FALCON BMS

VR GUIDE

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1. All changes in this document coming with 4.37.0 are marked with a **black** line.

2. All changes in this document coming with 4.37.1 are marked with a **blue** line.

3. All changes in this document coming with 4.37.2 are marked with a **red** line.

4. All changes in this document coming with 4.37.3 are marked with a green line.

5. All changes in this document coming with 4.37.4 are marked with a orange line.

1. VR - System Requirements

To be able to run BMS with VR (possible since 4.37), you have to download and install Steam VR or Open XR.

You need a VR headset (Pixax, Reverb G2, HTC Vive, Oculus, etc.) and a VR capable GPU graphics card (Nvidia, etc).

4.37 U4 brings the option to use MR (Mixed Reality) mask in BMS which can work together with Virtual Desktop or other applications with a camera passthrough option. For more information, please refer to chapter 4 in this document.

2. Launch BMS with VR

1. If your VR headset requires to set an runtime option in the headset software, make sure it is linked to Stream VR (example below : Pimax XR software).

2. Launch Steam VR.

3. Launch BMS and make sure to activate the VR option depending if you use OpenXR or SteamVR (see below).

Note: If there is no Steam VR or Open XR installed or not recognized by BMS, the VR option in the BMS launcher is not visible.

3. Config File - Options

The following lines are in the config file by default and can be modified if needed:

```
set g_nVRHMD 0                      // Enables the OpenVR (default 0/false).
set g_fVRZOOMFOV 60                 // Field of view in degrees for VR ZOOM (default 60.0).
set g_nVRHMCSEYE 0                  // HMCS renders, 0 Right eye, 1 Left eye (default 0/false).
set g_fVRResolution 1.0            // VR resolution multiplier. 1.0 by default.
set g_bVRParallelRenderThread 1    // Enable Multi-Thread optimization for VR
set g_bVRNoPresent 0               // This will not display the companion window in VR (only HMD will show image
                                        in 3d).
set g_bHdrLighting 1               // Enables the HDR lighting (default 1/true).
```

HDR has now been enabled by default. If VR users experience jittering issues while having the VR headset on, disable HDR.

```
set g_bMixedRealityCockpitCoverEnabled 0     // Setting this will default the Mixed Reality Cockpit Cover on (1) or off
                                                  (0). Can still be toggled in game.
```

More information in chapter 4 about Mixed Reality.

The following lines are NOT in the config file by default and must be added in the "Falcon BMS User.cfg":

```
set g_bEnvironmentMapping 0        // Performance boost
set g_bWaterEnvironmentMapping 0   // Performance boost
set g_bShadowMapping 0             // Performance boost
```

4. Mixed reality

Since 4.37 U4, MR (Mixed Reality) mask can be used in BMS. All VR headsets with a camera together with Virtual Desktop or other applications with a camera passthrough option are capable providing MR in BMS.

BMS uses a **pure magenta (Red 255, Green 0, Blue 255)** filter mask to enable the passthrough function. VR frameworks like "Virtual Desktop" can enable a passthrough filter option. Simply set RGB color filter in the Virtual Desktop application.

4.1 Enable Mixed Reality

The following flag in the config file *Falcon BMS.cfg* is in effect and already implemented. Please note that it can be set to 0 or 1. Toggle is still working in 3d.

set g_bMixedRealityCockpitCoverEnabled 0   // Setting this will default the Mixed Reality Cockpit Cover on (1) or off (0). Can still be toggled in game.

To toggle the cover mask on/off, the following line is added/must be added to your keyfile and mapped as desired:

SimMixedRealityCoverToggle -1 0 0XFFFFFFFF 0 0 0 1 "SIM: Toggle Mixed Reality Cockpit Cover Model"
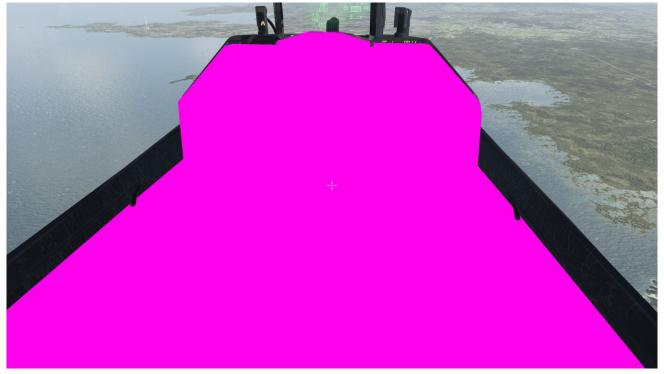
4.2 Default Cover Masks

BMS comes by default with four masks which you can choose from. 3840 is the default model for all F-16 planes. This is setup in the *3dCkpit.dat* file for each specific plane in the *\Data\Art\CkptArt* folders. The entry for changing the mask is: **cockpitmixedrealitycovermodel 3840;**
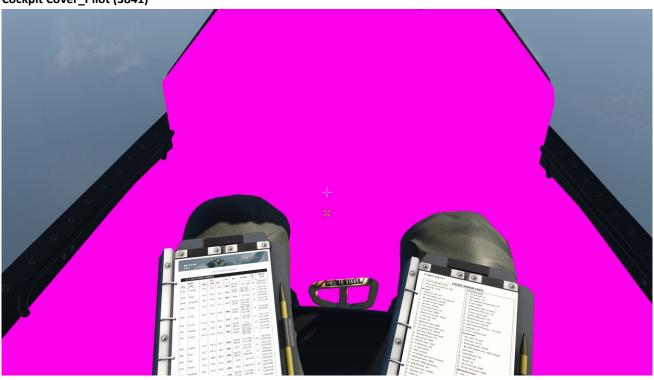
Models 3840, 3841, 3842 and 3843 are reserved for these masks, so you can have different masks for different planes.

Cockpit Cover (3840)
-    100% of the 3d cockpit is filtered (this preset is especially for pitbuilders)

Cockpit Cover_Pilot (3841)

Cockpit Cover_Desktop-Pit (3842)

Cockpit Cover_Desktop-Pit_No-MFD (3843)

4.3 Create your own mask

You will need the BML Exporter plugin for blender to create your own mask. Download the plugin <u>HERE.</u>

In addition, we created a substance painter plugin. Download the plug in <u>HERE</u>.

As a starting point, you find our default models (both blender and 3dsmax files) using the following path: *\Docs\01 Input Devices\04 VR Guide\BMS-Mixed Reality-Model files*

Create your model and add a material. Make sure the normals are correct.

Here we named the material MR-Cockpit-Cover as an example.

Export the model to bml. Add one LOD and a viewing distance of 600000.

Check the Parent.dat file. It should look like this:

Dimensions   **= 0.718953013 0 0 0 0 0 0**
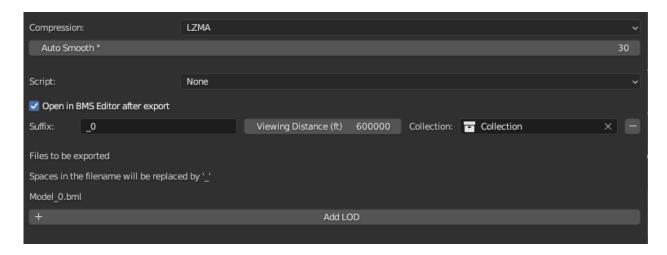**TextureSets**   **= 1**
Switches   **= 0**
Dofs   **= 0**
AddLOD   **= Model_0.bml 600000**

Modify the Materials.mtl file like this where the Name is the name you gave your material in the 3d program. PINK is a predefined material in BMS which will make the model magenta with no lights or shadows.

```
{
    "Materials": [
                {
                        "Name": "MR-Cockpit-Cover",
                        "Template": {
                                "File": "PBR",
                                "Material": "PINK"
                        }
                }
    ]
}
```

Now you can replace one of the default models by overriding the files in *\Data\TerrData\Objects\Models\3840 to 3843.*

5. Tested devices

HTC Vive
HP Reverb G2
Oculus Rift S
Oculus Quest 2
Pimax 5k
Pimax 8k
Pico 4

6. 3D Kneeboards

Besides the option to edit the in-game kneeboards with WDP (Weapon Delivery Planner), this third party tool works quite well for VR in BMS: https://github.com/OpenKneeboard/OpenKneeboard

7. Warnings

WARNING: Before Using VR Headset:

Read and follow setup instructions in User Manual, before using VR headset.

Do not use the headset when you are:

- Suffering from lack of sufficient sleep;
- Under influence of alcohol or drugs
- Suffering emotional stress or anxiety

If you are pregnant, elderly, have vision abnormalities or psychiatric disorders, or suffer from a heart condition or other serious medical condition, we strongly recommend seeing a doctor before using the VR headset.

WARNING: Children – Recommended and Discouraged Use:

- Children under age of 13 should NOT use the VR headset.
- Children age 13 and older should be constantly monitored by an adult to ensure:
- Health and Safety Warnings are followed
- VR headset is used as recommended
- Active use is limited in time and regular breaks is taken, where headset is removed
- Prolonged use is avoided
- Child is monitored for adverse symptoms during and after use.

WARNING: Risk of Seizures

- User should be aware that seizures, eye muscle twitching, severe dizziness or other conditions causing blackouts or loss of consciousness may be triggered by light patterns or flashes. These patterns can occur while using the VR headset.
- If you experience any of these symptoms you should immediately discontinue use of the VR headset and see a doctor.
- If you have a history of, or have been diagnosed with symptoms related to epileptic conditions, you should consult with a doctor before using the VR headset

WARNING: Vision Hazard

- NEVER aim the headset towards direct sunlight or other high intensity light source, such as lasers or car headlights as this may cause severe or permanent eye or skin tissue damage or severe burn injuries.

WARNING: Fire Hazard

- NEVER leave the headset in sunlight as this may cause fire or other property damage from sunlight focused into a high temperature area by the lenses in the VR headset.

WARNING: Heed Precautions

- Use VR headset while seated at all times, unless the VR game or VR application experience requires standing.

At all times, use VR headset while safely away from:
- Other people or animals
- Sharp objects, such as knives & furniture edges
- Tripping hazards
- Stairs and Stairwells
- Open doors, windows and patio doors
- Balconies and patios
- Furniture, plants and other household items
- Slippery or wet surface
- Light fixtures and moving objects, such as ceiling fans
- Other electrical equipment or electrical outlets
- Choking hazards
- Other items you may bump into or trip over during or immediately after use of the VR headset
- We recommend that you gradually increase daily use of VR headset, starting with a few minutes for each use, even if you don't feel any discomfort or side effects.
- We recommend taking prolonged and regular brakes while using the VR headset. An example would be removing headset for 10-15 minutes every 30 minutes.
- Use of VR headset can cause motion sickness similar to car, sea or air sickness and may not present until hours after using the VR headset.
- Do not use while driving or riding in a moving vehicle or operating machinery of any kind as this could lead to death, personal injury, or damage to property.
- If you experience motion sickness related symptoms, stop use and do not use VR headset until several hours after symptoms are gone before continuing use of the VR headset.

WARNING: Repetitive Stress Injury

- If you feel symptoms such as tingling, numbness, burning or stiffness in muscles, tendons or joints, stop using VR headset and rest for several hours before using it again.
- If above symptoms or other discomfort continue during or after use, stop using VR headset and see a doctor.

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