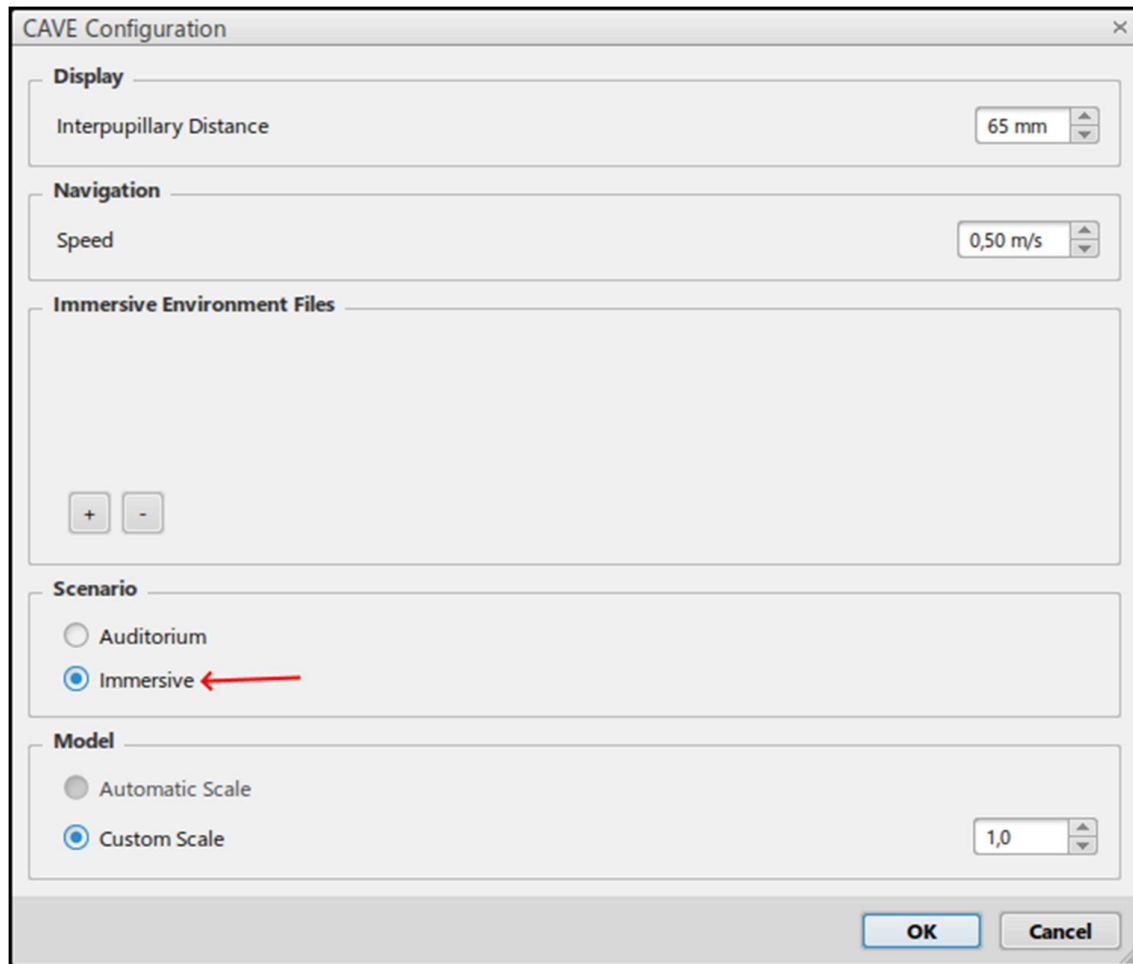
If you want to navigate with your Fly-Stick, you need to select the "Immersive" scenario.