

# OpusFSI

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## Flight Simulator Interface for FSX & Prepar3D

### The OpusFSI Live Camera Interface



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## Overview

**Live Camera** is a standard feature within the **OpusFSI** Flight Simulator Interface for the Microsoft's Flight Simulator X and Lockheed Martin Prepar3D simulators. **Live Camera** provides you with a user-friendly interface for creating, controlling and managing any number of virtual cockpit, 2D cockpit, external aircraft, and world views for your flight simulator system.

**Live Camera** enables you to create many useful views that are not included as standard in your sim and also control the transition speed between these different views.

You are not limited to VC cockpit views, you can create superb external aircraft views, even sweeping panoramic views with the use of multiple monitors or even networked PCs. The **Live Camera** interface also includes support for **Windowed Views** which are ideally suited to computer systems equipped with either multiple screens or single large screens.

You may assign a group of views with the same key (or joystick button) then use the key/button to cycle between them using your configured transition speed to slowly and smoothly fly from one view to another. You can create walk around sequences and nice fly around sequences. Import, create or export **Camera Panning Sequences** which can be assigned to a shortcut button/key or camera views.

This can be coupled with **Live Camera Control** and a dedicated 6-axis GamePad controller to wander or float around the cockpit or exterior to your heart's content.

**Dynamic Head Movement (DHM)** of course is a big plus as you can enable it for certain cameras and not others. For instance you can enable it for the Captains and First Officers views but disable it for a close up view of the MCP, Overhead panel, pedestal, or throttle quadrant.

Your standard hat switch will work fine since it alters PBY and does not interfere with XYZ, so DHM will not be affected.

Finally of course, you can assign joystick buttons to each view so you can switch from one view to another very efficiently and a far lot easier than using the default sim view cycling. You can jump from Captains view to Overhead and back again, or directly to the pedestal etc.

In short, the options are endless and infinitely more flexible than the default views which seem quite limited after you get used to using and switching between your own specified cockpit and external views. The sim is infinitely better after you get it configured up with a good selection of cameras and can efficiently switch between them, or just sit off the wing tip for fun.

Camera views are displayed either automatically when an aircraft is loaded by configuring the view as 'default', or they can be displayed in flight with a keyboard key or joystick button which you have pre-configured.

To experience turbulence effects you must either,

- enable **General DHM Options** in the Server's Configure dialog or
- enable **Live Camera** and create and display a camera view.

**General DHM (Dynamic Head Movement) Options** include DHM and aircraft turbulence for VC, 2D and opus custom external view modes. Each view mode has its own configurable DHM settings that can be adjusted by you and are relevant to all aircraft.

**Live Camera DHM** is associated with VC camera views. **Dynamic Aircraft Movement** is associated with 2D scenic views. A camera view may be associated with a single aircraft, group of aircraft, or all aircraft.

Although you will experience some level of turbulence with other weather engines enabled, for optimum effect enable the OpusFSI weather engine. The Opus turbulence is intelligently controlled by the LWE which knows all the meteorological conditions surrounding your aircraft, can even take into account atmospheric effects and gradients and can take into account additional site effects etc.

In addition to the standard non-windowed views **Live Camera** allows you to create multiple **Windowed Views** on your server and client systems. Windowed views are ideally suited to computer systems equipped with either multiple screens or single large screens. Windowed views cannot be associated with joystick buttons or keyboard keys, they are automatically opened when the aircraft is loaded. DHM cannot be specified for windowed view types.

Camera views can greatly enhance your flight simulator experience on both standalone and networked systems by providing easy view control with the press of a joystick button or the use of an assigned keyboard key sequence. The same joystick button or keyboard input can be assigned to multiple camera views. In such cases, repeated use of the assigned button or key will cycle through the assigned camera views. The cycle will apply to the aircraft associated with the camera view, which may be a single aircraft, a group, or all aircraft according to what you have configured. In addition you can use the shortcut control button/key assignments to restrict the cycle views forward and backward between identical view modes, that is, between the same virtual cockpit, 2D cockpit, or External Aircraft camera views for the currently selected aircraft.

On networked systems **Live Camera** provides you with the means to create a multitude of display options including wide sweeping panoramic views of the outside world. Joystick buttons and keyboard sequences can be assigned to individual views or multiple camera views spanning the networked system. Duplicated button or key assignments permit simple and fast coordinated changes to your multi-screened display with a single button press or key stroke.

All camera views are created, controlled and managed from the main 'flying' server system, with live view adjustment for each of your client system camera views. Each camera view may be associated with either a single aircraft, a group, or all aircraft according to what you have configured.

**Live Camera** features a Dynamic Head Movement (DHM) or 'camera shake' option utilizing actual real-life captured 3D accelerometer for the taxiing, takeoff, and landing phases of flight. The DHM is configured within and associated with each camera view. In order to produce the most realistic head movement, all DHMs are based on actual **real-life 3D accelerometer data**, captured on Boeing 737-800 airliners and a Europa XS Tri-Gear light aircraft. Special low pass filters have been developed to remove all traces of engine vibration. We have conducted extensive taxiing trials, multiple takeoffs and landings on hard surfaced runways to prepare the accelerometer data. Data comparisons between heavy and light aircraft have also allowed us to mimic the speed dependencies and subtle changes in the natural frequency within the captured data. The end result is an ultra-realistic flight simulator experience.

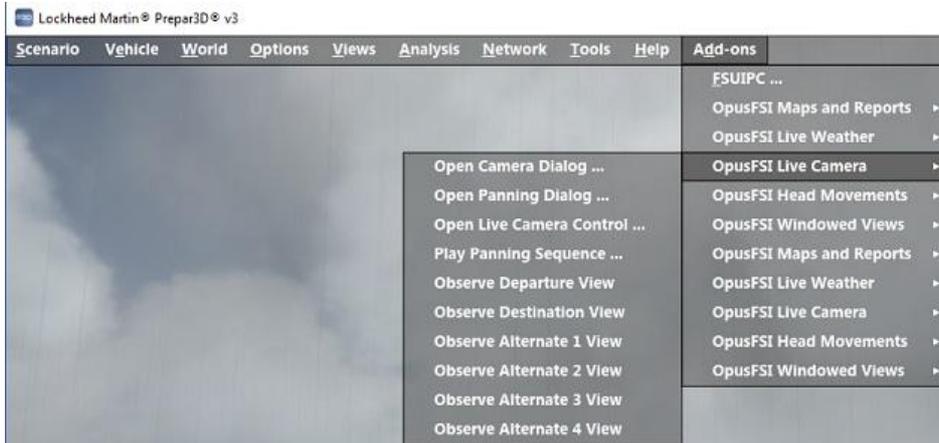
- **Live Camera** provides a user-friendly interface for creating, controlling and managing virtual cockpit, 2D cockpit, external aircraft, and world views.
- **Live Camera** provides a user-friendly interface for creating, controlling and managing multiple windowed views providing greater flexibility and support to cockpit builders and all systems equipped with multi-screened computers.
- **Live Camera** stores separate sizes and positions for all docked and undocked Windowed views, allowing the user to save different preferred window position and sizes.
- **Live Camera** creates, controls and manages all views from the 'flying' server system, with live view adjustment for each of your client system cameras.
- **Live Camera** allows joystick buttons and keyboard key sequences to be assigned to individual or multiple views. Live Camera does not require you to make any changes to the control assignments.
- **Live Camera** enables default views to be specified facilitating the use of multiple screens or the creation of panoramic views over networked systems.
- **Live Camera** provides both coarse and fine zoom control for all camera view types.
- **Live Camera** gives full control over Dynamic Head Movements all based on real-life 3D accelerometer readings.
- **Live Camera** supports Automatic Head Movements to assist the pilot whilst taxiing and banking in a turn (disabled when using TrackIR).
- Camera Import and Export options are included. User Camera Definition Files (CDFs) are available on our Downloads page for import.
- Import, create or export **Camera Panning Sequences** which can be assigned to a shortcut button/key or camera views.

In addition to the above features, the OpusFSI server and client programs provide **Save Win, Restore Win, Open Win, and Close Win** button options to assist you in controlling your windowed views, both docked and undocked.

With the exception to the Save Win button, these options are duplicated within the simulator's **OpusFSI Menu** as **Restore Windowed Views, Open Windowed Views, and Close Windowed Views** options, press ALT if the menu is not displayed.

## Sim Add-on Menu

The add-on menu has entries for **Open Camera Dialog**, **Open Panning Sequence**, **Open Live Camera Control** which is described in the OpusFSI User Guide, and **Play Panning Sequence** which is described in this document. For P3D there are also options for displaying **Observe Views** for the Departure, Destination and Alternate stations.



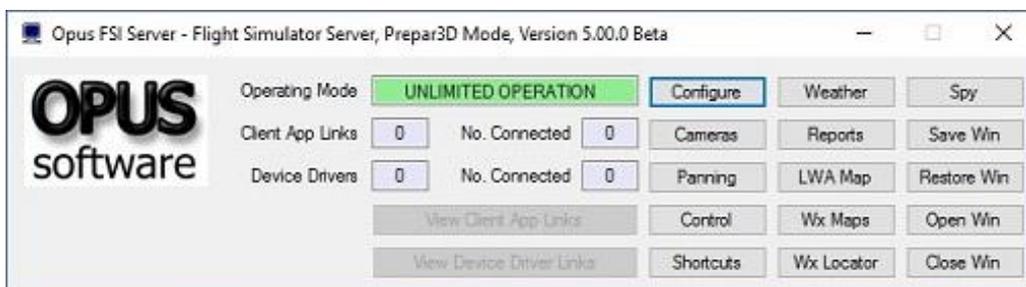
## Managing Camera Views

If you have previously used a 3rd party add-on for camera views then ensure your camera views are restored to the sim default, for EZCA run the configuration utility and select the "Restore" function otherwise EZCA camera definitions are not removed from the aircraft config files and will conflict.

Ensure you have selected and loaded an appropriate aircraft within the FSX or Prepar3D simulator

To see the main form of the server program you must be running FSX or Prepar3D in windowed mode.

Click on the server's **Configure** button to display the Configuration dialog.





**1.** If the **Enable Live Camera** checkbox is unticked then tick it now and restart the server program in order to configure your aircraft camera files.

N.B. If you subsequently untick the **Enable Live Camera** checkbox then the Opus camera definitions will be removed from the aircraft camera files when the server program is shutdown.

If you are using Prepar3D then enable the **Prepar3D PDK Interface (9)** to provide a more efficient Live Camera, Live Camera Control, and DHM eye point control. Refer to the OPUSPDK\_SETUP text file to set up the Prepar3D OpusPDK interface. If you encounter problems (errors in the Spy window) then you can disable the PDK.

**1a.** Tick the **Play Sound on View Change** if required. This defaults to the standard windows 'ding' sound (Ding.wav) but you can provide your own \OpusFSI\_v5\Camera.wav file if you require a different sound.

**2.** The **Enable Live Camera Control** option can be used to enable or disable the **Live Camera Control (LCC)** feature which is used to adjust the eye point within VC, 2D, and custom external camera views. This is independent of **Live Camera** and is described in the OpusFSI User Guide.

3. Tick **Enable TrackIR Device** if required.

4. The **Run TrackIR High Priority** option will affect the priority of the Opus FSITRACKIR program as well as any active Natural Point TrackIR4 or TrackIR5 programs. Enable this option if you have problems with TrackIR smoothness after tuning the TrackIR scan speed option.

5. The TrackIR **Scan Speed** can be altered from 6ms to 60ms. The default is 12ms, try this setting first, and if TrackIR is jerky then adjust this setting (try 25-30) in conjunction with your TIR device Speed and Smoothness settings to reach an optimum effect. If you set the scan rate too high it stutters, if you set it too low it jumps.

### **TrackIR Settings**

Please refer to the [OpusFSI v5 Getting Started guide for Single PCs](#) guide for TrackIR setup instructions.

Please minimize the TrackIR program when not in use to improve sim performance.

6. & 7. The XYZ raw data scaling (0.5 to 2.0, default 1), and PBY raw data scaling (0.5 to 2.0, default 0.75) can be adjusted on the fly from within the Configuration dialog.

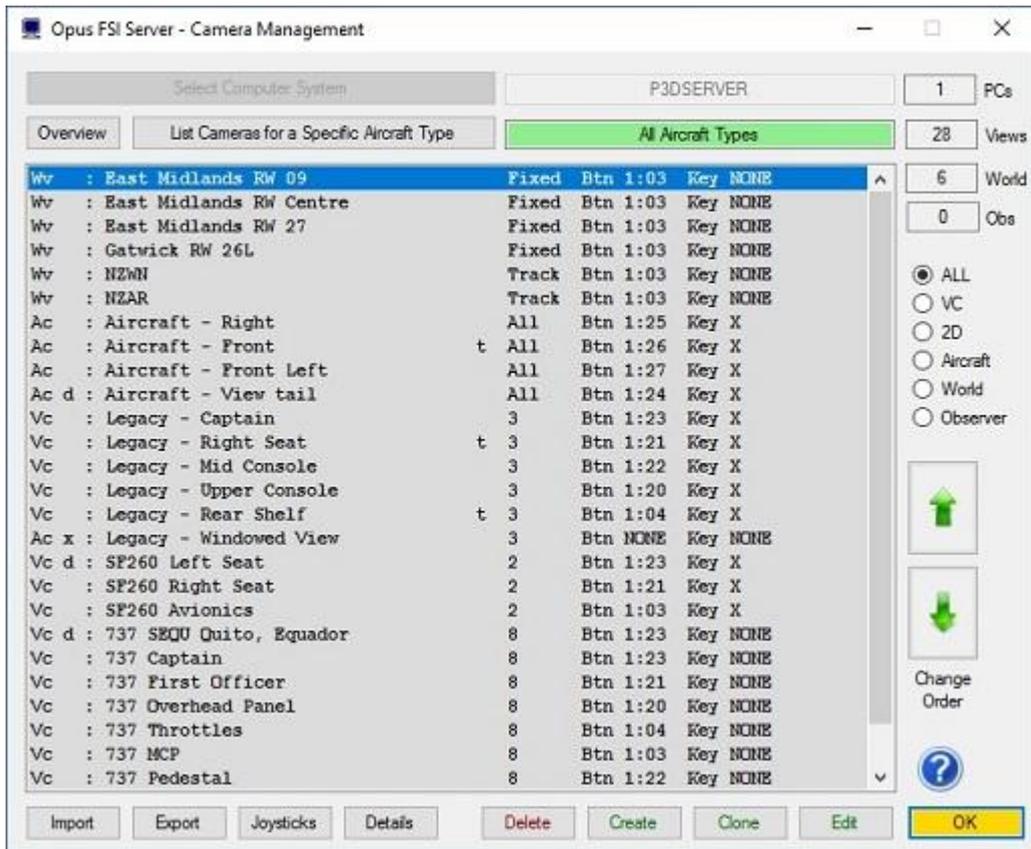
The PBY setting should be adjusted in conjunction with the TIR device speed setting to determine the range of head movement and how far you can see behind you.

General DHM options 8, are an alternative to Live Camera, and apply to all aircraft. If Live Camera is enabled these general DHM options are automatically disabled.

A simple dialog is used to manage the camera views. A separate dialog provides 'live' adjustment of all server and client views through the dialog's camera control buttons.

The Camera Management dialog is displayed by clicking on the **Cameras** button on the FSI SERVER's main form.





Opus FSI Server's Camera Management Dialog

The Camera dialog will automatically hide the FSI SERVER program's main form before being displayed in its last known screen position. The dialog can also be minimised down to the taskbar to assist those with limited screen space.

## Camera Management

The Camera Management dialog is used to perform all general camera management functions, that is,

To display the current Camera List.

To change the order of the cameras within the Camera List using the green arrows.

To **Create** or add new cameras to the Camera List.

To copy or **Clone** a camera within the Camera List.

To modify or **Edit** a camera within the Camera List.

To remove or **Delete** one or more cameras from the Camera List.

To **Import** one or more cameras stored in a Camera Definition File.

To **Export** one or more cameras into a named Camera Definition File.

Reassign **Joystick** numbers.

On networked OpusFSI systems, cameras for the server system or any individual client system can be displayed by first selecting the required system using the **Select Computer System** button option at the top of the Camera Management dialog. On standalone OpusFSI systems this option is

greyed out and disabled. The box to the right displays how many systems have been detected. The box below that displays how many views are configured, and the box below that displays the number of world views configured.

The radio buttons filter the listed view types, you can choose to list **All**, **VC**, **2D**, **Aircraft** (external aircraft), **World** or **Observer** cameras.

### Observer cameras for P3D

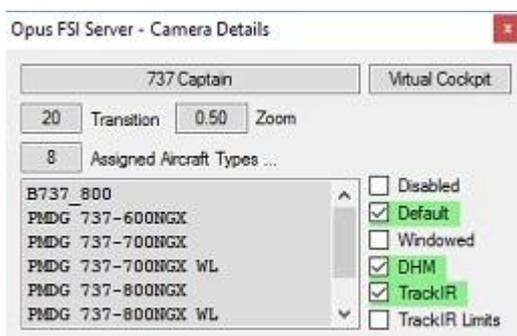
All Observer camera views are defined and created on start up of the FSISERVER program allowing them to be selected and viewed from within the P3D simulator (via the simulator's View menu). The 'Views -> Observer Management' option can also be used to delete any obsolete Observer views or views that have been renamed (note - at present there is no mechanism through SimConnect or the PDK to delete obsolete Observer views). The Live Camera Add-ons menu includes 'Observe Departure View', 'Observe Destination View', and 'Observe Alternate View' (for Alternates 1 through to 4) automated camera options. These options can be used to create and display an Observer view for the selected Departure, Destination, or Alternate location (determined from the Weather dialog settings). The resulting Observer is created at the aerodrome's latitude and longitude, placed 200 feet above the ground and configured to automatically track the user's aircraft.

Single clicking on any listed camera will now display that view on the screen irrespective of the currently selected aircraft and assigned aircraft types. Double clicking on any listed camera will Edit the camera.

Within the **Camera List** **d** denotes a default view, **w** denotes a windowed view, **t** denotes TrackIR limits have been set for the view, **x** denotes the view has been disabled. A **(C)** suffix indicates that it is a 'cloned' view. An **(R)** suffix indicates the camera has been re-assigned.

The next column denotes whether a World Views (World) camera is **Fixed** or **Tracks** the aircraft, for other camera types it indicates how many aircraft types have been assigned, shown as either **All** or a number.

The **Details** button is used to display a Camera Details form which indicates all the most important configuration details for the highlighted camera. These details include all main configuration options, the Transition and Zoom settings, and the assigned aircraft types.

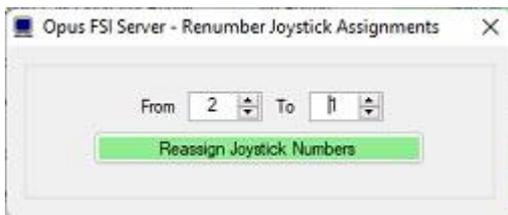


The displayed Camera List for the chosen system can be restricted to all cameras assigned to a specified aircraft type using the **List Cameras for a Specific Aircraft Type** button option. When the Camera List is restricted the Import options are greyed out and disabled.

*If you only have "All aircraft types" to choose from in the camera list then set the "C:\OpusFSI\_v5\FSISERVER.EXE" file properties (compatibility tab) to "Run as Administrator".*

### The Camera's Joysticks Option – Reassign Joystick Numbers for Cameras

First select (highlight) the group of camera views you wish to reassign within the management dialog, then click on the '**Joysticks**' button. In the '**Renumber Joystick Assignments**' dialog numeric boxes are primed and displayed allowing you to specify the 'From' and 'To' joystick numbers. The 'From' number is always primed with the first selected item's joystick number.



This option will change the assigned joystick numbering without changing the current device/joystick mapping.

### Changing the Order of Cameras

To change the order of a camera within the Camera List, first click on the camera you wish to move, this will highlight the single camera within the Camera List, then use the **Up Arrow** or **Down Arrow** keys to move the highlighted camera up and down the list.

### Creating a New Camera

To create a 'new' (blank) camera view simply click on the **Create** button option along the bottom of the Camera Management dialog. Select the appropriate radio button on the dialog for either Virtual Cockpit, 2D Cockpit, External Aircraft, World View or Observer View (P3D only) and click OK.



The **Create** option first creates a new or blank camera then opens the Camera Editing dialog ready for you to edit the newly created camera view.

Newly created camera views are automatically named 'Camera View X', where 'X' is the next camera number in the Camera List. You should change the camera name to something more meaningful (e.g. 'C172 - Captain') in the Camera Editing dialog. It is best to adopt a standard naming convention such as 'Global <description>' for global views, and '<aircraft> <description>' for aircraft specific views (e.g. '737 Left Side View').

### *Cloning an Existing Camera*

To copy or 'clone' an existing camera view, first click on the camera you wish to clone, this will highlight the camera within the Camera List, then click on the **Clone** button option along the bottom of the Camera Management dialog. The **Clone** option first takes an exact copy of the camera you have selected then opens the Camera Editing dialog ready for you to edit the newly cloned camera view.

Cloned camera views will adopt the name of the original camera with an added '(C)' suffix to indicate that it is a 'cloned' view. You should change the camera name to something more meaningful (e.g. 'C172 - Captain') in the Camera Editing dialog.

### *Editing an Existing Camera*

To alter or 'edit' an existing camera view, first click on the camera you wish to edit, this will highlight the camera within the Camera List, then click on the **Edit** button option along the bottom of the Camera Management dialog. The **Edit** option opens the Camera Editing dialog ready for you to edit the selected camera.

### *Deleting a Single Camera*

To remove or 'delete' a single camera view, first click on the camera you wish to delete, this will highlight the camera within the Camera List, then click on the **Delete** button option along the bottom of the Camera Management dialog. The **Delete** option will prompt you to confirm the operation, click 'Yes' to confirm and delete the selected camera, press 'No' to abort the operation.

When you delete a camera view these changes will not be noticeable until you either restart the sim, or reload a completely different aircraft type forcing FSX to reload the modified cfg file.

All the camera views for your main flying server system, or standalone single PC system, are stored in the OpusFSI\_v5\FSXSERVER.CAM file for FSX, or FSESERVER for FSX-SE systems, or P3DSERVER.CAM for P3D. You can delete all camera views and start afresh simply by renaming or deleting this file prior to running the FSI SERVER program.

Client views are stored in <clientname>.CAM. Previous version \_SE and \_P3D client CAM files are renamed automatically on first use by both the FSI SERVER and FSI CLIENT programs.

You will have a backup if you mistakenly delete a view and wish to restore it, see the Camera Views Backup section below.

## Deleting a Group of Cameras

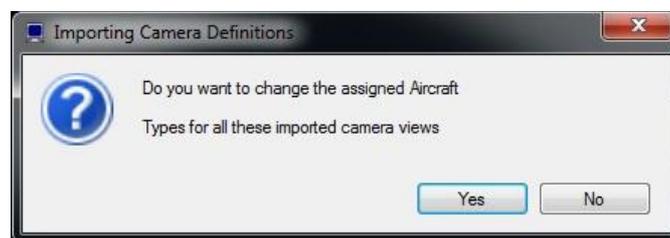
To remove or 'delete' a group of camera views, first select the group of cameras you wish to delete, this will highlight them within the Camera List, then click on the **Delete** button option along the bottom of the Camera Management dialog. The **Delete** option will prompt you to confirm the operation, click 'Yes' to confirm and delete the selected cameras, press 'No' to abort the operation.

## Importing Cameras

The Import option is greyed out and disabled when the current Camera List has been restricted to a specific aircraft type. Any cameras which match existing camera names are not imported.

You can 'import' one or more cameras stored in a Camera Definition File (CDF) by clicking on the **Import** button option along the bottom of the Camera Management dialog. This option will first display the **Open File** dialog ready for you to select the required CDF, Camera Definition File. You can click on the 'X' in the top right-hand corner of the Open File dialog to abort the operation. Otherwise, navigate to the required folder and select the required named CDF file, then click on the **Open** button option.

You will then be asked if you want to change the assigned aircraft types for all the cameras within the CDF to be imported. This is so that you can import cameras for use on a range of a similar aircraft type(s). For example you could import the Lancair Legacy cameras for use on the Maul etc.



Click 'No' to accept the previously assigned aircraft types. Click 'Yes' if you want to re-assign or change the assigned aircraft types. If you select Yes then a list of aircraft types is displayed for your selection. Click with the mouse to select an aircraft from the list, use <CTRL><left\_mouse\_click> to select multiple items from the list, use the standard windows method to select a consecutive group (click on the first item then <SHIFT>< left\_mouse\_click> on the last item). Each entry you select will turn the selected line blue. If you opt to re-assign the aircraft types then an '(R)' suffix will be appended to each camera name to indicate the cameras have been re-assigned.

If you make a mistake and wish to remove the imported cameras simply select them in the Camera List and click on the **Delete** option.

Two Opus CDFs are supplied in the OpusFSI\_v5 folder (*Opus\_PMDG\_737NGX.CDF* and *Opus\_RealAir\_Legacy.CDF*) containing camera definitions for the PMDG 737NGX and RealAir Lancair Legacy aircraft respectively. A selection of CDFs are also available on our [Downloads](#) page for import but CDFs cannot be imported if they were saved on newer versions of OpusFSI.

After importing edit the camera view to change the key/button assignments for the views if required.

All your camera definitions for your main server system are stored in the FSXSERVER.CAM file for FSX, FSESERVER.CAM file for FSX Steam Edition, or P3DSERVER.CAM for P3D. Importing from a Camera Definition File (CDF) will automatically save your current camera views and backup your current CAM file into the <system>\_UNDO.CAM file. For example, when importing into your main system's camera views on an FSX system your current definitions will be saved in FSXSERVER\_UNDO.CAM. To undo the camera import just delete your FSXSERVER.CAM file and rename FSXSERVER\_UNDO.CAM to FSXSERVER.CAM. You may notice CAM files with additional date stamps, these are copies of your CAM file automatically saved by the software to provide roll back options.

### *Exporting Cameras*

You can 'export' one or more cameras and store them in a Camera Definition File (CDF) by first selecting the group of cameras you wish to export, this will highlight them within the Camera List. Use the mouse to click on the first view and shift click (or ctrl click) to select a group of views. Then click on the **Export** button option along the bottom of the Camera Management dialog.

This option will first display the **Save File** dialog ready for you to select the required CDF, Camera Definition File, or type in the required file name for the new CDF file to be created. You can click on the 'X' in the top right-hand corner of the Save File dialog to abort the operation. Otherwise, navigate to the required folder and select the required named CDF file or type in your file name, then click on the **Save** button option.

If the file already exists you will be asked if you want to replace it and overwrite the file storing the current selected cameras. Click 'No' to abort. Click 'Yes' if you want overwrite the file.

### *Selecting Cameras within the List*

The standard Windows 'Left Click', 'Ctrl + Left Click' and 'Shift + Left Click' actions can be used to select cameras from within the Camera List. All selected cameras are highlighted with a blue background within the Camera List.

#### **Left Click**

Move the mouse over the required camera and left click on the mouse to select a single camera within the Camera List.

#### **Ctrl + Left Click**

Move the mouse over the required camera then hold down the Ctrl key and left click on the mouse to select an additional camera.

#### **Shift + Left Click**

Move the mouse over a camera then hold down the Shift key and left click on the mouse to select all the cameras inclusively, between the previous selected camera and the current camera.

## *Where are my Cameras Stored*

All cameras are stored in an appropriately named CAM file within your x:\OpusFSI\_v5 folder, where 'x' identifies your installation drive letter.

The **FSXSERVER.CAM** file stores all cameras created on your main server system for use with the Microsoft FSX Flight Simulator.

The **FSESERVER.CAM** file stores all cameras created on your main server system for use with the FSX Steam Edition Flight Simulator.

The **P3DSERVER.CAM** file stores all cameras created on your main server system for use with the Lockheed Martin Prepar3D Flight Simulator.

Files with names in the form of **<ComputerName>.CAM** store all cameras created on the named client system. The client computer name will have a suffix of '\_P3D' appended if the user has selected the Lockheed Martin Prepar3D Flight Simulator type. For example **<ComputerName>\_P3D.CAM**. The actual client systems can use either simulator type, this does not have to match the server but usually does.

Any time the cameras are stored to disk a backup file is created with the same filename as above with the date stamp **\_DDMMYY** appended. Where 'DD' is the current day, 'MM' the current month, and 'YY' the current year. Hence, previously backed up CAM files can easily be copied and renamed to restore the cameras from a previous date.

N.B. You can reuse your FSX (or FSX Steam Edition) Opus configured cameras in P3D by copying FSXSERVER.CAM (or FSESERVER.CAM for SE) to P3DSERVER.CAM and vice versa.

## *Camera Editing*

This section describes camera editing for VC, 2D and external aircraft cameras, for World Views please refer to the appropriate section of this document.

The basic steps involved in creating a camera are,

- Add or Clone a Camera
- Assign Aircraft Types to the Camera
- Make adjustments
- Save Cameras

The Camera Editing dialog is used to perform all general editing of a camera view, that is,

To change the camera name.

To change the assigned aircraft types.

To change the camera view mode and options.

To change the assigned joystick button or key sequence.

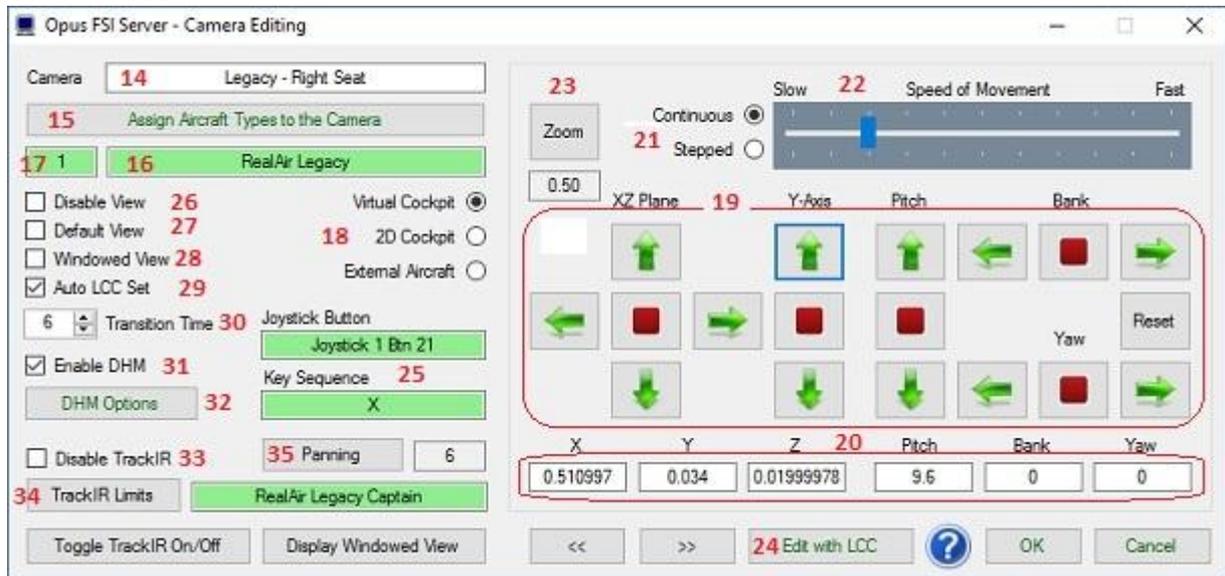
To change the TrackIR option and head movement limits.

To adjust the zoom level for the camera view.

To adjust the eye point for the camera view.

A camera is selected for editing in the Camera Management dialog using one of the Edit, Clone, or Create options, or alternatively by double-clicking on a camera using the left mouse button (which is the same as highlighting and using the Edit option).

Normally a camera is created or edited with the view on the simulator's main display window (or on the client system's main display window when editing a client camera). However, camera management and editing of the server system's cameras can also be done without running the actual simulator.



#### 14. Changing the camera name

The camera name is displayed and can be edited in the text box in the top left hand corner of the Camera Editing dialog. Camera names should be chosen to indicate both the assigned aircraft type and view. For example, 'B737 - First Officer'.

#### 15. Assign Aircraft Types

Camera views can be associated with all aircraft, a group of aircraft or a single aircraft. The camera can be assigned or associated with specific aircraft types using the **Assign Aircraft Types to the Camera** option. The first assigned aircraft type name is displayed (16) below the option along with the total number of aircraft types that have been assigned (17).

You will be prompted as to whether you wish to reassign multiple camera views. If you select Yes then a list is displayed for you to select multiple views from. Next a list of aircraft types is displayed for you to assign the view (or multiple views) to.

Select the 'All Aircraft Types' entry to make the view global, alternatively highlight all the associated aircraft types. Use <CTRL>< left\_mouse\_click> to select multiple items from the list, use the standard windows method to select a consecutive group (click on the first item then <SHIFT><left\_mouse\_click> on the last item). Click **OK**.

N.B If you are editing a view on a client and the client FSX is using a dummy or simple aircraft (recommended for performance reasons when you are viewing scenery only and not external views of the aircraft) then ensure your assigned aircraft types are set to **All Aircraft**.

#### 18. Select the Camera View Mode

It can be either,

- **Virtual cockpit**
- **2D Cockpit** (scenic)
- **External Aircraft**

There are no facilities within the sim that gives us the 6DOF control over other view types. It is pointless creating virtual cockpit views on a client system since you can only monitor and control the flight from the main server PC. DHMs will be most effective when used in conjunction with Virtual cockpit views.

Dynamic Aircraft Movements (DAM) has been implemented for the server's 2D 'scenic' views where the aircraft is shaken instead of the pilot's head. Please refer to the *2D Panels* section.

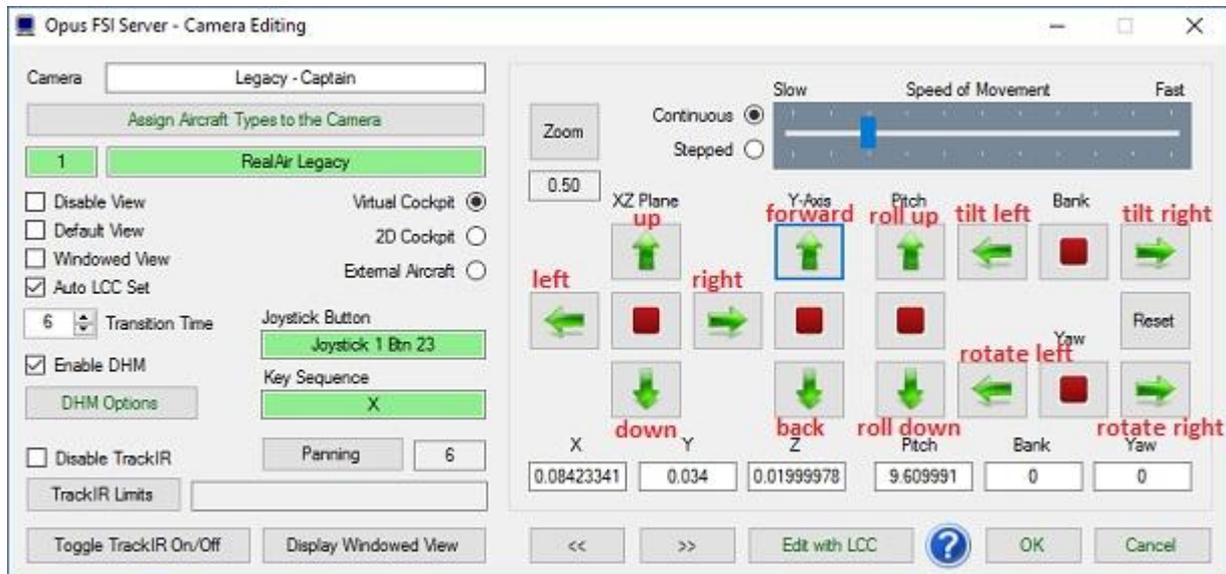
### Adjust the eye point using the Camera Editing dialog or the LCC

#### *Adjusting the eye point using the Camera Editing dialog*

You can adjust the eye point for the camera view using either the **X, Y, Z, Pitch, Bank, and Yaw** arrow keys (19) or by setting the numeric values directly in the XYZ PBY text boxes (20). To enter a value into a XYZPBY text box, first click on the box, its content will turn red indicating it is accepting a new entry, enter the new value, then either press the <return> key or click for a second time in the box. All distances are in meters and all angles in degrees.

All these commands are with reference to the aircrafts axes which normally runs through the centre of the aircraft. The X axis moves the eye point left and right, the Y axis up and down, the Z axis forward and back, and the Pitch, Bank, and Yaw movements are as expected.

The example dialog below shows arrow movements as seen from the pilot's seat.



The arrows operate in either continuous or stepped mode (21). In continuous mode clicking on any of the red buttons will stop the motion. They are spread over the dialog to allow mouse selection without too much hand movement, or hand-eye coordination. Also clicking more than once on a green arrow button will speed up the movement in the chosen direction, or slow down any motion in the opposite direction. You can also alter the speed slider (22) to modify the speed of the green arrow controls for altering the XYZ and PBY co-ordinates.

### **Troubleshooting if no movement with green arrows**

*In camera edit mode the only way the green arrows won't move the eye point are...*

*1. It is not connected to the sim via SimConnect. Open the Spy window and make sure correct sim mode is displayed and connected to SimConnect.*

*2. You have the Speed slider set to zero or far too low.*

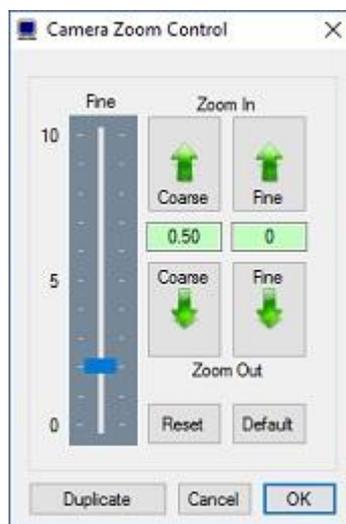
*3. You have changed the view mode manually so that a non controllable view mode is on display.*

*Note, eye point can only be changed in VC, 2D, and OpusFSI External Aircraft View modes.*

*Make sure Opus is able to select the correct view mode and you are not trying to control the view using some other non coordinated program. E.g. TrackIR not linked to Opus, or some other camera or view control package.*

Use the **Reset** button (19) if you want to return the camera to its original (last saved) position.

If required use the **Zoom** button (23) to adjust the camera view's zoom settings.



### **Zoom Recommendation for Prepar3Dv3**

The assumed default zoom levels are 0.7 for VC views, 1.0 for 2D cockpit views, and 0.8 for External Aircraft views, however Prepar3Dv3 uses different default zoom levels for certain 'inbuilt' VC views. If your VC camera uses the assumed default then the zoom level will not be changed when switching cameras in the same mode. Therefore for Prepar3Dv3 we recommend using a 0.5 (non standard) zoom setting for ALL VC views, since this is non-standard Opus will always set the zoom when first displaying the default VC view and work from there.

The Camera Zoom Control dialog provides both coarse and fine zoom control over the selected view.

Zoom control is a two stage process within the simulator, the Coarse control sets the actual base zoom level which can range from 0.3 (fully zoomed out) to 512 (fully zoomed in), the fine zoom control makes fine adjustments to this zoom level by either 'fine zooming' in a number of steps (positive) or 'fine zooming' out a number of steps (negative).

To make efficient use of the zoom control, first set the required base zoom level using the Coarse zoom controls, the current zoom level is displayed in the green text box and temporarily on the displayed view. After you have set the Coarse zoom level finely adjust the zoom either in or out, the current fine zoom step count (positive for fine zooming in, negative for fine zooming out) is displayed in the green text box. The fine zoom rate (number of steps per click) can be adjusted from 0 to 10 with the slider control.

Each time you adjust the Coarse zoom level the fine zoom adjustment will be reset to zero. Use the **Reset** button to reset the zoom adjustment to its original settings.

Use the **Default** button to reset the zoom to its displayed default setting. The software assumes a standard FSX set up which uses a Coarse zoom of 0.7 for virtual cockpit view modes, 1.0 for 2D cockpit view modes, and 0.8 for all external views.

Once you have completed the zoom adjustment click on the **OK** button to accept the settings or **Cancel** to abort the changes. The current zoom settings are displayed within the Camera Control dialog in a text box below the Zoom button (23). The displayed zoom setting shows the actual Coarse zoom level with either a '+' or '-' symbol indicating any fine zoom adjustment.

### Duplicate Zoom option

This option can be used to duplicate the current coarse and fine zoom settings across to all selected cameras. Only selected cameras of the same type (e.g. Virtual Cockpit, 2D Cockpit, or External Aircraft) will be affected by the duplicate action.

Once you select the **Duplicate** button a list of camera views are displayed for you to select from. You can use the usual methods to select items in the list. To select non consecutive items use left mouse click plus the ctrl key to select. To select consecutive items use left mouse click plus the shift key, (or drag left mouse button over the items) to select a consecutive block. Click **OK** to save, then click **OK** in the Camera Zoom Control dialog.

### 24. Adjusting the eye point using the LCC

As an alternative to the Camera Editing dialog features you can use **Live Camera Control** to adjust the eye point position. All changes and movements within the LCC are with reference to the 'current' eye point, hence they are labelled Left/Right, Fwd/Bwd, Up/Down, Pitch, Bank, and Yaw.



## 25. Joystick Button and Key Sequence

Windowed views cannot be associated with a joystick button or keyboard key. Default views don't need to be associated with buttons or keys if you don't have any other views.

If you wish to associate the camera view with a joystick button or keyboard key then click within the button or key command text boxes to specify the required assignment. When you click within the text box, the box will empty and turn red indicating it is waiting for your entry. You can now either click a second time to clear the entry, or press your desired joystick button or keyboard assignment, (focus must be on the simulator's window at this point).

OpusFSI will accept buttons 1 through to 32 of Joysticks 1 through to 16. All button and registered key events are displayed within the Spy window when the button or key is pressed.

If they are not displayed then the joystick or button is invalid, either not registered within FSX, already assigned elsewhere (i.e. FSX, 3rd party add-on etc), just an illegal entry or the focus wasn't on the simulator's window when the joystick or button was pressed.

Joystick buttons and keyboard key sequences can be assigned to views on the server and multiple client systems, thereby allowing simple and fast coordinated changes to the multi-screen displays.

Refer to the *Assigning Joystick Buttons and Keyboard Keystrokes* section of this document for further details.

## 26. Disable View

The **Disable View** option can be used to disable or enable a camera view for selection and display. Changing this field for Windowed View types will force the Camera Definitions within all aircraft.cfg files to be updated.

## 27. Default View

Tick the **Default View** checkbox if you wish to create (or assign) a default view that will be displayed on startup. You should only have one default view per aircraft but if you have inadvertently created multiple default views then OpusFSI will just pick the first one in the list. Windowed views cannot be assigned as default views since a default view is always displayed within the simulator's main window.

## 28. Windowed View

Tick the **Windowed View** checkbox if you want a windowed instead of full screen display. Windowed views are ideally suited to computer systems equipped with either multiple screens or single large screens.

Windowed views cannot be associated with joystick buttons or keyboard keys, they are automatically opened when the aircraft is loaded. DHM cannot be specified for windowed views. Windowed views cannot be assigned as default views.

Windowed views are displayed as new views within the simulator, these views can be left docked or undocked manually before being positioned and sized, either manually or automatically using the server program's **Restore Win** button.

All camera view types (including windowed) are edited using the simulator's main window since this is the only window that allows control over the camera's eye position. Windowed views can either be global or associated with specific aircraft groups. Up to nine windowed views can be

associated with each aircraft type on each of the server and client computer systems, this gives a maximum of ten views displayable at any one time on each system; typically far more than the simulator can cope with.

With the exception to zoom adjustment, after making changes to any windowed views you must force the simulator on the modified system to reload its aircraft.cfg file. This can be achieved by first loading a different aircraft type (not the same aircraft with a different livery) then reloading your original aircraft. The simulator loads its aircraft configuration file only on start up or after selecting a different type of aircraft.

The **Display Window View** button (**10a**) enables you to display an existing windowed view in order to align the view you are currently creating. A list of windowed views will be displayed, select one from the list with your mouse.

Refer to the *Windowed Views* section below for further details.

### **29. Auto LCC Set**

The **Auto LCC Set** camera edit option applies to all eye-point adjustable Live Camera views including Observer views (for P3D). When the option is set Live Camera will automatically save all LCC Offsets each time you change camera views. It will be as if you have manually pressed the **LCC Set** option (or used the assigned **Set Camera** LCC Shortcut command) before selecting the new camera view onto the display. The option is automatically set to true when older version 4 CAM files are loaded and converted by the OpusFSI Version 5 software. All LCC offsets are reset on start up and after any camera editing.

### **30. Transition Time**

The **Transition Time** value allows smooth transitions between virtual cockpit (VC to VC) and 2D scenic views (2D to 2D). A value of 0 is used for instant camera transitions, otherwise the speed can be set between 1 (fastest) to 255 (slowest). All Transition Speed settings greater than 100 are scaled to provide a wide range of camera transition times. A 'slowest speed' limit is imposed on the actual transition speeds to provide more consistency in the transitions. Different aircraft can have different VC panning rates.

#### *Stuttering camera transitions*

If you have set large transition times (for a slower transition) then your sim will have to process many more eye point adjustments. If your sim does not have enough time to handle these it will ignore many of them and you could end up with less than smooth motion. If so then you must set much lower transition times. Also check TrackIR and other eye point adjusting software, none of which will be compatible unless it is interfaced to OpusFSI. Switching Vertical Sync (Nvidia Inspector) to 1/2 refresh may fix the problem, if V.Sync is off or on it can cause stutter.

### **31. DHM**

Use the **DHM** checkbox to enable or disable DHM effects, disabling DHM will not change any configured settings within the DHM dialog.

If required use the **DHM** button (**32**) to specify any associated Dynamic Head Movement. Refer to the *Adjusting the Camera DHM* section of this document.

### 33. Disable TrackIR

Tick **Disable TrackIR** if you have enabled TrackIR (in the Config menu) but just want it disabled for this particular camera view.

The **Toggle TrackIR On/Off** button (12) will disable/enable TrackIR just whilst editing the camera view.

### 34. TIR Limits

If required use the **TIR Limits** button to create and specify any associated TrackIR head movement limits. Refer to the *TrackIR Head Movement Limits* section of this document.

### 35. Panning

If required you can assign panning sequences to the camera view. Click on the Panning button and confirm whether you wish to change the assigned panning sequences for multiple camera views. Select No if you just want the panning sequence assigned to this camera view only. Select the required panning sequences from the displayed list and click OK. The number of selected panning sequences is displayed to the right of the Panning button on the dialog. In flight when you select the **Play Panning Sequence** key/button (configured in the shortcuts dialog) the sequence will be played. If multiple Panning Sequences have been assigned to the camera then the on-screen Menu box will be displayed in flight allowing you to select the required named Panning Sequence to be played.

Finally, when you have finished editing a camera you should click on the **OK** button to end the edit session. You can cancel or abort the edit operation at any stage using either the **Cancel** option or by clicking on the 'X' in the top right of the dialog.

After your changes have been saved the software will automatically update the system and as a result you may notice the default camera view, if any, will be displayed. If you have selected one of your client systems then the new camera configuration file will be transferred onto your client system prior to reconfiguring all of the client system's aircraft.cfg files.

## Aircraft Walk Around

As an alternative to using LCC with a dedicated 6-axis game pad controller, or our [Panning Sequences](#), to perform an aircraft walk around or a fly around in flight you can create a set of camera views to pan around the aircraft.

1. Create a series of external aircraft views, each view taking you around the aircraft on a walk or fly around.
2. You can use the up/down arrow keys in the **Select Camera View** list to reorder the views and keep them together as a group in your camera list. Name them all appropriately as an aid memoir, such as NGX Aircraft View 1 etc.
3. Assign a joystick button to the first view, and the exact same key sequence (e.g. shift X) to each of the aircraft views, including the first. The joystick button will then select the first view in the sequence. After which the assigned key can be used to cycle through each view in turn.

4. Assign a high (very slow) **Transition Speed** parameter to all the aircraft views in this sequence.
5. **Save Cameras.**

Now you can press the button to commence the walk around and press the shared key (e.g. Shift X) to cycle the views, resulting in a slow walk around the aircraft.

If you order the aircraft views carefully then you could simply assign the same button or key to all of the views, the first view in the list will be selected first. Remember you can reuse the same button or key sequence over and over again since all view cycling is aircraft specific. So shift X for example could be used for all walk around sequences on all aircraft.

## Camera Views Backup

You have a backup of your current CAM file in the OpusFSI\_v5\FSXSERVER\_UNDO.CAM file for FSX, or OpusFSI\_v5\FSESERVER\_UNDO.CAM for FSX-SE, or P3DSERVER\_UNDO.CAM for P3D. So if you delete something by mistake then for FSX just delete your FSXSERVER.CAM file and rename FSXSERVER\_UNDO.CAM to FSXSERVER.CAM (or FSESERVER\_UNDO.CAM to FSESERVER.CAM for FSX-SE, or P3DSERVER\_UNDO.CAM to P3DSERVER.CAM for P3D).

The camera definitions are also backed up into a date stamped file (e.g.FSXSERVER\_04062014.CAM) each time the camera views are saved via the Camera Editing dialog's **OK** button.

## Adjusting the Camera Dynamic Head Movement (DHM)

Disable the turbulence effects within 3rd party packages since they may conflict with OpusFSI. The turbulence strength and frequency is determined by the LWE based on considering many factors and the meteorological conditions surrounding your aircraft. These parameters effect both the captured high and low frequency accelerometer data. At low levels wind speed and gusts become a factor, one considering the likelihood of rotor type turbulence, the other extending slightly to higher elevations. But many factors are considered, temperature gradients, cloud bases and depths, proximity of CBs and TCUs, etc. Clear Air Turbulence comes into effect above FL200 when the GRIB option is enabled, note that FSX does not show wing flex for Clear Air Turbulence.

To see wing flex you must set advanced animations which is set via the FSX menu option - Options, Settings, Display. Select the Graphics tab. To see changes to the VSI etc enable the options for turbulence and thermal effects on the aircraft in FSX (which is set via the FSX menu option - Options, Settings, Display. Select the Weather tab.

### **Live Camera Dynamic Aircraft Movements (DAM) for 2D Views**

Dynamic Aircraft Movements (DAM) has been implemented for the server's 2D 'scenic' views only. To configure the effect, enable DHM on your 2D view and edit the DHM taxiing and landing parameters to your own preferences. The head acceleration effects do not use the accelerometer data and may not be noticeable in the 2D views. The current version is scaled with a 2D view

offset by 1 metre in the y-axis. If necessary we will adjust the effect to suit the view's configured y-axis offset.

### Live Camera Dynamic Head Movement (DHM) for Virtual Cockpit Views

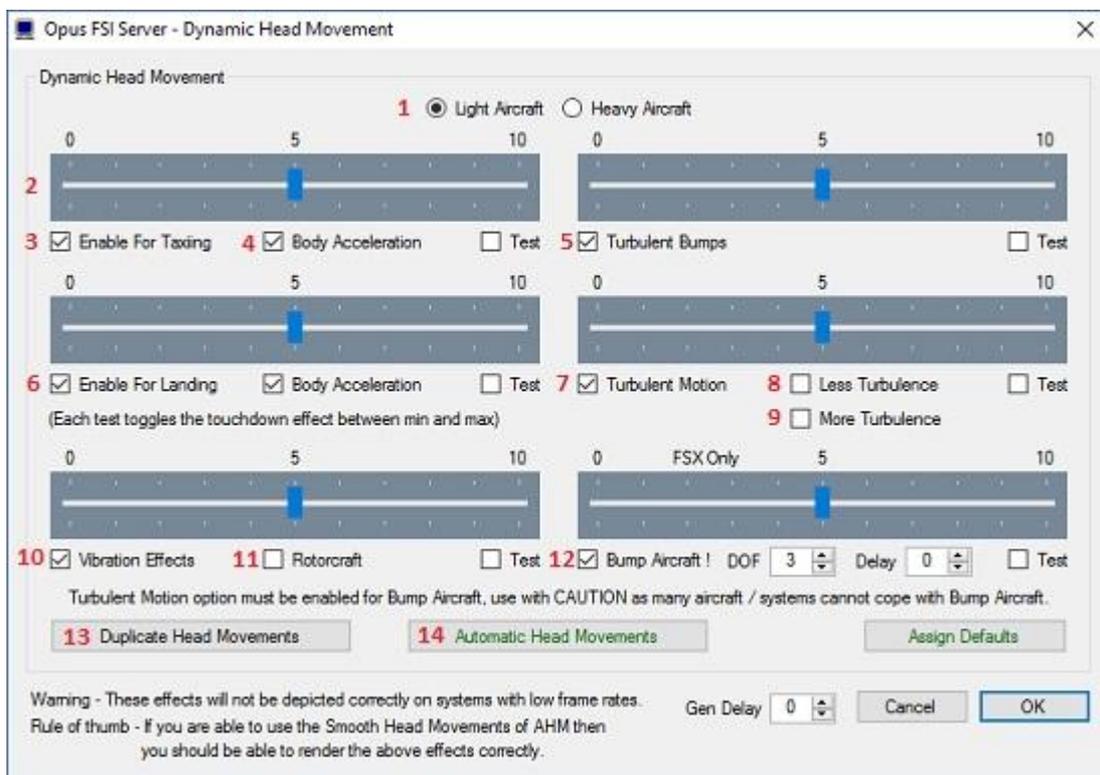
Even though we allow DHM to be specified for all 'non-windowed' view types (Virtual, 2D, or Aircraft), the DHMs will be most effective when used in conjunction with Virtual cockpit views.

To enable Dynamic Head Movement for a specific camera view, first tick the **Enable DHM** checkbox within the Camera Editing dialog, then specify the required DHM options within the **Dynamic Head Movement** dialog. This dialog is displayed using the **DHM Options** button.

This dialog provides options and fine adjustment for both the camera view's **Dynamic Head Movement** or virtual cockpit camera shake, and the **Automatic Head Movement** which can be used to automatically look into the turn when the activation bank angle is reached.

N.B. **Automatic Head Movement** is automatically disabled when you are using TrackIR.

You can use the DHM checkbox to enable or disable DHMs for a camera view without affecting the current DHM parameters. You can also use the OpusFSI **Enable DHM** and **Disable DHM** add-on menu options or OpusFSI Shortcut Controls to temporarily enable and disable all dynamic head movements.



Dynamic Head Movement Dialog

#### 1. Light or Heavy Aircraft

Select the appropriate aircraft type using the Light Aircraft or Heavy Aircraft radio buttons. For all piston aircraft choose Light Aircraft. The aircraft type will affect both the natural frequency and the relationship between ground speed and scaling of the accelerometer data. The aircraft type also has an effect on the head movements related to the current body acceleration data.

If you want a Rotorcraft effect with increased vibration effects then select either Light or Heavy and also tick the Rotorcraft checkbox (11).

#### Strength Sliders

DHM is determined by the current met conditions. You can alter the strength or severity of the DHM using the sliders (2). A setting of zero effectively disables the DHM (scaling of zero), a setting of 10 results in maximum scaling.

#### Enable DHM for Taxiing/ Landing Checkboxes

Tick the appropriate Enable checkboxes to enable DHMs for the specified phase of flight, Taxiing (3) and/or Landing (6). If you enable DHM for Taxiing (3) then you will enable for all ground movements including the takeoff phase. Ground vibration effects depict vibrations when power is applied against the brakes and during the initial roll out.

#### Body Acceleration

Tick the Body Acceleration checkbox (4) to enable additional DHM effects resulting from the current body acceleration data. For example, slight head movements forward and aft to reflect the current acceleration and deceleration in the Z-axis.

#### Turbulent Bumps

Tick the Turbulent Bumps checkbox (5) to enable occasional extra bumps as appropriate to METAR conditions e.g. in cloud.

#### Turbulent Motion

Tick the Turbulent Motion checkbox (7) to enable constant turbulence as appropriate to METAR conditions. You can decrease (8) or increase (9) the effect.

#### Vibration Effects

Tick the Vibration Effects checkbox (10) to enable aircraft vibration. The vibration effect is magnified when Rotorcraft (11) is selected.

#### Bump Aircraft in Turbulence

Tick the Bump Aircraft in Turbulence checkbox (12) to enable turbulence on the aircraft itself. When airborne the aircraft will bump in unison with the turbulent motions. Either the Turbulent Motion or Turbulent Bump options must be enabled for the effect to be seen. The sliders for Turbulent Motion, Turbulent Bump, Less Turbulence and More Turbulence all effect the Bump Aircraft severity.

OpusFSI uses our new injected turbulence and shear data and disables all previous Bump Aircraft turbulence in P3D which many sims and aircraft addons cannot cope with. If you want to experience this 'physical' aircraft turbulence, you will have to enable the simulator's Turbulence and Thermal Effects within its Weather Settings dialog.

The Degrees Of Freedom DOF option can be set to 1,2, or 3 as required. These settings are equivalent to turbulent jolts in Bank, Pitch + Bank, and Pitch + Bank + Yaw respectively. You should set an appropriate DOF to suit your preference and capabilities of the aircraft sim. Set the lower value options if your aircraft sim has trouble maintaining a heading.

Set a Delay value if you have problems with jerkiness or the auto pilot in aircraft sims such as the Dash 8. The Delay factor (0..4 = Fastest to Slowest, default 0) adjusts the Bump Aircraft frequency.

### Gen Delay

A General DOF Delay factor (**15**) (default 0ms) allows those who are experiencing DOF exceptions to slow the DOF updates down slightly so their simulators can cope. The delay factor can be set in any DHM dialog (bottom right numeric box) and can be adjusted between 0 and 50ms.

### Test Checkboxes

You can tick one of the Test checkboxes to get some idea of the effects of the DHM. This will not be identical to the actual DHM which has other dependencies, such as ground speed, body acceleration, severity of landing etc.

### Duplicate Head Movements

The Duplicate Head Movement (**13**) button allows the DHM and AHM settings for the current view to be duplicated into a number of other camera views selected from the displayed list box.

### Automatic Head Movement (AHM)

Automatic Head Movement (**14**) is described in the following section.

### Assign Defaults

Assign Defaults sets all checkboxes and sliders back to their default settings.

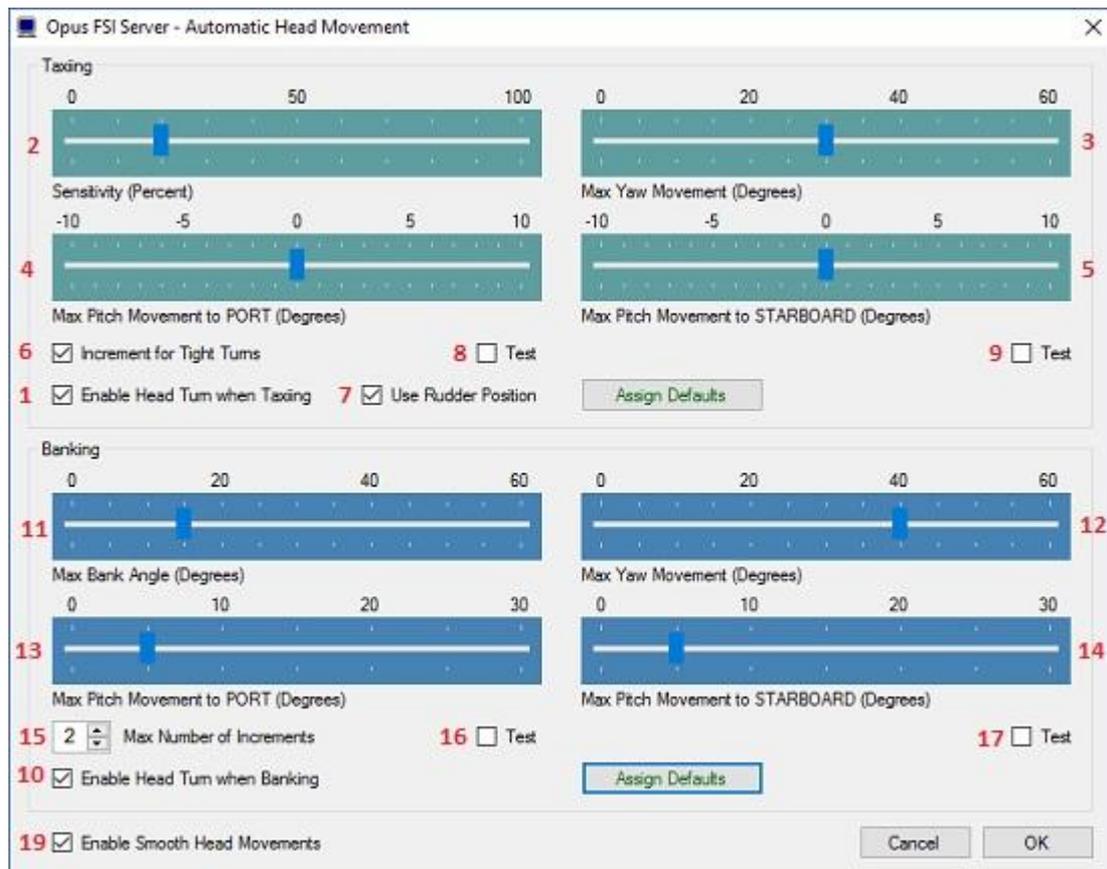
The DHM effects will not be displayed correctly on systems with low frame rates. If you are able to use the Smooth Head Movements of AHM then you should be able to render the above effects correctly.

*N.B. If you can't see the DHM effect on your aircraft then set the "C:\OpusFSI\_v5\FSISERVER.EXE" file properties (compatibility tab) to "Run as Administrator". This can be done by right clicking on the program in Windows Explorer or right clicking on the desktop shortcut.*

## **Adjusting the Camera Automatic Head Movement (AHM)**

When AHM is enabled (accessed via the AHM button in the DHM dialog) the view will automatically change to look into the turn. You can configure the view to change either in increments or in a continuous smooth movement.

N.B. Automatic Head Movement is automatically disabled when you are using TrackIR.



### 1. Enable Head Turn when Taxiing

Enable to set AHM Taxiing effects.

### 2 - 5. Taxiing Sliders

For AHM when taxiing you can alter the sensitivity for the calculated turn radius. You can alter the sensitivity (2) in percent, maximum yaw movement (3) in degrees, maximum pitch movement to the left (port) in degrees (4), and maximum pitch movement to right (starboard) in degrees (5). Adjust these sliders to set your desired parameters for the initial automated head movement. All incremented movements are calculated from this base level by increasing the specified angles and sensitivity. If in doubt then click on the Assign Defaults button to set the recommended defaults.

### 6. Increment for Tight Turns

Enable to set another level of increment for the AHM Taxiing effects.

### 7. Use Rudder Position

Uses the current rudder deflection for the AHM Taxiing effects as opposed to the simulator's 'delta heading' variable. The heading variable can be a little erratic and so requires both hysteresis and a small reset delay. If the 'Use Rudder Position' option is selected the AHM taxiing effects are disabled whenever the aircraft's ground speed and throttle position are greater than or equal to 30kts or 75 percent respectively.

### 8 - 9. Test Checkboxes

You can tick one of the Test checkboxes to get some idea of the effects of the AHM whilst taxiing to the left (port) and right (starboard).

### Assign Defaults

The Assign Defaults button can be used to reset all sliders back to their default settings.

### 10. Enable Head Turn when Banking

Enable to set AHM Banking effects.

### 11 - 14. Banking Sliders

You can alter the AHM maximum bank angle (**11**), the amount of head rotation in yaw (**12**) and pitch for turns to the left (port **13**) and right (starboard **14**). Adjust these sliders to set your desired parameters for the initial automated head movement. All incremented movements are calculated from this base level by increasing the specified angles and sensitivity. If in doubt then click on the Assign Defaults button to set the recommended defaults.

### 15. Max Number of Increments

Set the maximum number of increments for the AHM Banking effects. The maximum number of increments can range from 1 to 4, the recommended setting is 2.

### 16 - 17. Test Checkboxes

You can tick one of the Test checkboxes to get some idea of the effects of the AHM whilst banking to the left (port) and right (starboard).

### Assign Defaults

The Assign Defaults button can be used to reset all sliders back to their default settings.

### 19. Enable Smooth Head Movements

Tick the checkbox to select smooth head movements as opposed to stepped 'snap to' increments. Note, the smooth movement option is intended for the higher performance systems. All head movements are performed in such a way as to have minimal impact on your simulator's frame rates. If you experience any FSX/P3D DOF Errors reported in the main Spy window, or your head movement appears very jerky then you should immediately disable the smooth movement option and use the default 'snap to' movements.

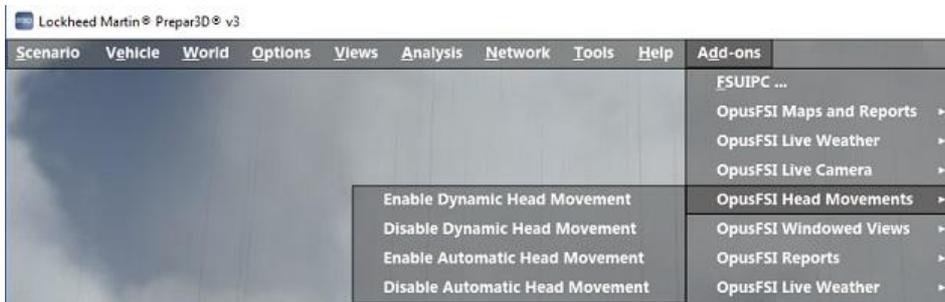
### User Note

The AHM effects are enabled the first time the camera view is displayed. If the camera view has been assigned to a keyboard key or joystick button then you can use that same input to toggle the AHM effects on and off. When toggled off, the AHM effects will automatically toggle back on as soon as you recover from the turn whilst taxiing or level the wings after a banked turn.

*Reselect the camera view to toggle any active AHM effects on and off.*

## Sim Add-on Menu and Shortcut Controls

DHM and AHM can be enabled and disabled from the sim Add-on menu and also via Shortcut Controls. Refer to the description of Shortcut Controls in the OpusFSI\_v5 User Guide.



## Assigning Joystick Buttons and Keyboard Keystrokes

All button and registered key events are displayed within the Spy window when the button or key is pressed. Keyboard events do not appear in Spy whilst editing cameras, only after they have been saved and edit mode is exited. If they are not displayed then the button or key is invalid, either not enabled or registered within FSX, already assigned elsewhere (i.e. FSX, 3rd party add-on etc), or just an illegal entry.

The same joystick button or keyboard input can be assigned to multiple camera views. In such cases, repeated use of the assigned button or key will cycle through the assigned camera views. The cycle will apply to the aircraft associated with the camera view, which may be a single aircraft, a group, or all aircraft according to what you have configured.

Alternatively you can assign a button and/or key to the same view type for each aircraft type/group, e.g. the Captain's view is the same key/button for all aircraft. We normally assign the same key combos to external views so we can just cycle through them.

### Joysticks and Game Controllers

The OpusFSI software will accommodate up to eight joysticks or game controllers connected to the FSI SERVER system, with up to 32 buttons on each, and up to 32 keyboard assignments. The program will automatically reconfigure the views and control assignments whenever the input device order changes i.e. when you either unplug or add a new device. Remember to restart FSX when removing or adding an input device.

### The Hat Switch and Panning

The Hat switch is not a button and cannot be assigned in the usual manner since FSX uses it for panning. The Hat switch can be used to pan the view when the TrackIR device is paused (F9). If you have disabled your controllers in FSX and are using FSUIPC then you can enable mouse wheel button panning and that also re-enables the hat switch on the joystick. Alternatively you can use FSUIPC to convert the hat switch data to keystrokes. ctrl+shift+0 through to ctrl+shift+8 are unassigned in FSX and you can use some of those as the keystrokes to trigger Live Camera views.

## Keyboard

Each keyboard assignment may consist of a combination of up to **two** modifier keys (Alt, Ctrl, or Shift) with a normal keyboard key. The entry is not case sensitive. The numeric pad keys 0 to 9 can be used but they must be assigned with the Num Lock ON (for recognition), and used with the Num Lock OFF within FSX/P3D. This is a quirk of the simulator and not the OpusFSI software.

*N.B. The Insert, Delete, Home, End, Page Up, Page Down, Left, Right, Up, and Down keys cannot be assigned to camera views.*

*If you assign numeric keys and have the Local Weather Report window displayed then FSX will interpret the numeric keys for the weather report window which in effect means you have to press the key twice, the first time the weather report window will close and the second time the camera view will change.*

## Shortcut Controls

You can assign shortcut control keys to cycle the camera views forward (next) and cycle the camera views backward (last) between views matching the currently selected view mode (virtual cockpit, 2D cockpit, or External Aircraft camera views for the currently selected aircraft). There is a difference between the actions of the Shortcut View Cycling commands and the way 'common' camera key or buttons are processed when configured into the actual Live Camera views. The Shortcut key/button will only cycle the views with the same view mode that was last selected onto the display through the Live Camera interface. So the Shortcuts will cycle through all your VC views or all your External views depending on what was last selected through Live Camera actions.

The common key (or button) is assigned to groups of views, assigned within the camera views themselves. I use a common X key configured in all my camera views. This common key (or button) will cycle through all assigned camera views irrespective of the camera view mode.

*Shortcut Commands - Cycle through relevant views with the same view mode as the current view.*

*Camera Commands - Cycle through all cameras assigned with the same common key/button.*

Refer to the description of Shortcut Controls in the OpusFSI\_v5 User Guide.

## Creating Panel (Flight Control) Windows

Firstly, panel windows, or any window used to control the aircraft's flight, must be displayed on the main 'flying' server system. All client systems are used purely as view controllers, offloading much of the display workload from the main 'flying' server.

If you wish to create a separate panel view on your server then follow the above instructions to create a new Windowed View and associate it with your aircraft. Select the required Virtual or 2D camera type depending on the cockpit you are using, then adjust the camera's coordinates and zoom settings to create a close up view of the instrument panel or panels. You may find it helpful to undock the main simulator's view during this process, this will allow you to adjust the shape of the window to match the panel(s) and your intended screen layout. You may also find it helpful to use the 'stepped' camera control to make fine adjustments to the camera's eye position.

When finished, make sure you save your new camera configuration using the **Save Cameras** button and re-dock your simulator's main view.

## 2D Panel

It is not possible to determine in software whether you have the 2D panel enabled or disabled within the simulator. This problem mostly affects the OpusFSI server system since all client systems normally have the 2D panel transparency set to 100%. If you have set up a scenic view intended to be displayed with the 2D panel disabled and display the view with the 2D panel enabled, the eye position will not be as expected. In such cases use the Shift-1 key sequence to toggle the 2D panel OFF.

*On the main 'flying' OpusFSI server system, toggle the 2D panel on and off display using the Shift-1 key sequence. Normally it will be off for all 'scenic' views and only enabled if you specifically want to fly with the 2D panel.*

Warning, do NOT set the 2D panel transparency on your main OpusFSI server to 100% as this may result in making the aircraft's docked panels invisible.

## Incorrect Eye Position for 2D 'Scenic' Views

Refer to the above *2D Panel* section. For scenic views the eye position will be incorrect if you have the 2D panel enabled. Use the Shift-1 key sequence to toggle the 2D panel OFF on your server system's display.

## Creating a Virtual Cockpit Camera View

*A few words before you begin ...*

### Run the simulator in windowed mode

You will be needing to open and access the Camera dialog within your main OpusFSI server program, or simply your OpusFSI program if you don't have a networked system. In each case, I am referring to the FSI SERVER program installed in your c:\OpusFSI\_v5 folder. It is therefore essential to set the simulator into windowed as opposed to full screen mode so that you can see and access the server program's form.

### Select your aircraft in the sim before you start

You will be creating a camera view for a specific aircraft's virtual cockpit so it is best to load that aircraft into the simulator before you get started. The OpusFSI camera editing software will not do this for you.

### Selecting the computer system

*If you just have a standalone PC you can ignore this step.*

However, if you have a networked system then you should make sure you have selected the FSI SERVER computer system when you open the OpusFSI Camera Management dialog. Note, it is rather pointless creating virtual cockpit views on a client system since you can only monitor and control the flight from the main server PC. The OpusFSI camera editing software will remember what computer system you have selected and always assumes you wish to continue editing the cameras on the same system, so you will probably only need to select the FSI SERVER computer system once. It is also the default selection when you activate the server program.

#### List Cameras for the Specified Aircraft

This feature is only needed on systems that have many camera views configured and assigned to a large number of different aircraft. This option is used to restrict the number of camera views listed for your selection, it just saves you having to search for a specific view you wish to edit. For this exercise just make sure this reads **All Aircraft Types**. If it doesn't then open the list and select the first option **All Aircraft Types**.

#### Select an existing camera of similar type to edit

This can be a very useful procedure. For example, if you have already created a view for the captain's position, then selecting this camera view prior to clicking on the **Clone** button will mean you only have to slide the camera over to the other seat to create the first officer's camera.

*One final note ...*

We will be concentrating here on creating a new virtual cockpit view for the main display so you will not be setting the Windowed View option nor will you have any need to display a Windowed View to assist in the camera's alignment.

#### **Creating a Virtual Cockpit Camera View**

I will take you through creating a VC camera view in six easy stages. Stages four and five are optional, stage four (zooming) is not usually required in VCs since it is best to use the default zoom level for all VC views, on the other hand, stage five (head movement effects) is intended specifically for VC use.

At any stage during the process you can click on the Camera Editing **OK** button to save your current state of affairs in the CAM file.

Stage One - Create and name the new camera view.

Stage Two - Assign the Aircraft Types.

Stage Three - Move the camera into position.

Stage Four - Adjust the camera zoom.

Stage Five - Add head movement effects.

Stage Six - Assign a joystick button or key to the view.

### Stage One - Create and name the new camera view

If you already have created a similar camera view in the past and just wish to copy it then simply select the existing view in the Camera Management dialog and select the **Clone** button. Otherwise just select the **New** button. The Camera Editing dialog will be displayed. A new camera view will be created and you will see a name of the form 'Camera View X' appear in the name window. Click in the name window and rename the view to something more appropriate (for example, B737 Captain).

Select the **Virtual Cockpit** camera type radio button.

### Stage Two - Assign the Aircraft Types

Click on the **Assign Aircraft Types to the Camera** button and select (highlight) the aircraft types you wish to assign to the view from the displayed list. You can use the standard Windows selection procedures to highlight your chosen aircraft types. Hold down the CTRL key to add/remove items, hold down the Shift key to select a group of items. Click OK when done.

Since this is the first view to be created for the selected aircraft group, click on the **Default View** option to indicate it is the default view, to be automatically displayed when the aircraft is selected.

### Stage Three - Move the camera into position

The camera's eye point is adjusted using the green arrow buttons or the **Live Camera Control** button.

The six available degrees of freedom (6DOF) or XYZ PBY axes are all controlled about the aircraft's central axis looking forward. The X axis moves the eye point left and right, the Y axis up and down, the Z axis forward and back, and the Pitch, Bank, and Yaw movements are as expected.

The speed of movement, or step size, is controlled using the **Speed of Movement** slider. The camera's motion can be either **Continuous** or **Stepped** by selecting the appropriate mode radio button. In continuous mode, any of the red stop buttons can be used to stop the current motion. Also clicking more than once on a green arrow button will speed up the movement in the chosen direction, or slow down any motion in the opposite direction.

If you wish, you can also assign the coordinates manually using the current XYZ PBY coordinate edit boxes.

At any stage you can press the **Reset** button to reset the eye point back to its initial, last saved, position.

Remember you can click on the **OK** at any stage in the proceedings to save your changes.

### Stage Four - Adjust the camera zoom

This stage is optional and my advice is to not use anything other than the default zoom level unless you absolutely have to, for example when adjusting the view to show a specific area of the

instrument panel. If you do need to adjust the zoom for any view always try to minimise the number of fine zoom steps, that is always use the nearest coarse zoom setting before making any fine adjustments. When the software displays the camera view it must follow your exact steps to recreate the same zoom setting, setting zoom level x1, then adjusting the coarse zoom, then issuing the fine zoom steps.

### **Stage Five - Add head movement effects**

Dynamic and Automatic Head Movements (DHM and AHM) are intended for use in virtual cockpits and are usually always set for the pilot and co-pilot cameras. These effects are usually disabled for virtual cockpit views that are specific to instrument panels, engine controls, communications panels etc.. In other words, do not use these effects if you want your view to be completely stable for viewing or controlling panel switches etc. Having said that it is fairly simple to operate buttons and switches with the mouse even when the DHM effects are enabled.

For this exercise click on the **Enable DHM** checkbox, open the DHM dialog using the **DHM Options** button and enable all the DHM options, open the AHM dialog and enable all the AHM options then close the AHM and DHM dialogs. N.B. AHM effects are automatically disabled when using TrackIR.

### **Stage Six - Assign a joystick button or key to the view**

Click in the upper **Joystick Button / Key Sequence** box to assign a joystick button, click in the lower box to assign a key command. Any assigned key command must not be used elsewhere (FSX, FSUIPC etc.), if it is then FSX will refuse to relay the key press event to the OpusFSI interface. The OpusFSI interface will accept buttons 1 through to 32 of Joysticks 1 through to 16. All button and registered key events are displayed within the Spy window when the button or key is pressed. If they are not displayed then the joystick or button is invalid, not registered within FSX, already assigned elsewhere, or just an illegal entry.

Finally don't forget to click on **OK** before closing the Camera Editing dialog. Your default virtual cockpit view should now be defined and saved within the FSXSERVER.CAM file.

You can repeat this exercise and move the eye point across to the right hand seat position to create the non-default First Officer's position.

## **Windowed Views**

Windowed views are ideally suited to computer systems equipped with either multiple screens or single large screens. DHM cannot be specified for windowed view types. Windowed views cannot be associated with joystick buttons or keyboard keys, they are automatically opened when the aircraft is loaded and then must be manually undocked (if required) prior to using the Restore Win option to restore their sizes and positions.

### **Editing**

It is not possible to alter the camera's eye point in windowed views so they must be edited in the main window. The settings for the view are specified entirely within the FSX or Prepar3D

aircraft.cfg files. Separate sizes and positions are stored for your docked and undocked views, allowing you to save different preferred window position and sizes.

The aircraft.cfg files on the **OpusFSI** server and all **OpusFSI** clients are updated each time you click on the **Save Cameras** button within the **OpusFSI** Camera Configuration dialog.

*If you make changes to an aircraft's windowed views, other than a zoom adjustment, you must force FSX or Prepar3D to reload the modified aircraft.cfg file. This can only be achieved by either restarting the simulator, or by first selecting a different aircraft type then reloading your original aircraft.*

*Undocked windowed views must be undocked manually before their size and positions can be saved or restored using the **Save Win** and **Restore Win** button options, or the **Save Windowed Views** and **Restore Windowed Views** options within the simulator's **OpusFSI** menu.*

After you have moved and resized all the windowed views use the server or client program's **Save Win** button option to save the layout of your system. This option saves the position and sizes of all your docked and undocked windowed views on the server or client system, this gives you the option of restoring the screen layout in the future with the **Restore Win** button (or simulator's **OpusFSI** menu).

## Displaying

There are three steps involved in displaying windowed views,

- Open the windowed view
- Undock if required
- Restore the size and position

## Opening the Windowed View

Windowed views cannot be associated with joystick button or key commands. Windowed views are displayed automatically each time you change the aircraft selection or load a flight.

You can also control the windowed view display using either the **Open Win** (and **Close Win**) buttons on the server and client program forms, or via the **Open Windowed Views** and **Close Windowed Views** options within the simulator's **OpusFSI** add-on menu.

## Undocking Windowed Views

Windowed views are displayed in an identical manner to the simulator's 'Views - New View' menu option, they appear as docked new view windows within the simulator's main display. You can undock the windowed view if you wish but windowed views cannot be undocked automatically within FSX or Prepar3D, therefore, *all windowed views must be undocked manually by the user.* Manually undock them by right-clicking in the window area and selecting the **Undock Window** option.

## Restoring the Window Views

Finally, if you have previously saved the windowed views position and sizes using the **Save Win** button then use the **Restore Win** button to restore the previously saved position and sizes of each of your docked and undocked windows. These button options are provided on the server and each of the client programs. These options are also available via the simulator's **OpusFSI** add-on menu.



The **Save Win** and **Restore Win** options reduce the process of preparing for a flight to the following three simple steps,

1. Load the aircraft and flight into the simulator
2. Either leave the windowed views docked, or undock them as required.
3. Either click on the server or client program's **Restore Win** button, or select the **Restore Windowed Views** menu option within the simulator.

This procedure has to be repeated on each system displaying windowed views.

Warning - the Restore process will not work if you have a TH2Go device, the device changes the window sizes and positions making them unknown to other software.



Windowed Views

### *Tips for Creating Windowed Views*

The software only works with views you create using Live Camera, in other words its own camera views and not views you open using the sim menus.

1. Windowed views can only be created by the software editing your aircraft.cfg files in the simulator's SimObjects folders, located in <FSX>\SimObjects\Airplanes and <FSX>\SimObjects\Rotorcraft. If you look in these folders you will find an aircraft.cfg file. You can open these files using Notepad, if you go to the bottom of the aircraft.cfg file you will find our camera definition for the custom External Views.

```
[CameraDefinition.899]
Title = "OpusFSI Aircraft View"
Guid = {01021987-E220-6507-1024-462840738899}
Description = OpusFSI Aircraft View
```

...

If you have successfully created a Windowed view you will also see that view appended here ...  
For example,

```
[CameraDefinition.990]
Title = "OpusFSI Windowed View 1"
Guid = {01021987-E220-6507-1024-462840738990}
Description = OpusFSI Customized External View
```

...

If CameraDefinition.899 is missing then you either have the Live Camera feature disabled or the LC software cannot access your aircraft.cfg files. The aircraft.cfg files are amended each time OpusFSI server program is run and when you click on **Save Cameras**, which you must do to save your camera views.

The Getting Started guide for Single PCs (and Networked PCs) has sections describing how to set the sharing and permissions on drives and individual folders. If you have the above CameraDefinition.899 missing then you most likely will have to make sure the relevant drives and folders are shared. First alter the drive containing FSX, then share the FSX installation folder itself. It is quite a simple process.

2. After OpusFSI has made changes to the cfg files you must load an entirely different aircraft type and reload the original aircraft to force FSX to reload the cfg data, including the modified CameraDefinitions contained within.

3. Windowed views cannot be Undocked by the software, there is no facility in FSX that allows this. So when Windowed views are displayed, if you want them Undocked then you must do it manually by right-clicking in the window.

4. Windowed views should not be assigned with any button or key commands. They are displayed automatically when you select the aircraft and when you click on the Open Views button.

5. To assist you, when the view is displayed you should Undock the view, reposition and resize it, then click on the **Save Win** button. Next time the view is displayed and Undocked (by you), you can then click on **Restore Win** and the software will attempt to reposition and size the window for you.

Warning - this process will not work if you have a TH2Go device, the device messes with the window sizes and positions making them unknown to other software.

6. Another useful test to check you have a correct view setup is to load your flight then use the S key to cycle through your view types. You should see (in the top right-hand corner) the following view types ...

**Virtual Cockpit -> Outside View -> Tower View -> Aircraft View -> Custom View OpusFSI External View**

before it then cycles back to the VC view.

### *Windowed Views and Frame Rates*

Windowed views are ideally suited for use on the 'non-flying' client systems. On these systems, by their very nature, the use of multiple windowed views will have far less of an impact on the displayed frame rates than say on the main 'flying' server system.

In fact, the use of multiple windowed views on the main 'flying' server may result in considerable reduction in frame rates, especially if you are using a complex aircraft such as the PMDG 737NGX, or you are operating close to an airport with complex scenery (e.g. during the takeoff and landing phases of the flight). However, there will be far less impact on the frame rates during the cruising or decent phases of flight.

Windowed views will always have a considerable effect on the frame rates within the Lockheed Martin Prepar3D simulator, on both server and client systems.

The **Open Win** and **Close Win** buttons on the server and client program forms, and the **Open Windowed Views** and **Close Windowed Views** options within the simulator's OpusFSI menu, can be used to remove and re-display all windowed views whilst flying.

These options give you control over the display of the configured windowed views, most useful on the main 'flying' server system. For example, you can close all windowed views during certain high-demand phases of flight, and re-open them during the less demanding phases.

For your convenience, the restore, close, and open view options have been duplicated as **Restore Windowed Views**, **Close Windowed Views**, and **Open Windowed Views** options within the FSX and Prepar3D simulator's OpusFSI Menu.

### **Creating Panoramic Views**

2D cockpit views are generally used on the client systems to create panoramic (scenic) views. On the client systems this is achieved by setting the 2D panel transparency to 100% (making the panel invisible) and then setting up the client views via the server's Camera Control dialog. On the main 'flying' server system it is up to the user to press **Shift-1** to disable the 2D panel display. Note, the eye position will be different with the 2D panel enabled so you should always disable the panel when displaying scenic views on the server.

Please refer to the **OpusFSI\_v5 Getting Started Networked PCs** guide for detailed instructions on setting up your client systems.

The **field of view** (FOV) of all displayed windows in the simulator is affected by the shape of the window. You must take this into account when creating or editing any camera view. If the FOV is important, for instance when view is part of a panoramic vista, you should undock the simulator's main viewing window and adjust its size and shape before adjusting its eye position and zoom level.

Any 2D cockpit view that is panned more than 45 degrees either side will reveal the virtual cockpit walls. The cockpit walls can all be eliminated by simply moving the 2D cockpit views forward a few meters. For example, setting the Z-axis to 2.0 will move the eye position forward by 2 meters and usually fix your eye point outside the invisible 2D cockpit. You will need to experiment with your selected aircraft cockpit by adjusting the Z-axis and panning the Yaw-axis around to cover the full extent of your intended panoramic vista.

If you are using windowed view to create a panoramic vista, you can use the **Display Windowed View** button to display one or more windowed views to assist you in creating and aligning the current view. You may also find it helpful to undock the simulator's main view during this process, this will allow you to adjust the shape, position, and size of the main window aligning it with the other displayed windowed views. You may also find it helpful to use the **Stepped** camera control to make fine adjustments to the camera's eye position.

If you create a panoramic vista without using windowed views (i.e. on systems not using multi-screened PCs) then not only will you achieve the optimum system performance but you will be able to change the displayed vista with a single button or key press. To achieve this simply assign the same button or key press to the required set of views on your server and client systems. Each set of views would be configured with a different eye position or perspective. For example, you could recreate the same panoramic vista using external aircraft views with the eye point moved 50 meters behind the aircraft.

## Out of Sync - OpusFSI External Views

The number of available view modes can be determined simply by pressing the 'S' key and counting the total number of view modes that can be cycled. The normal sequence in the simulator is,

VC - Spot - Tower - Aircraft - External

Giving a total of five (5) different view modes. Opus sets each of these view types as CycleHidden=No.

You should ensure you have not hidden any of these views by setting their CycleHidden field to Yes in the aircraft.cfg or cameras.cfg files. Also ensure the cfg files are not write protected.

If you display an external view within the main viewing area and get the wrong external view then use the A or Shift-A keys to cycle back to the OpusFSI External View, after that everything will be back in sync.

# World Views

## Introduction

World Views are cameras that have been fixed at a specified latitude, longitude, and altitude. All World Views are defined within the simulator's Cameras.CFG file (in your AppData Roaming folder) and their Camera Definitions are read in by the simulator only on start up.

Live Camera automatically modifies your simulator's Cameras.CFG AppData file based on your current World View camera configuration. After creating, cloning, or editing (making changes) to any of your World Views you must shutdown and restart both your simulator (FSX, FSX Steam Ed, or P3D) and the OpusFSI SERVER program.

## Limitations

You can create up to 99 World Views on your system but will generally only need a few defined at your favourite airports, or multiple views defined at the same airport specifically for video making or plane spotting.

Be warned there are limitations and plenty of unfinished features or bugs within the sim code relating to fixed type cameras. These problems cannot be overcome in software due to the incomplete support for camera control within SimConnect and general lack of monitoring and view control within the FSX simulator code (the same limitations and problems are found in the FSX Steam Edition and Prepar3D simulators).

### WARNINGS ...

#### 1. Camera Positioning Error

The Lat/Lon coordinates for all World Views (Fixed Cameras) within the sim are stored with very limited accuracy hence the camera position may end up shifted N/S or E/W depending on the coordinates. You will have to use trial and error, shifting the view to compensate for this limited accuracy within the sim.

#### 2. Change of Hemisphere Bug

The sim does not like displaying World Views (Fixed Cameras) located in different N/S or E/W hemispheres. This is a bug that results in corrupting the stored data for all the World Views in the sim. The sim will continue functioning, however all World Views will be corrupted until the sim is restarted. Solution - don't display World Views in different hemispheres.

These problems however can be overcome by adhering to the following simple rules,

### DOs ...

**1. DO assign a 'unique' button or key sequence to your World Views (see below).**

## **2. DO use the assigned World View button or key sequence to display a World View.**

When an assigned button or key sequence is detected the software selects or cycles to the configured World View that,

- a) has been assigned to that button or key sequence, and
- b) is currently within 48km (30 miles) of your present position.

Under normal circumstances we therefore recommend you assign the same button or key sequence to ALL your World Views. Use of this 'unique' assigned button or key sequence will always select or cycle to the World View(s) local to your current position.

If you have multiple World Views configured at the same location then you can either assign separate or common button/key sequences to each view at that location, or you can manually select the view you want via the simulator's Views->View Mode->Custom Menu. Warning - NEVER manually select a distant World View (see the DON'T section below).

If you do not assign buttons or key sequences to World Views you can still select them manually via the simulator's Views->View Mode->Custom Menu provided you are very careful and never manually select a distant World View.

### DON'Ts ...

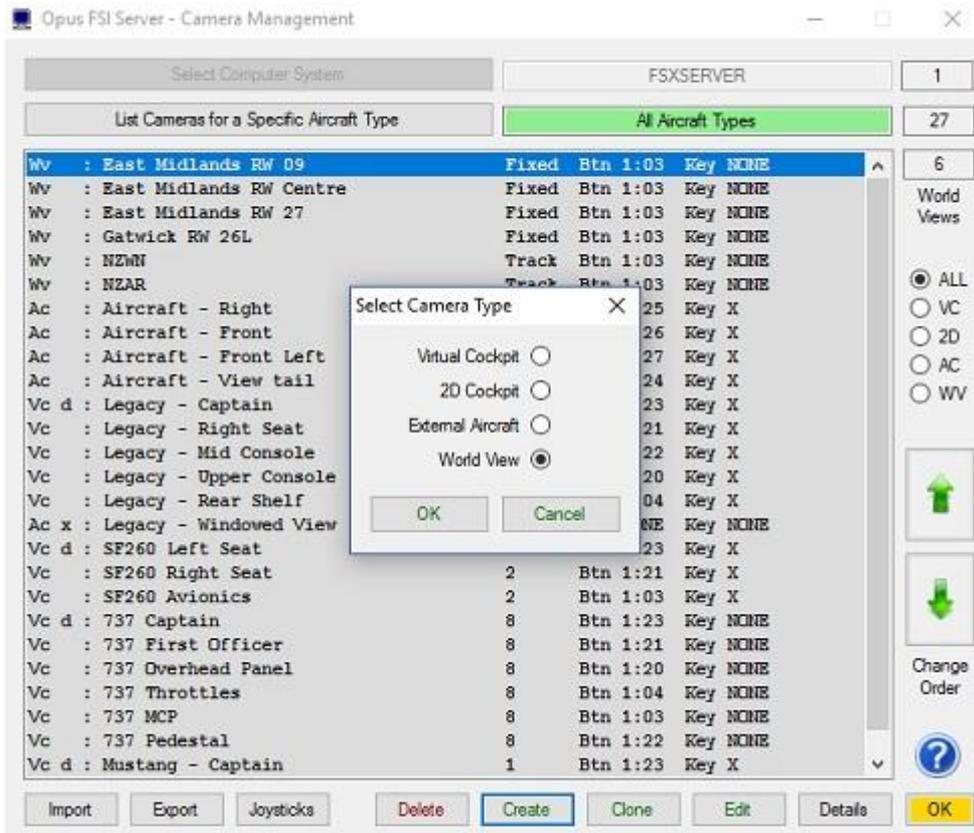
- 1. NEVER use the menu to select a World View that is not near to your present position.**
- 2. NEVER use the 'A' key to cycle when any OpusFSI External or World View is displayed.**
- 3. NEVER relocate the aircraft or 'Go to airport' when a World View is on display.**
- 4. NEVER display World Views defined in opposite hemispheres.**

The only time you should use the 'A' key to cycle through World Views is when you know for certain that ALL the selected World Views will be nearby to your current position. Nearby in this case is assumed to be within 48km or 30 miles.

If you do select a distant World View that is say on the other side of the globe or in a different hemisphere then it will most likely result in the faulty FSX code corrupting ALL World View configuration data held within its memory. The sim will most likely continue to function as normal but NONE of the configured World Views will work as expected. The effects in the sim may be unpredictable and the only recovery will be to restart the simulator !

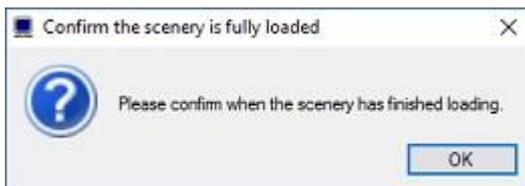
If you NEVER display a distant World View the sim will be happy.

## Creating World Views



Click on the **Create** option within the Camera Management dialog then select the **World View** camera type and click **OK**. The simulator's display will be initialised at your aircraft's current latitude, longitude, and altitude.

Wait until the scenery has finished loading then click OK on the prompt.



## Cloning World Views

Highlight the World View camera you wish to clone within the Camera Management list then click on the **Clone** option. The simulator will automatically slew to the World View's configured latitude, longitude and altitude. The Confirm the scenery is fully loaded dialog will then be displayed. Click on the **OK** button **ONLY** after the scenery has finished loading and displaying on the simulator, normally indicated by all the runway markings appearing along with all airport infrastructure.

## Editing World Views

Highlight the World View you wish to edit within the Camera Management list then click on the **Edit** option. The simulator will automatically slew to the World View's configured latitude, longitude and altitude. The Confirm the scenery is fully loaded dialog will then be displayed. Click on the **OK** button **ONLY** after the scenery has finished loading and displaying on the simulator, normally indicated by all the runway markings appearing along with all airport infrastructure.

### General Editing ...

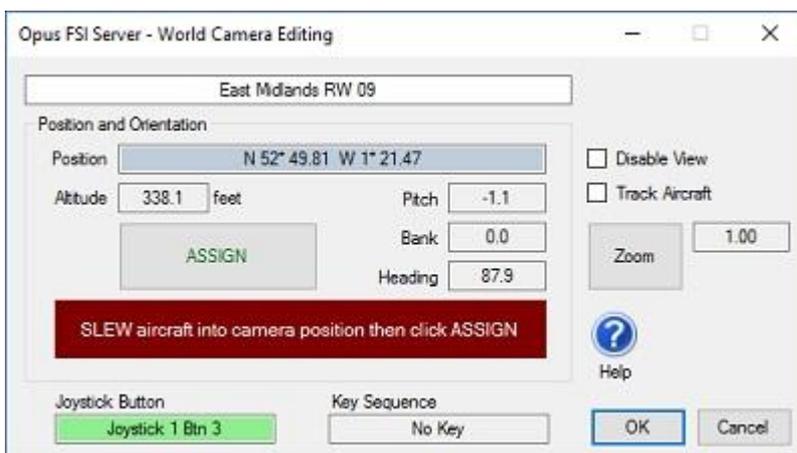
All camera editing should be carried out with the simulator operating in Windowed Mode (as opposed to Full Screen Mode where you will not be able to access the OpusFSI dialogs).

All World View camera editing should be carried out with your aircraft stationary on the ground.

World Views can be Created, Cloned, and Edited via the Camera Management dialog. When the World View Edit dialog is displayed the simulator will automatically be placed in 2D Cockpit and Slew mode.

If the 2D panel is on display you can remove it by right clicking on the panel and using the Close Window option. The 2D panel can also be toggled on and off the display using the simulator's Views->Instrument Panel->Main Panel menu option.

In edit mode you can use the simulator's normal Slew Commands to slew your aircraft to the desired World View (fixed) camera position. You can also use the **World->Go to Airport** menu option to relocate your aircraft to a different part of the globe. In doing this you may need to use the **World->Time and Season** menu option to restore daylight conditions. You may adjust the view's Altitude, Pitch, Bank, and Heading manually if required.



### World View Name

Specify the name of the World View in this edit box (e.g. East Midlands RW 09). This is the name (preceded with OpusFSI) that will appear on the screen and within the simulator's Views->View Mode->Custom menu.

### **Assign Button**

After making any adjustments slewing your aircraft, the Assign button option **MUST** be used to record the aircraft's current position, altitude and attitude. The World View's 'assigned' position and altitude are displayed within the dialog. The aircraft's attitude (pitch, bank, and heading) are recorded but not displayed. The assigned pitch, bank and heading are generally only relevant in Non-Track mode.

### **Disable View**

Tick this box if you want to disable or remove the World View from the simulator's Cameras.CFG configuration. When ticked the World View will not be selectable nor will it appear within the simulator's **Views->View Mode->Custom** menu.

### **Track Aircraft**

Tick this box if you want the World View to always track and point toward your aircraft's current position.

### **Zoom**

The default zoom level for all World Views is 1.00. You can use this option to alter the zoom to any desired setting. When an assigned button or key sequence is detected the software always attempts to select the nearest assigned World View that is within 48km (30 miles) of your present position.

### **Joystick Button and Key Sequence**

To change these assignments simply click within the Joystick Button or Key Sequence text boxes and press the required button or key sequence. Clicking a second time within the box will clear the entry.

## *Displaying World Views*

When you display a World View using an assigned button or key sequence you will notice the OpusFSI External View momentarily flash onto the screen. This is deliberate and necessary as Live Camera must first select the OpusFSI External View, prepare the sim's display and allow the sim time to settle before cycling or stepping to the chosen World View.

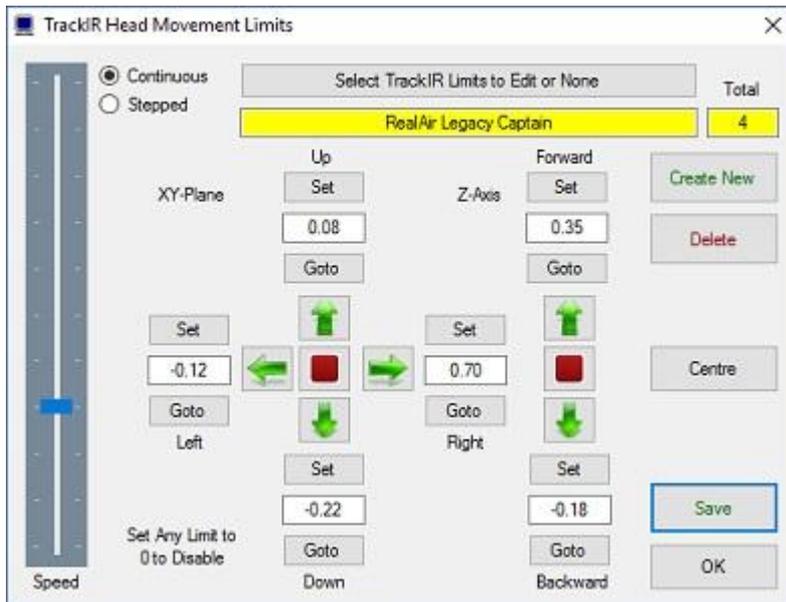
## **Spy Messages**

We have left some of the Spy messages in the software. These messages can be seen by clicking on the top right-hand **Spy** button on the server's main form. These messages will indicate when the mode changes occur within the software; the mode will change between TAXIING, AIRBORNE, and LANDING and are indicated with the following messages.

```
SIM TAXIING  
SIM AIRBORNE  
SIM LANDING , Accel xxxx , Factor x.xxx
```

Where on landing, the vertical acceleration (in units of 100 x feet per second squared) is displayed as 'Accel xxxx', and the resulting severity factor (< 1.0 for smoother landings, 1.0 for normal landings, and > 1.0 for heavier landings) is displayed as 'Factor x.xxx'. At present, normal landings have an assumed acceleration of 8 feet per second squared. The Spy window automatically closes after two minutes.

## TrackIR Head Movement Limits



TrackIR limits can be set and named via the TrackIR Limits button in the Camera Editing dialog. A camera view can reference a named TIR Limit. The same named limit can be assigned to multiple camera views, and therefore multiple aircraft types.

The Live Camera option must be enabled (ticked) to assign these limits. You do not need to enable the TIR device to assign the head movement limits.

1. First either select the **Create New** button or to edit an existing entry click on the **Select TrackIR Limits to Edit** button. You can also set the entry to None by selecting the **None** option from the displayed list of named limits.  
The number of named limits will be displayed in the box labelled **Total**.  
If you wish to change the limit name then modify the entry in the yellow name box.
2. Use the green arrow keys to set the limits. Clicking on the same arrow again will speed up the camera movement.  
The red (and **Set**) buttons will stop movement when in **Continuous** mode. In **Stepped** mode click on the green arrow to move in increments, the increment size is determined by the **Speed** slider bar.

3. Click on each **Set** button to fix the limits. The appropriate limit settings will be displayed in the corresponding box. Limits can be entered or modified manually if desired by clicking on the boxes (the box will be highlighted in red) and typing in a value.
4. Click on the **Save** button to save the limits for the selected aircraft types.

The **Goto** buttons can be used to move to the existing limit. The **Centre** button centres the cockpit image. You can use the **Delete** button to delete the currently selected named limit.

The **OK** button saves the limits and exits the dialog. To exit without saving your changes click on the red X at the top right of the dialog.

All TrackIR Limit data is stored in the following LIM files,

FSXSERVER.LIM ... Microsoft FSX systems  
FSESERVER.LIM ... Microsoft FSX-SE systems  
P3DSERVER.LIM ... Lockheed Martin Prepar3D systems

## SimObject Path Additions

The **OpusFSI\_SimObjects\_Template.txt** file can be used to define a list of SimObject paths not currently identified by OpusFSI, normally addon aircraft that have been installed elsewhere and not defined anywhere that OpusFSI checks.

Copy and rename the supplied OpusFSI\_SimObjects\_Template.txt file. Rename the file as indicated below. OpusFSI will check and process the following sim typed files for the additional path specifications,

OpusFSI\_SimObjects\_FSX.txt  
OpusFSI\_SimObjects\_FSXSE.txt  
OpusFSI\_SimObjects\_P3D.txt

For backwards compatibility, the file OpusFSI\_SimObjects.txt is also checked for 'FSX Steam' sim types.

N.B.

Prepar3D systems should already include a 'simobjects.cfg' file within their common application data (c:\ProgramData) folder. These files are also checked and decoded by OpusFSI so try not to duplicate additional Simobject paths in the above text file if used. Your specified SimObjects folders should each contain the same Airplanes or Rotorcraft sub-folders as the standard SimObjects folder within the sim. The SERVER and CLIENT programs will accept SimObject Addon paths that end in specific sub-folder names '\Airplanes' or '\Rotorcraft' (with or without a trailing backslash). Previously the standard '\SimObjects' root folder was assumed and the sub-folder names '\Airplanes' or '\Rotorcraft' were appended prior to looking for the additional (addon) SimObjects.

Don't forget to check that any addon folders are shared with adequate sharing and security permissions.

Each path must be entered on a separate line in the form,

Path = <full\_path\_specification>

For example,

Path = E:\3rd Party\Company\_XYZ\SimObjects

*The SERVER and CLIENT create a log file named SimObjects\_FSX.log, SimObjects\_FSXSE.log, or SimObjects\_P3D.log, depending on the sim type. This log file lists all SimObject Airplane and Rotorcraft paths that are checked along with any errors encountered during the process. The log file helps determine the reason why any aircraft/rotorcraft are not detected by the SERVER program.*

## Example 1 - Quick Guide to Setting up a Default View on the Server

First ensure you have selected and loaded an appropriate aircraft within the FSX or Prepar3D simulator on both the server and client PC.

To see the main form of the server program you must be running FSX or Prepar3D in windowed mode.

Click on the **Configure** button to display the Configuration dialog and tick the **Enable Live Camera** checkbox. Restart the server program if prompted to do so.

The Camera Control dialog is displayed by clicking on the **Cameras** button on the FSI SERVER's main form.

If you have created a similar view to the one you want to create now then select it from the Camera List and select the **Clone** button. Otherwise select the **Create** button and the camera type. The Camera Editing dialog will be displayed.

You may modify the view name by clicking in the Camera text edit box.

Select the associated aircraft using the **Assign Aircraft Types to the Camera** button. It will first ask if you wish to assign multiple camera views to aircraft types, you can say No. Select the **All Aircraft Types** entry to make the view global, alternatively highlight all the associated aircraft types and click **OK**.

To create your forward (or other) view change the eye point for the view using the **X, Y, Z, Pitch, Bank, and Yaw** camera control buttons or by entering values directly into the coordinate text boxes.

Tick the **Default View** checkbox. If required **Disable TrackIR**, set the **Transition Time** and enable **DHM**.

Use the **Zoom** and **DHM Options** buttons to adjust the camera view's zoom settings and specify any associated Dynamic Head Movement respectively.

Finally, click on the **OK** button to save your changes.

When you start up you should have your default view on the server.

## **Example 2 - Quick Guide to Setting up a Forward and Windowed Side Views on a Server PC with three monitors**

### Forward View

Set up a forward view on the server in accordance with the example above - *Quick Guide to Setting up a Default View on the Server*. Of course it's optional whether you make it the default view.

### Left Windowed View

It is not possible to alter the camera's eye point in windowed views so they must be edited in the main window.

If you have created a similar view to the one you want to create now then select it from the Camera List and select the **Clone** button. Otherwise select the **Create** button and the camera type. The Camera Editing dialog will be displayed.

You may modify the view name by clicking in the Camera text edit box.

Select the associated aircraft using the **Assign Aircraft Types to the Camera** button. It will first ask if you wish to assign multiple camera views to aircraft types, you can say No. Select the **All Aircraft Types** entry to make the view global, alternatively highlight all the associated aircraft types and click **OK**.

Tick the **Windowed View** checkbox. Make sure **Default View** is unchecked.

To create your left side view change the **Yaw** to -90 by entering the value directly into the coordinate text box. Click in the Yaw field (it will turn red), type in -90 (note the minus sign; you want the camera to turn left), then hit the enter key. The camera view will rotate to 90 degrees left.

Set the zoom as you like; a zoom factor between 0.8 and 1.0 seems to work well for a right or left view.

Windowed views cannot be associated with joystick buttons or keyboard keys, they are automatically opened when the aircraft is loaded. DHM cannot be specified for windowed views.

Click the **OK** button and exit the dialog.

*You must now force FSX or Prepar3D to reload the modified aircraft.cfg file. This can only be achieved by either restarting the simulator, or by first selecting a different aircraft type then reloading your original aircraft.*

Undock the window manually by right clicking on it and selecting the undock option.  
Move the window to the left monitor and resize the windowed view.

Use the Server dialog's **Save Win** button option to save the layout of your system. This option saves the position and sizes of all your docked and undocked windowed views and gives you the option of restoring the screen layout in the future with the **Restore Win** button (or addon menu option).

### Right Windowed View

Follow the above procedure to create the left windowed view but this time to create your right side view by changing the **Yaw** to 90 by entering the value directly into the coordinate text box. Click in the Yaw field (it will turn red), type in 90, then hit the enter key. The camera view will rotate to 90 degrees right.

Set the zoom to match the left camera view.

Click the **OK** button and exit the dialog.

*You must now force FSX or Prepar3D to reload the modified aircraft.cfg file. This can only be achieved by either restarting the simulator, or by first selecting a different aircraft type then reloading your original aircraft.*

Undock the right window manually by right clicking on it and selecting the undock option.  
Move the window to the right monitor and resize the windowed view.  
Undock the left window manually by right clicking on it and selecting the undock option.  
Move the window to the left monitor and resize the windowed view.

Use the Server dialog's **Save Win** button option to save the layout of your system. This option saves the position and sizes of all your docked and undocked windowed views and gives you the option of restoring the screen layout in the future with the **Restore Win** button (or addon menu option).

You've now got your server set up for your forward view (with a virtual cockpit if you like that), and your two side monitors set up for left and right. You must manually undock the right and left views by right clicking on them selecting the undock option. Finally use the **Restore Win** button (or addon menu option) which will position and resize the views.

Warning - the Restore process will not work if you have a TH2Go device, the device changes the window sizes and positions making them unknown to other software.

You can also control the windowed view display using either the **Open Win** (and **Close Win**) buttons on the server dialog, or via the **Open Windowed Views** and **Close Windowed Views** options within the simulator's **OpusFSI** add-on menu.

If you wish to amend your views then remember you must repeat the process of,

- reloading the modified aircraft.cfg file by first selecting a different aircraft type then reloading your original aircraft
- undocking and repositioning the windows
- using Save Win to save the positions
- to display the views manually undock the windowed views and then use Restore Win to restore the window positions

If you wish to create a separate panel view on your server then follow the above instructions to create a new Windowed View and associate it with your aircraft. Select the required Virtual or 2D camera type depending on the cockpit you are using, then adjust the camera's coordinates and zoom settings to create a close up view of the instrument panel or panels. You may find it helpful to undock the main simulator's view during this process, this will allow you to adjust the shape of the window to match the panel(s) and your intended screen layout. You may also find it helpful to use the Stepped camera control to make fine adjustments to the camera's eye position.

If you have more than three monitors then the **Display Window View** button enables you to display an existing windowed view in order to align the view you are currently creating. A list of windowed views will be displayed, select one from the list with your mouse.

### **Example 3 - Quick Guide to Setting up a Default Scenic View on a Client**

First ensure you have selected and loaded an appropriate aircraft within the FSX or Prepar3D simulator on both the server and client PC.

To see the main form of the server program you must be running FSX or Prepar3D in windowed mode.

#### On your client PC

**Configure** the **FSX Server Network ID** to the server PC name or IP address.

In FSX set 2D panel transparency to 100%. Only do this on the client not the server.

Click on the **Configure** button to display the Configuration dialog and tick the **Enable Live Camera** checkbox. Restart the client program if prompted to do so.

#### On your server PC

Click on the **Configure** button to display the Configuration dialog and tick the **Enable Live Camera** checkbox.

Set the **Number of Client Computers** to one (or as appropriate).

The Camera Control dialog is displayed by clicking on the **Cameras** button on the FSI SERVER's main form.

Use the **Select Computer System** button or click in its associated text box to select the client PC. All client systems will be identified using their configured computer name. If no client computers are connected to the server when you open the dialog then this option will be disabled (grayed out).

If you have created a similar view to the one you want to create now then select it from the Camera List and select the **Clone** button. Otherwise select the **Create** button and the camera type. The Camera Editing dialog will be displayed.

Select the associated aircraft using the **Assign Aircraft Types to the Camera** button. It will first ask if you wish to assign multiple camera views to aircraft types, you can say No. Select the **All Aircraft Types** entry to make the view global, alternatively highlight all the associated aircraft types and click **OK**.

N.B If the client FSX is using a dummy or simple aircraft (recommended for performance reasons when you are viewing scenery only and not external views of the aircraft) then ensure your assigned aircraft types are set to **All Aircraft Types**.

Tick the **Default View** checkbox.

Tick the **2D Cockpit** checkbox.

To create your side (or other) view change the eye point for the view using the **X, Y, Z, Pitch, Bank,** and **Yaw** camera control buttons, or by entering values directly into the coordinate text boxes, or by using the **Live Camera Control**.

Use the **Zoom** button to adjust the camera view's zoom settings. Finally, click on the **OK** button to save your changes.

The new camera configuration file will be transferred onto your client system prior to reconfiguring all of the client system's aircraft.cfg files. You must have the file permissions and sharing set correctly so that the file can be transferred.

When you start up you should have your default view on the client.

N.B. If you have set up a scenic view intended to be displayed with the 2D panel disabled and display the view with the 2D panel enabled, the eye position will not be as expected. In such cases use the Shift-1 key sequence to toggle the 2D panel OFF.

## **Example 4 - Quick Guide to Setting up a Default Forward View on the Server and Side Views on separate Client PCs**

First ensure you have selected and loaded an appropriate aircraft within the FSX or Prepar3D simulator on both the server and client PC.

To see the main form of the server program you must be running FSX or Prepar3D in windowed mode.

### On your client PC

**Configure** the **FSX Server Network ID** to the server PC name or IP address.

In FSX set 2D panel transparency to 100%. Only do this on the client not the server.

Click on the **Configure** button to display the Configuration dialog and tick the **Enable Live Camera** checkbox. Restart the client program if prompted to do so.

### On your server PC

Click on the **Configure** button to display the Configuration dialog and tick the **Enable Live Camera** checkbox.

Set the **Number of Client Computers** to two (or as appropriate).

The Camera Control dialog is displayed by clicking on the **Cameras** button on the FSI SERVER's main form.

*Set up the Default Forward view on the server as per the instructions in Example 1...*

If you have created a similar view to the one you want to create now then select it from the Camera List and select the **Clone** button. Otherwise select the **Create** button and the camera type. The Camera Editing dialog will be displayed.

You may modify the view name by clicking in the Camera text edit box.

Select the associated aircraft using the **Assign Aircraft Types to the Camera** button. It will first ask if you wish to assign multiple camera views to aircraft types, you can say No. Select the **All Aircraft Types** entry to make the view global, alternatively highlight all the associated aircraft types and click **OK**.

To create your forward (or other) view change the eye point for the view using the **X, Y, Z, Pitch, Bank, and Yaw** camera control buttons or by entering values directly into the coordinate text boxes.

Tick the **Default View** checkbox. If required **Disable TrackIR**, set the **Transition Time** and enable **DHM**.

Use the **Zoom** and **DHM Options** buttons to adjust the camera view's zoom settings and specify any associated Dynamic Head Movement respectively.

Finally, click on the **OK** button to save your changes.

*Set up the left side view on the left client ...*

Use the **Select Computer System** button or click in its associated text box to select the left client PC. All client systems will be identified using their configured computer name. If no client computers are connected to the server when you open the dialog then this option will be disabled (grayed out).

If you have created a similar view to the one you want to create now then select it from the Camera List and select the **Clone** button. Otherwise select the **Create** button and the camera type. The Camera Editing dialog will be displayed.

Select the associated aircraft using the **Assign Aircraft Types to the Camera** button. Select the **All Aircraft Types** entry to make the view global, alternatively highlight all the associated aircraft types and click **OK**. N.B If the client FSX is using a dummy or simple aircraft (recommended for performance reasons when you are viewing scenery only and not external views of the aircraft) then ensure your assigned aircraft types are set to **All Aircraft Types**.

Tick the **Default View** checkbox.

Tick the **2D Cockpit** checkbox.

To create your left side view change the **Yaw** to -90 by entering the value directly into the coordinate text box. Click in the Yaw field (it will turn red), type in -90 (note the minus sign; you want the camera to turn left), then hit the enter key. The camera view will rotate to 90 degrees left.

Use the **Zoom** button to adjust the camera view's zoom settings.

Finally, click on the **OK** button to save your changes.

#### *Set up the right side view on the right client ...*

Use the **Select Computer System** button or click in its associated text box to select the right client PC. All client systems will be identified using their configured computer name. If no client computers are connected to the server when you open the dialog then this option will be disabled (grayed out).

If you have created a similar view to the one you want to create now then select it from the Camera List and select the **Clone** button. Otherwise select the **Create** button and the camera type. The Camera Editing dialog will be displayed.

Select the associated aircraft using the **Assign Aircraft Types to the Camera** button. Select the **All Aircraft Types** entry to make the view global, alternatively highlight all the associated aircraft types and click **OK**. N.B If the client FSX is using a dummy or simple aircraft (recommended for performance reasons when you are viewing scenery only and not external views of the aircraft) then ensure your assigned aircraft types are set to **All Aircraft Types**.

Tick the **Default View** checkbox.

Tick the **2D Cockpit** checkbox.

To create your right side view change the **Yaw** to 90 by entering the value directly into the coordinate text box. Click in the Yaw field (it will turn red), type in 90, then hit the enter key. The camera view will rotate to 90 degrees right.

Use the **Zoom** button to adjust the camera view's zoom settings.

Finally, click on the **OK** button to save your changes.

The new camera configuration file will be transferred onto your client system prior to reconfiguring all of the client system's aircraft.cfg files. You must have the file permissions and sharing set correctly so that the file can be transferred.

When you start up you should have your default views on the server and clients.

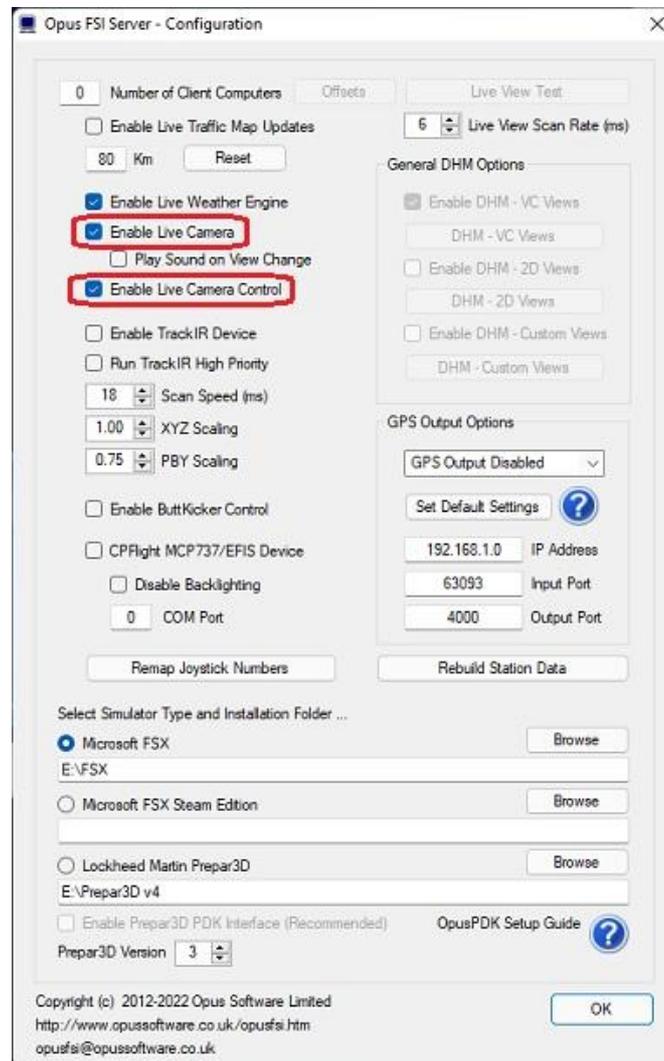
N.B. If you have set up a scenic view intended to be displayed with the 2D panel disabled and display the view with the 2D panel enabled, the eye position will not be as expected. In such cases use the Shift-1 key sequence to toggle the 2D panel OFF.

## **Removing OpusFSI Custom Views and Restoring the aircraft.cfg Files**

If you wish to disable Live Camera and remove the Opus custom views from your aircraft.cfg files then disable Live Camera in the Configuration dialog. A message box informs you that Live Camera is removing the Camera Definitions from all aircraft.cfg files for you. These changes will NOT be noticeable until you either restart FSX, or reload a completely different aircraft type forcing FSX to reload the modified cfg file.

## Panning Sequences

In order to use Panning Sequences enable both **Live Camera** and **Live Camera Control** in the Server Configuration dialog.



There is no limit to the number of sequences that can be created. Each panning sequence may consist of up to 99 eyepoint steps. The configured transition speeds and delays are used to play the sequence. The LCC can be used to define each eyepoint and options are provided to copy, flip and mirror steps which makes the creation of panning sequences quick and easy.

You may assign aircraft types to a sequence so that the sequence will only be played if the relevant aircraft is loaded.

In order to play the panning sequence during flight you may either,

- assign a key/button to each sequence (in sequence editing), the sequence will be played whenever you select the key/button in flight.

- assign up to nine sequences to each camera view (in camera editing), the sequence will be played when you select the **Play Panning Sequence** key/button (shortcut commands) in flight only if it has been assigned to the current camera on view. If there are multiple Panning Sequences assigned to a camera then the on-screen Menu box will be displayed in flight allowing you to select the required named Panning Sequence to be played. The Panning Sequence Menu is automatically removed after either a 15 second timeout period or when you make a selection.

Panning Sequences can be terminated during playback by pressing and holding down the Left Mouse Button for a few seconds. The playing sequence will be terminated at the start of the next configured eye point position, so make sure you are holding down the left mouse button when the next eye point position is reached.

Panning Sequences cannot be assigned or associated with client camera views, they can only be used on the main 'flying' server system.

### **Getting Started**

Example pre-configured Panning Sequences are loaded ready for you to try, edit, or clone. These sequences can also be Imported from Opus\_Panning\_Sequences.PSF.

The following five example Panning Sequences have been prepared,

- General - Look Left / Right
- General - Small Aircraft Fly Around
- General - Large Aircraft Fly Around
- Lancair Legacy - Walk Around
- Boeing 737 - Walk Around

The following procedure will allow you to make use of these sequences,

#### *Step One*

Open the Shortcuts dialog and assign a unique button or key to the new 'Play Panning Sequence' command option.

#### *Step Two*

Open the Cameras dialog and edit one of your Lancair or B737 Live Camera views.

#### *Step Three*

Click on the new Panning button, just above the TrackIR Limits options, and assign the required Panning Sequences to your current set of cameras for that aircraft type.

For example, assuming you are editing your B737 Captains view, click on the Panning button, answer Yes to the Assign To Multiple Cameras prompt, select all your B737 cameras, click OK, now select all the relevant B737 Panning Sequences ...

- General - Look Left / Right
- General - Large Aircraft Fly Around

## Boeing 737 - Walk Around

Click OK. You should now see that 3 Panning Sequences have been assigned or associated with each of your B737 Cameras.

Now click OK to save your editing and OK to save your Cameras file.

### Step Four

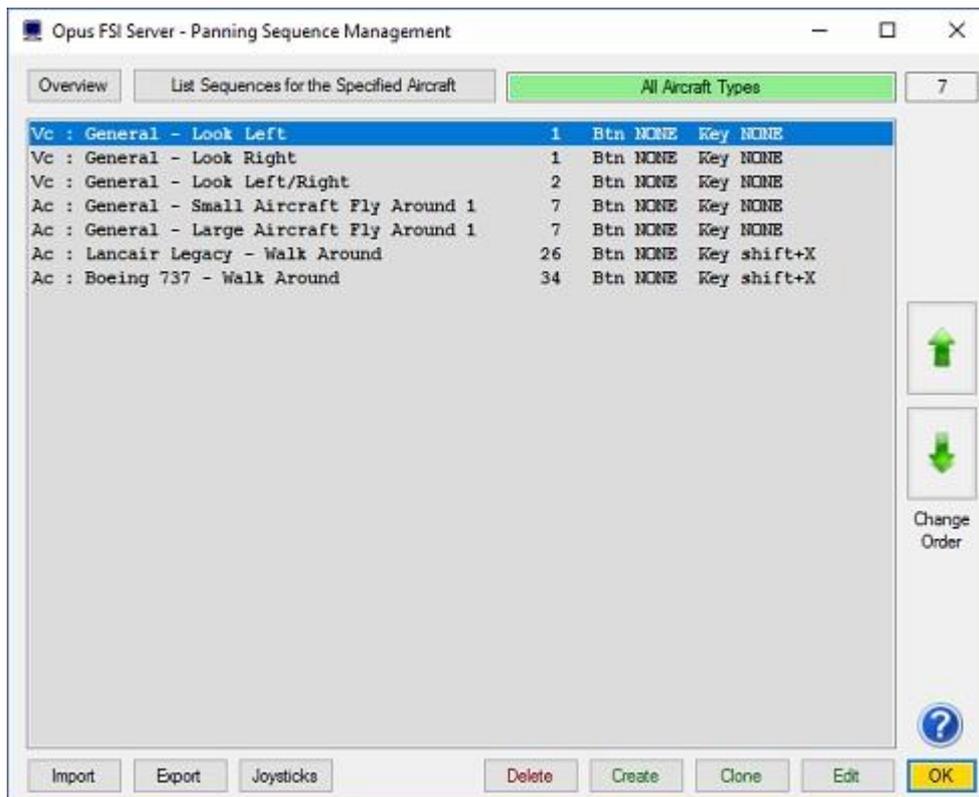
With all relevant Panning Sequences assigned to relevant camera views you can now use the configured **Play Panning Sequence** button or button/key to play a sequence. If there is only a single sequence assigned to the camera view then it will play. If multiple sequences have been assigned as per the above example, then the on-screen Menu will be displayed allowing you to select the required sequence to play. The selection can be made with the mouse or by pressing the appropriate number key 1 to 9. The Menu will close after the selection or after 15 seconds if no selection is made.

## Panning Management and Editing

You manage and edit panning sequences via the Panning button on the server form.



The Panning Management dialog will be displayed listing the configured sequences. If none exist an example set of sequences for the Lancair Legacy and B737 are loaded.



The dialog will automatically hide the FSI SERVER program's main form before being displayed in its last known screen position. The dialog can also be minimised down to the taskbar to assist those with limited screen space.

## Panning Management

The Panning Management dialog is used to perform all general panning management functions, that is,

- To display the current Panning Sequence List.
- To change the order of the sequences within the List using the green arrows.
- To **Create** or add new sequences to the List.
- To copy or **Clone** a sequence within the List.
- To modify or **Edit** a sequence within the List.
- To remove or **Delete** one or more sequences from the List.
- To **Import** one or more sequences stored in a Panning Sequence File.
- To **Export** one or more sequences into a named Panning Sequence File.
- Reassign **Joystick** numbers.

Within the Sequence List **Vc** denotes Virtual Cockpit view, **2d** for 2D cockpit and **Ac** for external aircraft view. The figure after the sequence name denotes how many steps are in each sequence.

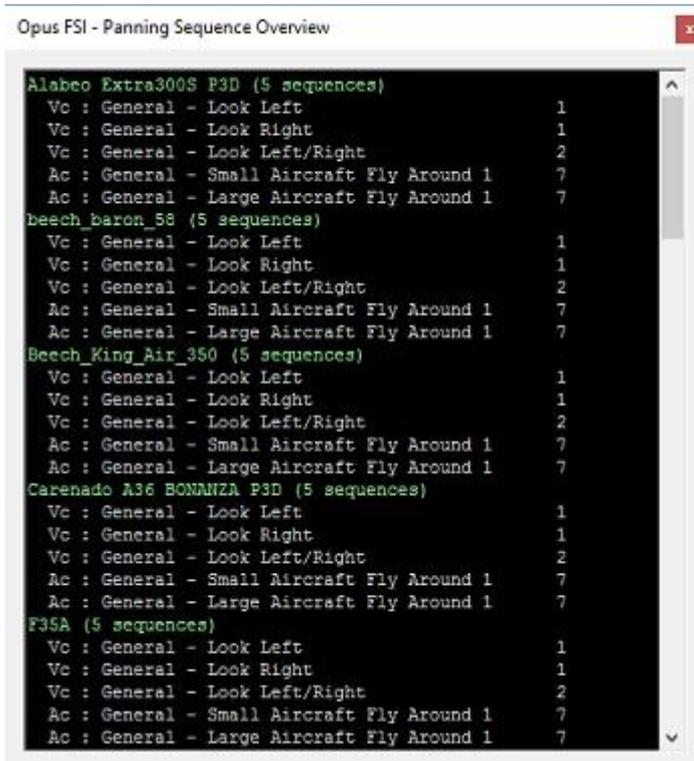
Double clicking on any listed camera will Edit the camera.

The displayed Sequence List can be restricted to all sequences assigned to a specified aircraft type using the **List Sequences for the Specified Aircraft** button option. When the Sequence List is restricted the Import options are greyed out and disabled.

*If you only have "All aircraft types" to choose from in the sequence list then set the \OpusFSI\_v5\FSISERVER.EXE file properties (compatibility tab) to "Run as Administrator".*

## Overview

The Overview button will display an overview of all cameras or sequences that match or are assigned to each known aircraft type. Each aircraft type is displayed in green followed by a list of all associated cameras or sequences assigned to that type.



## Changing the Order of Sequences

To change the order of a sequences within the Sequence List, first click on the sequence you wish to move, this will highlight the single item within the Sequence List, then use the **Up Arrow** or **Down Arrow** keys to move the highlighted item up and down the list.

## Creating a New Sequence

To create a 'new' (blank) panning sequence simply click on the **Create** button option along the bottom of the Panning Sequence Management dialog. The **Create** option first creates a new or blank sequence then opens the Panning Sequence Editing dialog ready for you to edit the newly created sequence.

Newly created sequences are automatically named 'Sequence X', where 'X' is the next sequence

number in the Sequence List. You should change the sequence name to something more meaningful (e.g. 'C172 - Walk Around') in the Panning Sequence Editing dialog. It is best to adopt a standard naming convention such as 'Global <description>' for global views, and '<aircraft> <description>' for aircraft specific sequences.

### *Cloning an Existing Sequence*

To copy or 'clone' an existing sequence, first click on the sequence you wish to clone, this will highlight the item within the Sequence List, then click on the **Clone** button option along the bottom of the Panning Sequence Management dialog. The **Clone** option first takes an exact copy of the sequence you have selected then opens the Panning Sequence Editing dialog ready for you to edit the newly cloned sequence.

Cloned sequences will adopt the name of the original sequence with an added '(C)' suffix to indicate that it is 'cloned'. You should change the sequence name to something more meaningful in the Panning Sequence Editing dialog.

### *Editing an Existing Sequence*

To alter or 'edit' an existing sequence, first click on the sequence you wish to edit, this will highlight the item within the Sequence List, then click on the **Edit** button option along the bottom of the Panning Sequence Management dialog. The **Edit** option opens the Panning Sequence Editing dialog ready for you to edit the selected sequence.

### *Deleting a Single Sequence*

To remove or 'delete' a single sequence, first click on the sequence you wish to delete, this will highlight the item within the Sequence List, then click on the **Delete** button option along the bottom of the Panning Sequence Management dialog. The **Delete** option will prompt you to confirm the operation, click 'Yes' to confirm and delete the selected sequence, press 'No' to abort the operation.

All the sequences are stored in the OpusFSI\_v5\FSXSERVER.PAN file for FSX, or FSESERVER.PAN for FSX-Steam Edition systems, or P3DSERVER.PAN for P3D. You can delete all sequences and start afresh simply by renaming or deleting this file prior to running the FSI SERVER program.

You will have a backup if you mistakenly delete a sequence and wish to restore it, see the Panning Sequence Backup section below.

### *Deleting a Group of Sequences*

To remove or 'delete' a group of sequences, first select the group of sequences you wish to delete, this will highlight them within the Sequence List, then click on the **Delete** button option along the bottom of the Panning Sequence Management dialog. The **Delete** option will prompt you to confirm the operation, click 'Yes' to confirm and delete the selected sequences, press 'No' to abort

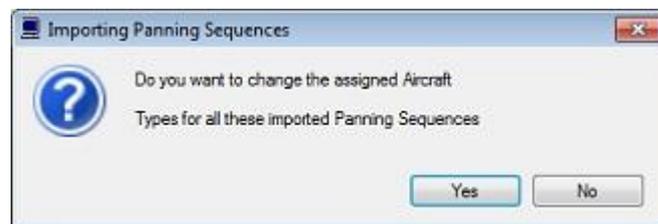
the operation.

### *Importing Sequences*

The Import option is greyed out and disabled when the current Sequence List has been restricted to a specific aircraft type. Any sequences which match existing names are not imported.

You can 'import' one or more sequences stored in a Panning Sequence File (PSF) by clicking on the **Import** button option along the bottom of the Panning Sequence Management dialog. This option will first display the **Open File** dialog ready for you to select the required PSF, Panning Sequence File. You can click on the 'X' in the top right-hand corner of the Open File dialog to abort the operation. Otherwise, navigate to the required folder and select the required named PSF file, then click on the **Open** button option.

You will then be asked if you want to change the assigned aircraft types for all the sequences to be imported. This is so that you can import sequences for use on a range of a similar aircraft type(s). For example you could import the Lancair Legacy sequences for use on the Maul etc.



Click 'No' to accept the previously assigned aircraft types. Click 'Yes' if you want to re-assign or change the assigned aircraft types. If you select Yes then a list of aircraft types is displayed for your selection. Click with the mouse to select an aircraft from the list, use <CTRL><left\_mouse\_click> to select multiple items from the list, use the standard windows method to select a consecutive group (click on the first item then <SHIFT>< left\_mouse\_click> on the last item). Each entry you select will turn the selected line blue. If you opt to re-assign the aircraft types then an '(R)' suffix will be appended to each sequence name to indicate the sequences have been re-assigned.

If you make a mistake and wish to remove the imported sequences simply select them in the Sequence List and click on the **Delete** option.

An Opus PSF Panning Sequence file is supplied in the OpusFSI\_v5 folder (*Opus\_Panning\_Sequences.PSF*) containing sequence definitions for the Boeing 737 and RealAir Lancair Legacy aircraft. A selection of PSFs will also be available on our Downloads page for import.

After importing edit the sequence to change the key/button assignments if required.

All your sequences are stored in the FSXSERVER.PAN file for FSX, FSESERVEN.PAN file for FSX-SE, or P3DSERVER.PAN for P3D. Importing from a Panning Sequence File (PSF) will automatically save your current sequences and backup your current PAN file into FSXSERVER\_UNDO.PAN for FSX, FSESERVEN\_UNDO.PAN for FSX-SE, or P3DSERVER\_UNDO.PAN for P3D. To undo the import for FSX

just delete your FSXSERVER.PAN file and rename FSXSERVER\_UNDO.PAN to FSXSERVER.PAN. Similarly for FSX-SE delete your FSESERVER.PAN file and rename FSESERVER\_UNDO.PAN to FSESERVER.PAN or for P3D delete your P3DSERVER.PAN file and rename P3DSERVER\_UNDO.PAN to P3DSERVER.PAN

You may notice PAN files with additional date stamps, these are copies of your PAN file automatically saved by the software to provide roll back options.

### *Exporting Sequences*

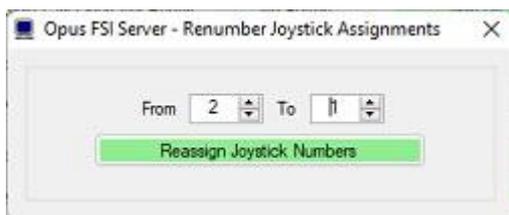
You can 'export' one or more sequences and store them in a Panning Sequence Definition File (PSF) by first selecting the group of sequences you wish to export, this will highlight them within the Sequence List. Use the mouse to click on the first item and shift click (or ctrl click) to select a group of views. Then click on the **Export** button option along the bottom of the Panning Sequence Management dialog.

This option will first display the **Save File** dialog ready for you to select the required PSF, Panning Sequence Definition File, or type in the required file name for the new PSF file to be created. You can click on the 'X' in the top right-hand corner of the Save File dialog to abort the operation. Otherwise, navigate to the required folder and select the required named PSF file or type in your file name, then click on the **Save** button option.

If the file already exists you will be asked if you want to replace it and overwrite the file storing the current selected sequences. Click 'No' to abort. Click 'Yes' if you want overwrite the file.

### *The Panning Sequence Joystick Option - Reassign Joystick Numbers for Panning*

First select (highlight) the group of panning sequences you wish to reassign within the management dialog, then click on the **Joysticks** button. In the **'Renumber Joystick Assignments'** dialog numeric boxes are primed and displayed allowing you to specify the 'From' and 'To' joystick numbers. The 'From' number is always primed with the first selected item's joystick number.



This option will change the assigned joystick numbering without changing the current device/joystick mapping.

### *Selecting Sequences within the List*

The standard Windows 'Left Click', 'Ctrl + Left Click' and 'Shift + Left Click' actions can be used to select sequences from within the Sequence List. All selected sequences are highlighted with a blue background within the Sequence List.

## Left Click

Move the mouse over the required sequence and left click on the mouse to select a single item within the Sequence List.

## Ctrl + Left Click

Move the mouse over the required sequence then hold down the Ctrl key and left click on the mouse to select an additional sequence.

## Shift + Left Click

Move the mouse over a sequence then hold down the Shift key and left click on the mouse to select all the sequences inclusively, between the previous selected sequence and the current sequence.

## *Where are my Sequences Stored*

All sequences are stored in an appropriately named PAN file within your x:\OpusFSI\_v5 folder, where 'x' identifies your installation drive letter.

The **FSXSERVER.PAN** file stores all sequences for use with the Microsoft FSX Flight Simulator.  
The **FSESERVER.PAN** file stores all sequences for use with the FSX-SE Flight Simulator.  
The **P3DSERVER.PAN** file stores all sequences for use with the Lockheed Martin Prepar3D Flight Simulator.

Any time the sequences are stored to disk a backup file is created with the same filename as above with the date stamp **\_DDMMYYY** appended. Where 'DD' is the current day, 'MM' the current month, and 'YYYY' the current year. Hence, previously backed up PAN files can easily be copied and renamed to restore the cameras from a previous date.

## *Sequence Editing*

The basic steps involved in creating a sequence are,

- Add or Clone a sequence
- Assign Aircraft Types to the sequences
- Make adjustments
- Save sequences

The Panning Sequence Editing dialog is used to perform all general editing of a sequence view, that is,

To change the sequence name.

To change the assigned aircraft types.

To change the camera view mode.

To change the assigned joystick button or key sequence.

To modify the eye point steps for the sequence.

A sequence is selected for editing in the Panning Sequence Management dialog using one of the Edit, Clone, or New options, or alternatively by double-clicking on a sequence using the left mouse button (which is the same as highlighting and using the Edit option).

Normally a sequence is created or edited with the view on the simulator's main display window. However, sequence management and editing can also be done without running the actual simulator.



### 1. Changing the sequence name

The sequence name is displayed and can be edited in the text box in the top left hand corner of the Panning Sequence Editing dialog. Sequence names should be chosen to indicate both the assigned aircraft type and view. For example, 'B737 - Walk Around'.

### 2. Assign Aircraft Types

Sequences can be associated with all aircraft, a group of aircraft or a single aircraft. The sequence can be assigned or associated with specific aircraft types using the **Assign Aircraft Types to the Sequence** option. The first assigned aircraft type name is displayed below the option along with the total number of aircraft types that have been assigned.

You will be prompted as to whether you wish to reassign multiple sequence views. If you select Yes then a list is displayed for you to select multiple sequences from. Next a list of aircraft types is displayed for you to assign the sequence(s) to.

Select the 'All Aircraft Types' entry to make the view global, alternatively highlight all the associated aircraft types. Use <CTRL>< left\_mouse\_click > to select multiple items from the list, use the standard windows method to select a consecutive group (click on the first item then <SHIFT> <left\_mouse\_click > on the last item). Click **OK**.

### 3. Select the Sequence View Mode

It can be either,

- **Virtual cockpit**
- **2D Cockpit** (scenic)
- **External Aircraft**

There are no facilities within the sim that gives us the 6DOF control over other view types.

#### 4. Adjust an eye point using the LCC or the Sequence Editing dialog

First select the required step by clicking on a step number button on the left. The currently selected step number will be highlighted in green. You can display the next and previous pages of steps by clicking on the right and left chevron buttons at the top and bottom of the column. The total number of configured steps (eyepoints) is displayed in the dialog.

##### *Adjusting the eye point using the LCC*

You can use **Live Camera Control** to adjust the eye point position by clicking on the required step number, then clicking on the **Edit with LCC** button. All changes and movements within the LCC are with reference to the 'current' eye point, hence they are labelled Left/Right, Fwd/Bwd, Up/Down, Pitch, Bank, and Yaw. Click on Set, Adjust or Create to save the position.



##### *Adjusting the eye point using the Sequence Editing dialog*

As an alternative to the LCC you can adjust the eye point for each step by setting the numeric values directly in the XYZ PBY text boxes (5). To enter a value into a XYZPBY text box, click on the step number to select the required step, click on the box, enter the new value, then either press the <return> key or click outside the box. All distances are in meters and all angles in degrees. XYZ values are displayed to 3 decimal places and PBY to 2 decimal places.

All these commands are with reference to the aircraft axes which normally runs through the centre of the aircraft. The X axis moves the eye point left and right, the Y axis up and down, the Z axis forward and back, and the Pitch, Bank, and Yaw movements are as expected.

#### **Speed, Delay and Defaults**

The transition **Speed** value allows smooth transitions between each step of the panning sequence. A value of 0 is used for instant transitions, otherwise the speed can be set between 1 (fastest) to 255 (slowest). All Speed settings greater than 100 are scaled to provide a wide range of transition times. A 'slowest speed' limit is imposed on the actual transition speeds to provide more consistency in the transitions. Note that different aircraft can have different VC panning rates.

##### *Stuttering camera transitions*

If you have set large transition times (for a slower transition) then your sim will have to process many more eye point adjustments. If your sim does not have enough time to handle these it will

ignore many of them and you could end up with less than smooth motion. If so then you must set much lower transition times.

The **Delay** in milliseconds is used at the end of each step during playback if you wish to pause at a step.

The configured **Defaults (6)** are used for the transition speed and delay between each step when playing the sequence. In addition for each step in the sequence you may configure a transition speed and delay to override these defaults.

## 7. Delete

Click on the required step number and then select **Delete**.

## Copy and Paste

Click on the required step number to copy from and select **Copy (8)**. Next click on the required step number to copy to and select **Paste (9)**. Note that when you click on an empty step at the end of the sequence it will be initialised with a copy of the previous step's data, you can just Paste over this.

## 10. Duplicate

Click on **Duplicate** to copy multiple steps with the option of flipping these steps about the horizontal, vertical or longitudinal axis. Enter the required from and to step numbers to be copied and select the appropriate radio button for any transformation. The new duplicated steps are appended to the end of the sequence.

This is a useful tool for quickly creating the second half of a sequence which circles the aircraft. For example for a walk around sequence create the steps for the first side of the aircraft walk around and then just duplicate these steps and choose the flip horizontal radio button, this will create the steps for the other side of the aircraft to complete the sequence. The duplicated steps are automatically reversed so that they continue from the end point of the original sequence i.e. if the original sequence starts at the front and stops at the tail then the duplicated sequence would start at the tail and stop at the front of the aircraft.

## Flip Horizontal, Vertical and Longitudinal

Click on the required step number and then select **Flip Horizontal (8)** to flip about the X axis, **Flip Vertical (13)** to flip about the Y axis, or **Flip Longitudinal (15)** to flip about the Z axis.

## Insert Above and Below

Click on the required step number and then select **Insert Above (12)** to insert a new step above the currently selected step, or **Insert Below (14)** to insert a new step below the currently selected step.

## Play from Start

Preview the whole panning sequence from the start.

## **Play from Pos**

Preview the panning sequence from the currently selected step position to the end. Panning Sequences can be terminated during playback by pressing and holding down the Left Mouse Button for a few seconds.

## **Change Order**

To change the order of the steps within the sequence use the green arrows. Panning Sequences can be terminated during playback by pressing and holding down the Left Mouse Button for a few seconds.

## **19. Joystick Button and Key Sequence**

If you wish to associate the sequence with a joystick button or keyboard key then click within the button or key command text boxes to specify the required assignment. When you click within the text box, the box will empty and turn red indicating it is waiting for your entry. You can now either click a second time to clear the entry, or press your desired joystick button or keyboard assignment.

OpusFSI will accept buttons 1 through to 32 of Joysticks 1 through to 16. All button and registered key events are displayed within the Spy window when the button or key is pressed. If they are not displayed then the joystick or button is invalid, either not registered within FSX, already assigned elsewhere (i.e. FSX, 3rd party add-on etc), or just an illegal entry.

You may use the same key/button assignment (e.g. key 1) for a particular panning sequence type (e.g. aircraft walk around) and restrict the aircraft type as appropriate for each walk around sequence you create. This means that in flight whenever you press the same key/button (e.g. key 1) you will play a walk around sequence for the currently loaded aircraft.

Refer to the *Assigning Joystick Buttons and Keyboard Keystrokes* section of this document for further details.

## **20. Return to Start**

Select this checkbox to return to the start of the sequence after playing the sequence during flight.

## **21. Return to Camera**

Select this checkbox to return to the camera view after playing the sequence during flight.

## **22. Acceleration**

Select this checkbox to accelerate and decelerate each step of the sequence during playback. If this is disabled the sequence will just accelerate to the first step and decelerate on the final step.

## **23. Disabled**

The **Disabled** option can be used to disable or enable a sequence for selection and play.

Finally, when you have finished editing a sequence you should click on the **OK** button to end the edit session. You can cancel or abort the edit operation at any stage using either the **Cancel** option or by clicking on the 'X' in the top right of the dialog.

## FAQ

### TrackIR doesn't work or DHM is jerky

You must follow the TrackIR setup instructions in the Getting Started guide. Try enabling the **Run TrackIR High Priority** option in the Server Configuration dialog.

TrackIR can become very jerky if 'precision' is disabled, its default key assignment is F7 so it's possible to inadvertently change its setting if you use F7 to increase flaps.

### How do I pan around?

At present you can use either Live Camera Control (using a game controller, or the arrow keys on the LCC dialog, or assigned shortcut keys), the standard hat switch, FSX Mouse Look or TrackIR.

FSX uses the hat switch as standard for panning views around, this panning is fully compatible with our camera control and effects. If you have disabled your controllers in the sim and are using FSUIPC then you can enable mouse wheel button panning and that also re-enables the hat switch on the joystick.

FSX Mouse Look conflicts with TrackIR so you need to disable TrackIR (F9) prior to using Mouse Look. To use Mouse Look try the following methods;

- press the space bar whilst holding down the left mouse button
- hold down the middle wheel button whilst moving the mouse around
- press shift-O then move whilst holding down the left mouse button, press shift-O again to exit mouse look
- program the wheel button to shift-O in your mouse driver.

### The camera dialog only lists "All aircraft types" or DHM doesn't work

Either right click on the your OpusFSI SERVER desktop shortcut icon, or the file C:\OpusFSI\_v5\FSISERVER.EXE in Windows Explorer, and select Properties, select the Compatibility tab, tick the checkbox to "Run as Administrator". Also set this option for FSICLIENT.EXE on your optional client PCs.

### The camera dialog doesn't list all my aircraft

Ensure your aircraft.cfg file is not corrupted and the file attribute is not 'read only'.

### My aircraft disappeared from the FSX/P3D list

When you open/edit an aircraft.cfg file in Notepad, select **File - Save As ...**

You will see the Encoding type in the bottom right-hand corner of the dialog. This should be set to **ANSI**.

## Missing aircraft textures - skeleton view

Basically the skeleton aircraft results from positioning the eye point for an external view but with a cockpit (VC) view selected on the display. We cannot actually determine what view is displayed, the software is forced to just select 2D then count in steps from there.

In OpusFSI v4 (and OpusFSX v3.49.3 onwards) you can specify the number of **Simulator View Modes** (Configuration dialog) on your system which should overcome this problem (but also refer to the information below regarding SP2 and 3rd party camera packages). For example if you have the Tower view disabled, the Simulator View Modes setting can be used to reduce the available view modes and allow the correct selection of the your external aircraft cameras.

For OpusFSX versions prior to v3.49.3 for correct operation your views should cycle (S key) between,

VC - Spot - Tower - Aircraft - External

Opus sets each of these view types as CycleHidden=No. You should ensure you have not hidden any of these views by setting their CycleHidden field to Yes in the aircraft.cfg or cameras.cfg files. Also ensure these files are not write protected.

Missing aircraft textures can also be caused by a corrupt FSX Service Pack 2 or Acceleration Expansion Pack.

Before disabling 3rd party camera packages their configuration utility must be run and the "Restore" function selected to restore all camera views to FSX default, otherwise 3rd party camera definitions are not removed from the aircraft config files and can cause problems.

## I've lost the F12 top down view

This problem is corrected in OpusFSI Beta Version 3.18.1 onwards.

N.B If you are using TrackIR then by default it re-assigns the F12 key to its center view function, other 3rd party packages may reassign keys too.

## My key/button assignments to change views don't work

All button and registered key events are displayed within the Spy window when the button or key is pressed. Keyboard events do not appear in Spy whilst editing cameras, only after they have been saved and edit mode is exited. If they are not displayed then the joystick or button is invalid, either not registered within the sim, already assigned elsewhere (i.e. FSX, 3rd party add-on etc), or just an illegal entry.

A joystick must be enabled in the sim for it to be recognised and its button press events to be forwarded on to OpusFSI.

The numeric pad keys 0 to 9 can be used but they must be assigned with the Num Lock ON (for recognition), and used with the Num Lock OFF within FSX/P3D. This is a quirk of the simulator and not the OpusFSI software.

Make sure you are assigning the key/button assignments in the correct camera dialog box. Button assignments go in the top box and key assignments in the bottom box in the camera dialog.

When you create camera views you can assign them either to a particular aircraft, or group of aircraft, or "all aircraft", if the views are assigned to specific aircraft then one of those aircraft must be loaded in FSX/P3D.

Your sim main window must have focus before using the key.

### **Camera transitions are not smooth and stutter**

If you have set large transition times (for a slower transition) then your sim will have to process many more eye point adjustments. If your sim does not have enough time to handle these it will ignore many of them and you could end up with less than smooth motion. If so then you must set much lower transition times. Also check TrackIR and other eye point adjusting software, none of which will be compatible unless it is interfaced to OpusFSI. Switching Vertical Sync (Nvidia Inspector) to 1/2 refresh may fix the problem, if V.Sync is off or on it can cause stutter.

### **What views can I see on the server and client computers ?**

You can display any interior (cockpit), exterior (scenic), or external (aircraft) views on the main 'flying' server system. You can only display exterior (scenic), or external (aircraft) views on the secondary client systems. You cannot control the aircraft by displaying panels such as CDUs or GPS on the client systems - these are non flying slaves.

On networked systems, the main 'flying' server PC operates the same as it would on a standalone (single PC) system providing the same assortment of interior (cockpit), exterior (scenic), and external (aircraft) views; and hence it provides the means to monitor and control the aircraft and its systems. In addition, the Live View and Live Camera networked links with the secondary client systems (PCs or Laptops) allows a variety of exterior (scenic) and external (aircraft) client system views to be created and controlled. If desired, a number of exterior views can be used on your networked multi-screened system to create a panoramic vista. All views are created and controlled centrally from the server system.

On networked systems, the Live View connections automatically synchronize the aircraft's current position, attitude, flaps, rudder, ailerons, gear and lighting configuration, and simulator's date/time, along with either your chosen weather theme or the full METAR weather for the surrounding area.

OpusFSI supports Windowed Views on the server and all client systems. These additional views are ideal for multi-screened PCs as well as single large screen displays. All windowed views can be positioned and sized automatically.

### **Can I create an Instrument Panel view ?**

Yes, but the controls only work on the main 'flying' server machine.

First create a windowed view associated with the aircraft type on your main 'flying' server.

Select virtual or 2d cockpit view.

Tick the Windowed View checkbox.

Adjust the viewpoint (x, y, z, pitch and yaw) to centre the view on the required instrument panel. You can adjust the z axis to move the eye point in as close as you want.

Save the camera views and reload the aircraft type to force FSX to reload the aircraft.cfg file.

Your new windowed view should be on display, you can now position your window. Click on the **Save Win** button to save the position and size of your window.

### **Can I use Live Camera with another weather engine?**

You can but of course the DHM and Bump Aircraft turbulence effects are not going to be as good as when you use the Opus LWE, which we believe is by far the best, since it is the LWE that supervises all intelligent and RW turbulence effects, both the DHM and the Bump Aircraft turbulence. Its only the LWE that can possibly provide such real time supervision because its the LWE that knows the exact meteorological conditions surrounding your aircraft. Hence, for maximum realism in the simulator, which is what OpusFSI is all about, it's is by far best to couple both the OpusFSI Live Weather Engine with the Live Camera views and their associated real world DHM and Bump Aircraft.

### **I don't have any turbulence with Live Camera**

When using **Live Camera** our DHM effects are associated with camera views so you must configure a camera view with DHM effects and set it as either the default view, assign it with a keyboard key or joystick button, or configure it as a windowed view. When you then subsequently display the camera view in flight (by default or by pressing the assigned key/button) you will see the DHM effects.

For turbulence on the aircraft itself select both the **Bump Aircraft** and Turbulence Effects options (**Turbulent Motion** and/or **Turbulent Bump**) within DHM. Enable sim turbulence (which is set via the FSX menu option - Options, Settings, Display. Select the Weather tab, there is an option for turbulence and thermal effects on the aircraft).

If you can't see the DHM effect on your aircraft then set the "\\OpusFSI\_v5\FSISERVER.EXE" file properties (compatibility tab) to "Run as Administrator". This can be done by right clicking on the program in Windows Explorer or right clicking on the desktop shortcut.

### **I don't have any wing flex**

To see wing flex you must select advanced animations which is set via the sim menu option - Options, Settings, Display. Select the Graphics tab. To see changes to the VSI enable the options for turbulence and thermal effects on the aircraft in FSX which is set via the FSX menu option - Options, Settings, Display. Select the Weather tab.

## **"Unable to transfer camera configuration data across to system <client\_name>" message**

You must set up your drive sharing, security, permissions etc. as described in the Getting Started guide so that the server and client systems can access each other BOTH ways. You will find your configured camera definition files for your client systems stored in the c:\OpusFSI\_v5 installation folder on your server system, they are named < CLIENTNAME>.CAM

## **Can I use 3rd party packages with OpusFSI?**

All Opus DHM effects are camera shake effects with the exception of the Bump Aircraft option in the DHM dialog. Setting this option results in bumping the aircraft's motion synchronously with the DHM low frequency turbulence effect.

If you are using Accu-Feel then turn off their global turbulence, chop, gusts, and clear air turbulence in order to prevent conflict with OpusFSI.