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**Fly Elise-ng  
MSFS Multi-View  
Step by Step Guide**

1	Introduction .....	3
2	MSFS Multi-view export.....	5
3	Setting up the MSFS for multi-view .....	9
4	Setting up the MSFS zoom .....	13
5	Setting up the MSFS cockpit mode .....	15
6	Removing the virtual cockpit .....	16
7	Final setup .....	17

## **1 Introduction**

MSFS is out there for more than 2 years. However, the lack of one essential feature (multi-view) prevents cockpit and simulator builders to use MSFS in their solutions.

MSFS update SU10 introduced an EXPERIMENTAL “multi-monitor” feature which allows opening multiple rendering windows on a single PC. But, the feature is undocumented, and largely unusable in multi-view flight simulation setups. The following 3 key functionalities are missing from the current MSFS multi-monitor feature:

- Consistent and accurate specification and configuration of the view/camera position and orientation (pitch, bank, heading) for each view independently.
- Accurate specification of the Horizontal and/or Vertical Field of View (FOV) for each view/camera independently, including asymmetric FOV and frustums.
- System level specification for the multi-view parameters independent from the selected plane or flight scenario.

Although there have been so many attempts to contact and convince Asobo and Microsoft to implement and release a proper and functional multi-view interface similar to ViewGroups in P3D and multi-view in X-Plane, Asobo/Microsoft have failed to provide a clear roadmap for this essential multi-view feature.

We at Fly Elise-ng decided to take the current EXPERIMENTAL multi-monitor feature and work-around all its limitations and inconsistencies in order to provide a usable and workable multi-view geometrical correction and edge blending for perfect 100% geometrically accurate view.

We updated our Immersive Calibration PRO, Immersive Display PRO and Immersive LCD PRO software packages to support multi-PC (one channel/view per PC) and Single-PC (multiple channels/views per PC) using the current experimental multi-view implementation in MSFS.

This document does not describe the steps needed to design and auto-align your multi-projection or multi-LCD visual system.

For all details about designing and auto-aligning workflow, please check our website for the latest documentation and step by step guides:

[Calibration PRO User Guide](#)

[Calibration PRO Step by Step \(No Cam\)](#)

[Calibration PRO Step by Step \(Multi Cam\)](#)

[Immersive LCD PRO Step by Step Guide](#)

The rest of this step by step guide describes the steps needed to:

- Export the multi-view data from Immersive Calibration PRO and/or Immersive LCD PRO
- Configure MSFS with the exported MSFS multi-view data
- Configure and use Immersive LCD PRO and Immersive Display PRO with the exported MSFS multi-view data

This guide involves manual editing of some MSFS configuration files as well as plane cameras and models files. Read the guide carefully and follow it accurately.

Future version of Fly Elise-ng software might include automatic (single click button) export and configuration of MSFS multi-view, but for now one needs to do those steps manually each time the system is re-calibrated and new warping and multi-view data is exported.

**FPS PERFORMANCE DISCALIMER:** All Fly Elise-ngs warping and edge-blending processing is performed on the GPU. Our warping algorithms use the most advanced GPU techniques and minimal GPU resources to limit the impact of the warping on the frame rate. The processing algorithms are optimized to sub-millisecond timing, which means at most 1 frame drop on 1000 frames (0.1% FPS drop).

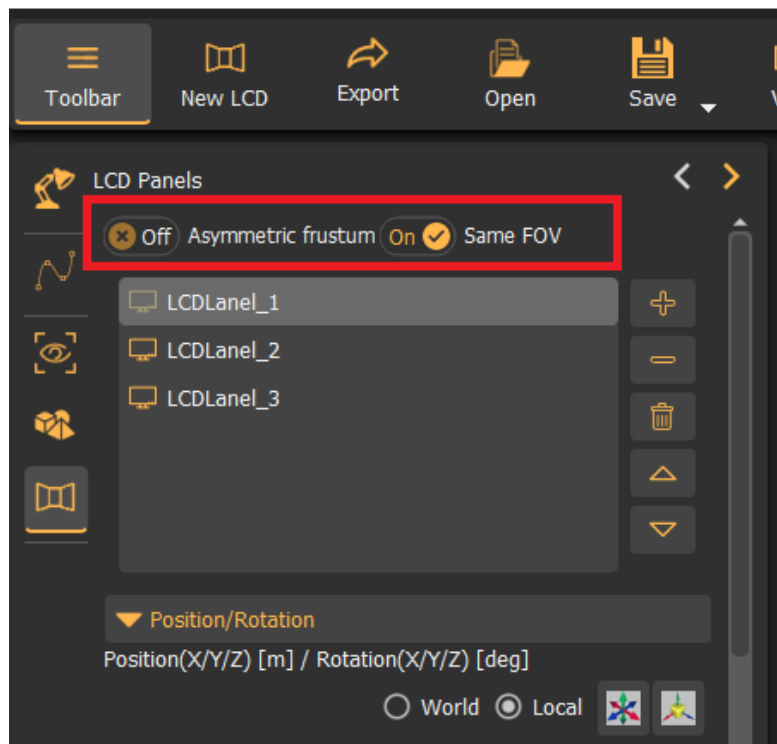
Any additional FPS performance drop can only be accounted to the MSFS rendering and processing performance required to render one or multiple views with the desired Field of View.

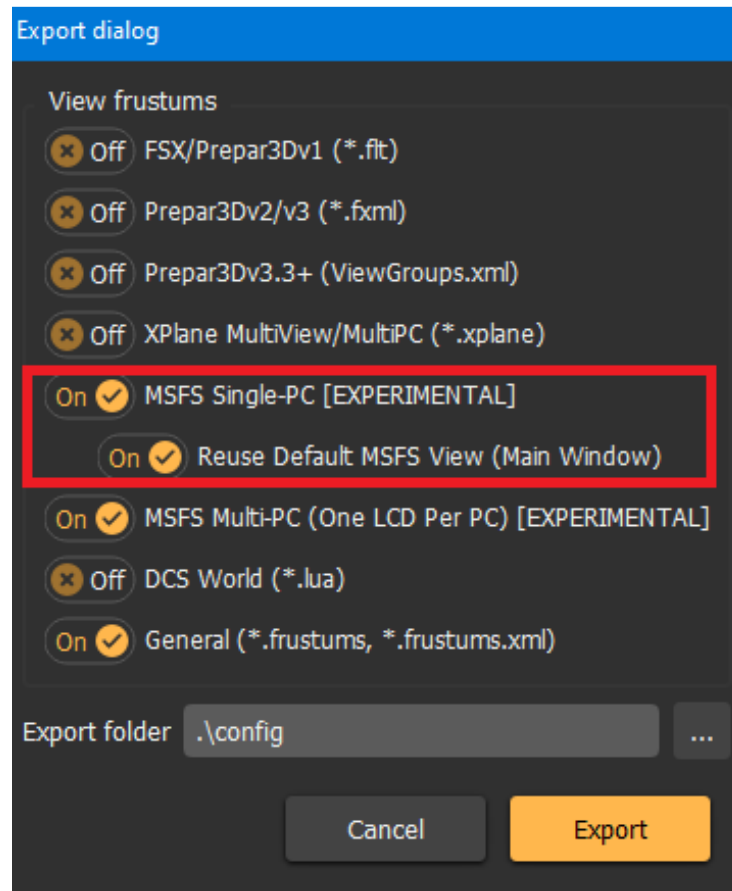
Please do not address FPS performance questions to Fly Elise-ng.

## 2 MSFS Multi-view export

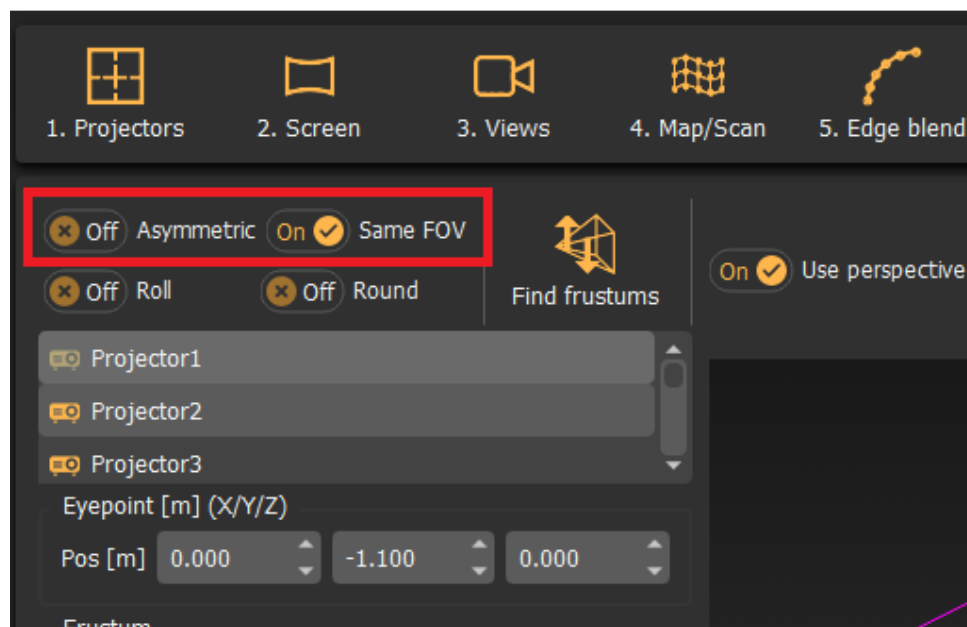
Both Immersive Calibration RPO and Immersive LCD PRO software support export for Multi PC (one channel/view per PC) or Single PC (multiple channels/views per PC) MSFS multi-view data. The multi-view data contains the needed parameters to configure the view orientation and the horizontal/vertical Field of View (FOV) for each view.

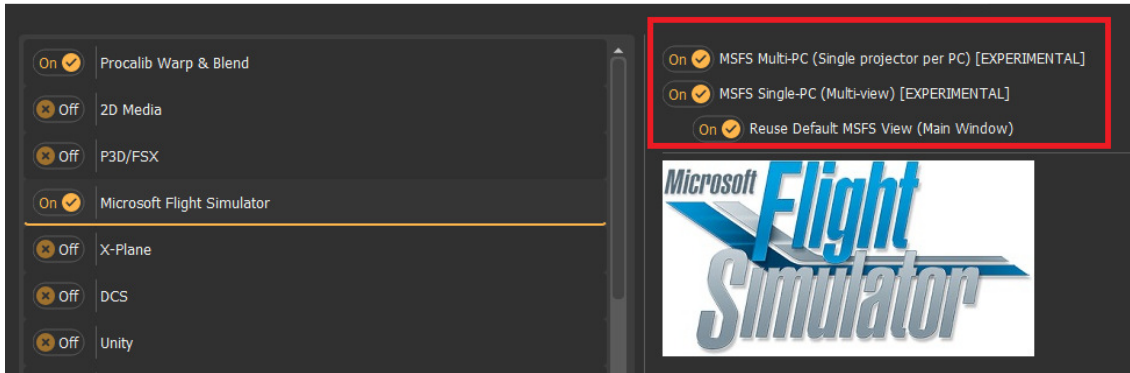
### Immersive LCD PRO





## Immersive Calibration PRO





Current MSFS implementation supports only one FOV value for all views per PC. In case of Multi-PC setups this is not an issue at all, because each PC has only one view.

However, on a Single-PC setup with more than one view, all views have to have the same FOV.

**IMPORTANT:** When exporting multiple views for Single-PC, ALWAYS make sure that Same FOV is selected and checked to ensure all views have the same FOV.

**IMPORTANT:** MSFS does NOT support asymmetric frustums. ALWAYS make sure Asymmetric frustum is turned OFF before you calculate and export the perspective view data.

**IMPORTANT:** The current multi-view MSFS export has a limitation of Vertical FOV between **26 degrees and 104 degrees**. Any design which produces Vertical FOV out of this range will not be able to be exported and needs to be re-designed.

Additional “Reuse Default MSFS View” option is only available for Single-PC setups. When selected, the exported view data will include the view parameters for the main MSFS window for the first view and each additional view will be configured using the MSFS experimental multi-view window. This makes optimal use of the MSFS windows.

However, if the main window is to be used for some other rendering (example maps, instruments, etc...), then the option “Reuse Default MSFS View” can be disabled. In that case, each view will be opened on a separate multi-view window and the main window can be used for the menus and other rendering.

The MSFS export will export the files “msfs\_multiPC.txt” and “msfs\_singlePC.txt” respectively which contain information about the views and how to setup the views in MSFS (see next chapters).

### 3 Setting up the MSFS for multi-view

The exported data and the procedure for Multi-PC and Single-PC is slightly different. However, in both cases, it is needed to locate and modify the camera.cfg file in the Airplane folder.

**IMPORTANT:** The required changes must be made per airplane

The Airplane folders can be found in the MSFS Official or Community packages folders.

Example: The Asobo default C172sp airplane (for Steam installs) can be found here:

```
<MSFS_INSTALL>\packages\Official\Steam\asobo-aircraft-c172sp-classic\SimObjects\Airplanes\Asobo_C172sp_classic
```

Locate and make a backup copy of the cameras.cfg file. You will need to open and modify this file according to the exported data.

Locate the Camera definition for the Pilot Virtual Cockpit and apply the following mandatory changes:

```
[CAMERADEFINITION.0]
Title ="Pilot"
Guid ="{195EAB58-9E4A-1E2A-A34C-A8D9D948F078}"
Description =" "
Origin ="Virtual Cockpit"
...
InitialZoom = 1.0;
InitialPbh = p, b, h;
...
```

Where the p, b, h are the values from the exported files.

Additionally, if you would like to move the position of the view use the line eyepoint from the opt of the file to adjust the eye point position.

```
[VIEWS]
eyepoint = -3.95, -0.85, 1.9 ; (feet) longitudinal, lateral,
vertical distance from reference datum
```

For **Multi-PC (Single channel/view per PC)**, there is no need to use the MSFS experimental multi-view feature.

However, for multi-PC, a separate software is needed to synchronize the position and state of each MSFS instances on each PC. One can consider WideView or similar software to couple and synchronize multiple MSGFS instances.

The exported “msfs\_multiPC.txt” file contains information about each view on each PC separately.

```
Export for MultiPC (single channel per PC)
Locate the plane folder in the MSFS packages directory
Example: packages\Official\Steam\asobo-aircraft-cl72sp-classic\SimObjects\Airplanes\Asobo_C172sp_classic
Locate and create a copy of the cameras.cfg
Locate the [CAMERADEFINITION.x] for Origin = "Virtual Cockpit"
Edit the camerass.cfg file and add/modify the InitialZoom and InitialPbh lines as indicated below
```

```
-----
Set the ZoomPercentage in MSFS GUI to 29.7854
Channel = 1
ProjectorName = Projector1
Enter the following values in the cameras.cfg file
InitialZoom = 1.0
InitialPbh = 9, 0, -72
-----
```

```
-----
Set the ZoomPercentage in MSFS GUI to 29.7854
Channel = 2
ProjectorName = Projector2
Enter the following values in the cameras.cfg file
InitialZoom = 1.0
InitialPbh = 5, 0, 1
-----
```

On each PC locate the camera.cfg for the same plane and enter/modify the InitialZoom and InitialPbh according to the exported data.

The views FOV data is encoded in the ZoomPercentage value. Check the later sections on how to set and ensure the ZoomPercentage value in Immersive LCD PRO or Immersive Display PRO.

For **Single-PC (Multiple channels/views per PC)**, in addition to setting up the cameras.cfg file for the desired plane, the exported “msfs\_singlePC.txt” file contains additional information on how to setup the additional views.

```
Export for SinglePC (reuse main MSFS view/window)
Locate the plane folder in the MSFS packages directory
Example: packages\Official\Steam\asobo-aircraft-cl72sp-classic\SimObjects\Airplanes\Asobo_C172sp_classic
Locate and create a copy of the cameras.cfg
Locate the [CAMERADEFINITION.x] for Origin = "Virtual Cockpit"
Edit the camerass.cfg file and add/modify the InitialZoom and InitialPbh lines as indicated below
```

```
-----
Set the ZoomPercentage in MSFS GUI to 29.7854
Channel = 1
ProjectorName = Projector1
Enter the following values in the cameras.cfg file
InitialZoom = 1.0
InitialPbh = 9, 0, -72
-----
```

```
-----
Add the folwing lines in the UserCfg.opt file
-----
WindowCustom0.Monitor 1
WindowCustom0.Windowed 0
WindowCustom0.FullscreenBorderless 1
WindowCustom0.WindowActive 1
WindowCustom0.Resolution 1920 1080
WindowCustom0.FullScreenResolution 1920 1080
WindowCustom0.PosX 0
WindowCustom0.PosY 0
WindowCustom0.CameraDegRotationAdd 1.18751 54.5368 8.61082
WindowCustom1.Monitor 2
WindowCustom1.Windowed 0
WindowCustom1.FullscreenBorderless 1
WindowCustom1.WindowActive 1
WindowCustom1.Resolution 1920 1080
WindowCustom1.FullScreenResolution 1920 1080
WindowCustom1.PosX 0
WindowCustom1.PosY 0
WindowCustom1.CameraDegRotationAdd 8.20089 105.951 5.7513
-----
```

Although the MSFS GUI supports visually adding new view windows and editing of the lateral, vertical and roll offers for each window, the GUI functionality has a number of bugs and limitations (number of decimal places) which makes it not suitable for GUI editing.

The exported msfs\_singlePC.txt contains the exact data to be copied in the UserCfg.opt configuration file. This file contains the exact definition of the additional views in MSFS.

Locate and make a backup of the UserCfg.opt file in the  
%APPDATA%\Microsoft Flight Simulator folder.

Open the UserCfg.opt, locate the {Video section and remove any lines starting with WindowCustom. Then insert the exported WindowCustom lines from the exported msfs\_singlePC.txt file.

```
Version 66
{Video
  Adapter "NVIDIA GeForce RTX 2080"
  Monitor 0
  Windowed 1
  FullscreenBorderless 1
  WindowActive 0
  Resolution 1280 1024
  FullScreenResolution 1920 1080
  PosX 9
  PosY 3
  <INSERT HERE THE EXPORTED WindowCustom lines>
  AntiAliasing TAA
  DLSSMode BALANCED
  DLSSG 0
  Reflex OFF
```

Additionally, you can edit and change the WindowCustom0.Monitor, WindowCustom1.Monitor, etc. values to position to additional windows on the correct PC output. This can also be done in the GUI by making the view window non-full screen (ALT+ENTER), moving the window to the desired output and making the window full screen (ALT+ENTER).

The views FOV data is encoded in the ZoomPercentage value. Check the next sections on how to set and ensure the ZoomPercentage value in Immersive LCD PRO or Immersive Display PRO.

## 4 Setting up the MSFS zoom

MSFS has a very limited and volatile way to set the view Field of View. Only a single ZoomPercentage value (slider) can be used to zoom in and out and setup the field of view. There is no direct logical relation between the zoom factor and the actual horizontal or vertical field of view.

Additionally, when changing views in MSFS, the ZoomPercentage values are often reset to the default 50%.

Our Immersive LCD PRO and Immersive Calibration PRO software accurately calculates the needed MSFS ZoomPercentage based on the desired Horizontal and Vertical FOV values. For a Single-PC multi-view setup, all view must have the same ZoomPercentage because MSFS applies the same zoom to all the views.

In order to ensure a stable and accurate ZoomPercentage, both Immersive LCD PRO and Immersive Display PRO include a SimConnect client which connects to the MSFS instance on the same PC and makes sure that exported ZoomFactor is always applied to MSFS Virtual Cockpit view. Even when changing views or ZoomPercentage in the GUI, the desired ZoomPercentage will be set and enforced correctly by both Immersive LCD PRO and Immersive Display PRO software. This is required for both a Single-PC multi-view and Multi-PC multi-view setups.

```

Locate the plane folder in the MSFS packages directory
Example: packages\Official\Steam\asobo-aircraft-c172sp-classic\SimObjects\Airplanes\Asobo_C172sp_classic
Locate and create a copy of the cameras.cfg
Locate the [CAMERADEFINITION.x] for Origin = "Virtual Cockpit"
Edit the camerass.cfg file and add/modify the InitialZoom and InitialPbh lines as indicated below

```

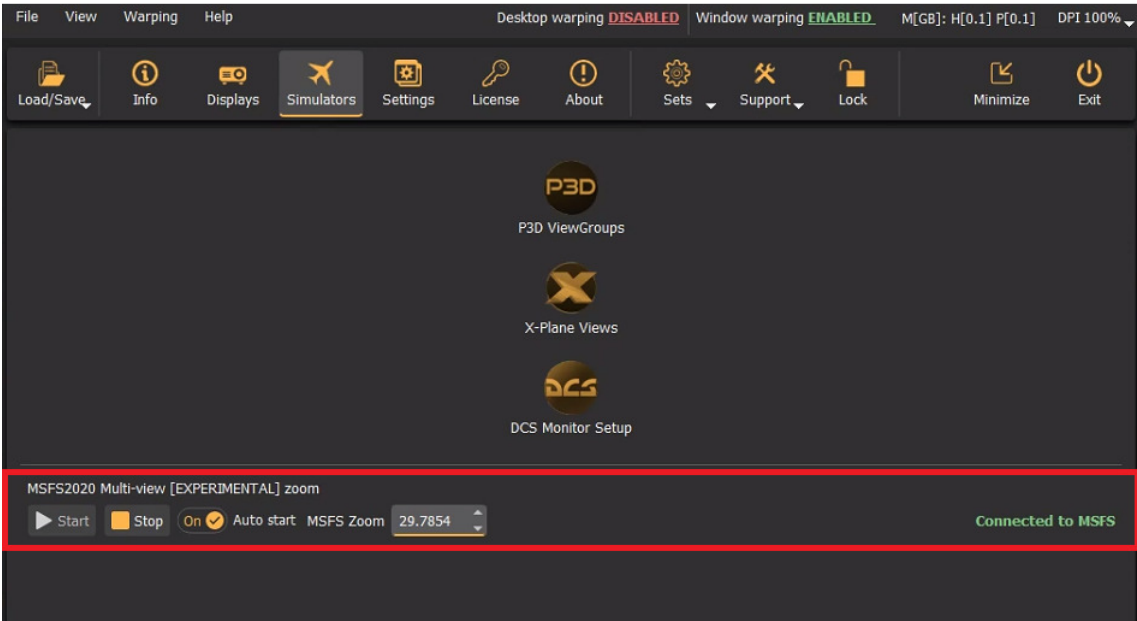
```

-----
Set the ZoomPercentage in MSFS GUI to 29.7854

```

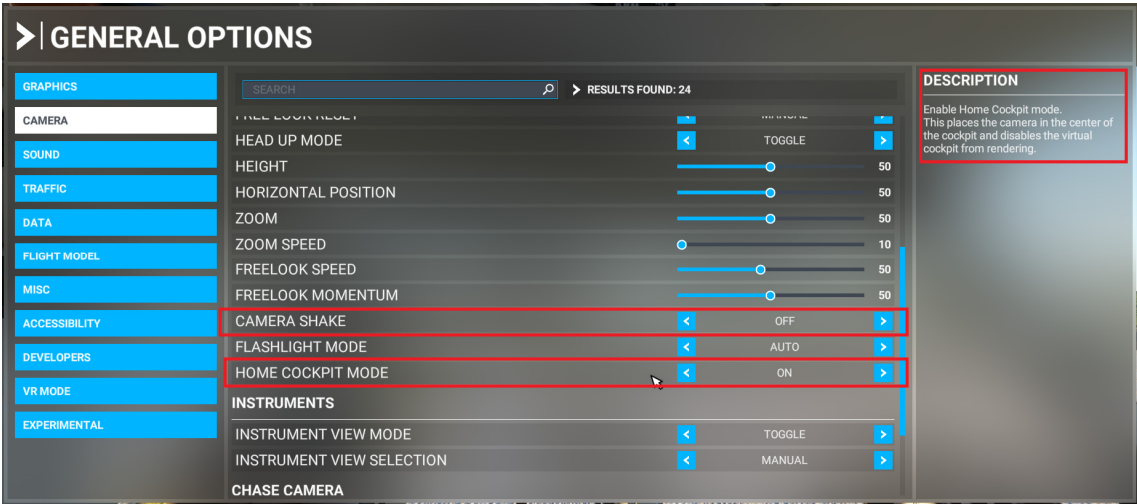
Locate the line with the ZoomPercentage from the exported "msfs\_multiPC.txt" and "msfs\_singlePC.txt" and copy the ZoomPercentage value.

Open the Immersive Display PRO or Immersive LCD PRO Simulator window and enter the exported Zoom value. Press on Start (or enable auto-start) to start SimConnect client which will connect to MSFS and make sure the entered Zoom value is always applied in MSFS.



5 Setting up the MSFS cockpit mode

By default, MSFS has some camera options enabled that will change the view orientation and will mess up with the geometrical correction and edge-blending. To prevent any view changes, make sure that the CAMERA SHAKE option is turned OFF and the HOME COCKPIT MODE is turned ON.



## 6 Removing the virtual cockpit

Although the HOME COCKPIT MODE documentation suggests that when this option is enabled the Virtual Cockpit will not be drawn, the current and the latest version of MSFS contains a bug and the interior and exterior are still drawn even when HOME COCKPIT MODE is enabled. This is undesirable with simulator setups with its own cockpit and when the visual system only needs to project the outside views (and not the virtual cockpits and other exteriors).

Fortunately, there is another way to remove the rendering of the interior and/or exterior of the aircraft. Locate and make a copy of the SimObjects model.cfg file for the particular aircraft.

Example: The Asobo default C172sp airplane (for Steam installs) can be found here:

```
<MSFS_INSTALL>\packages\Official\Steam\asobo-aircraft-c172sp-classic\SimObjects\Airplanes\Asobo_C172sp_classic\model\model.cfg
```

Edit the file and put the “;” (semicolon) before exterior and interior lines to comment out the lines. This will remove them from the rendered views.

```
; Reference LOD implementation, please keep these comments (for now).

[model.options]
; if true, when showing the exterior, also show the interior model (default false)
withExterior_showInterior=true
; if true, when showing the interior with the exterior, exclude interior.lod0 (default false); only has an effect when withExterior_showInterior is true
withExterior_showInterior_hideFirstLod=true
; when showing the interior, force showing lod0 (default true)
withInterior_forceFirstLod=true
; when showing the interior, also show the exterior model (default false)
withInterior_showExterior=true

[models]
;exterior=Cessna172SP.xml
;interior=Cessna172N_interior.XML
```

## 7 Final setup

There is one more step. Just load the exported multi.procalib files in Immersive Display PRO or the exported .lcdcalib files in Immersive LCD PRO respectively.

Start MSFS in full screen mode and make sure that the main view and the additional views are positioned on the correct video output display.

After that the views will be perfectly aligned and edge blended.

Happy flying.

Here is an example of one of our customers 6 channels helicopter setup with MSFS2020.

