CameraPosition X

Documentation

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1.   Overview

This small application makes it very easy to add and edit camera definitions for your aircraft.

You can:
- Load and edit CameraDefinition - tags from your aircraft and simulator definition files
- Add end Edit new cameras by visually positioning them in the simulator world
- Add fixed point "world" cameras either globally or individually for your aircraft
- Remove unwanted camera definitions.
- Build a playlist out of camera definitions that cycles through the different positions automatically
- **Works completely stand alone – camera definitions are saved to your aircraft.cfg or cameras.cfg.**
  It is not required to run this app alongside your simulator once you have set up your cameras.

2. Installation

2.1 Distribution

CameraPosition X is distributed as self-extracting installer packages.

2.2 Installation

– Please use the installer intended for your sim:
  – FSX boxed or dual install with SE: *CameraPositionX_Install.exe*
  – FSX SE stand alone: *CameraPositionX_SE_Install.exe*
  – Prepar3D V2.5: *CameraPositionX_P3D_Install.exe*
  – Prepar3D V3: *CameraPositionX_P3D_V3_Install.exe*
  – Prepar3D V4: *CameraPositionX_P3D_V4_Install.exe*

Running the installer:
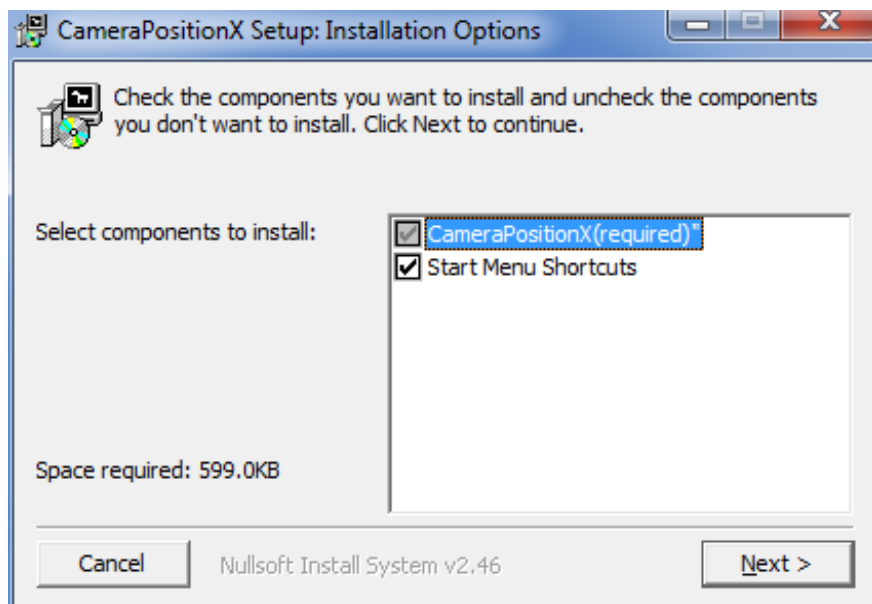
– "Start Menu Shortcuts": CameraPosition X will be added to your Start Menu (advised)
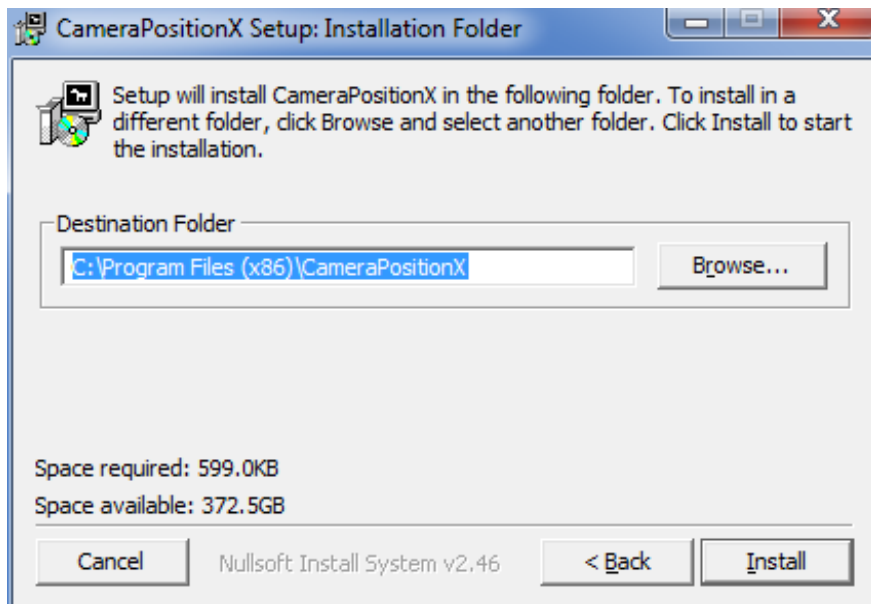
- On the next page you choose the installation path for CameraPosition X.
  THIS IS NOT THE PATH TO YOUR SIMULATOR DIRECTORY, IT IS USED EXCLUSIVELY FOR CameraPosition X!
- Selecting "Install" will begin the installation

2.3   Microsoft .Net 4.5.1

The CameraPosition X requires that the .Net ("dot Net") library version 4.5.1 is installed and current on your PC.

This library can be obtained here:

https://www.microsoft.com/en-us/download/details.aspx?id=40779

2.4   SimConnect

CameraPosition X relies on SimConnect being installed correctly on your computer. SimConnect is a part of FSX/P3D and it is set up automatically when you first install the simulator. To save you the trouble of installing the SDK, the necessary SimConnect DLL for each sim is shipped inside CameraPosition X and gets deployed in your Temp folder when CameraPosition X is run.

FSX only: In case SimConnect is not installed, and CameraPosition X does not start up, giving you an error message instead, you will have to install the SimConnect Client manually:

- FSX boxed users can find the "SimConnect.msi" installation file either online or in the FSX SDK folder "..\Microsoft Flight Simulator X SDK\SDK\Core Utilities Kit\SimConnect SDK\lib"
- FSX SE users find it here: "..\Steam\steamapps\common\FSX\SDK\Core Utilities Kit\SimConnect SDK\LegacyInterfaces\FSX-SP1\SimConnect.msi "

2.5   Pause on Task Switch

CameraPosition X is a separate application, a task independent from your simulator.

It is therefore extremely important, that you switch the "Pause On Task Switch" option OFF in your simulator. If you leave it on, the CameraPosition X cannot work correctly!
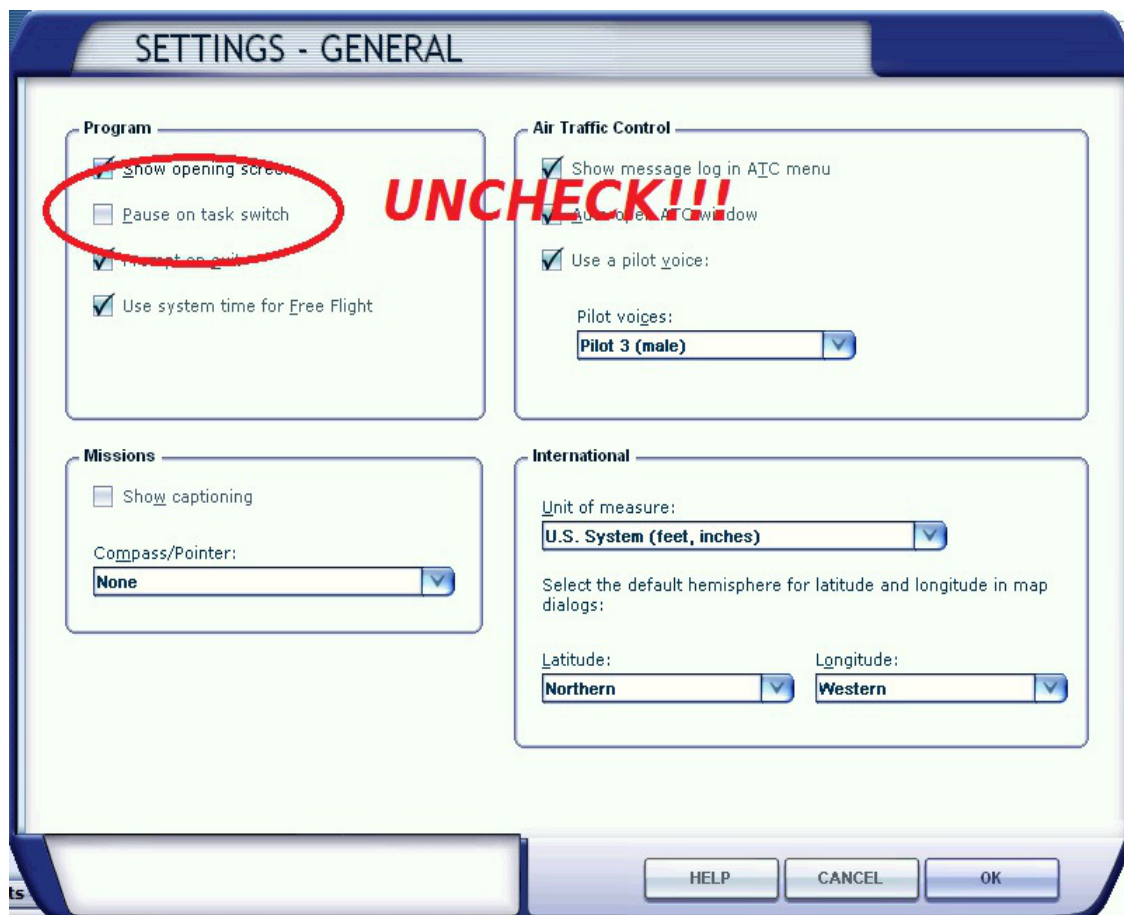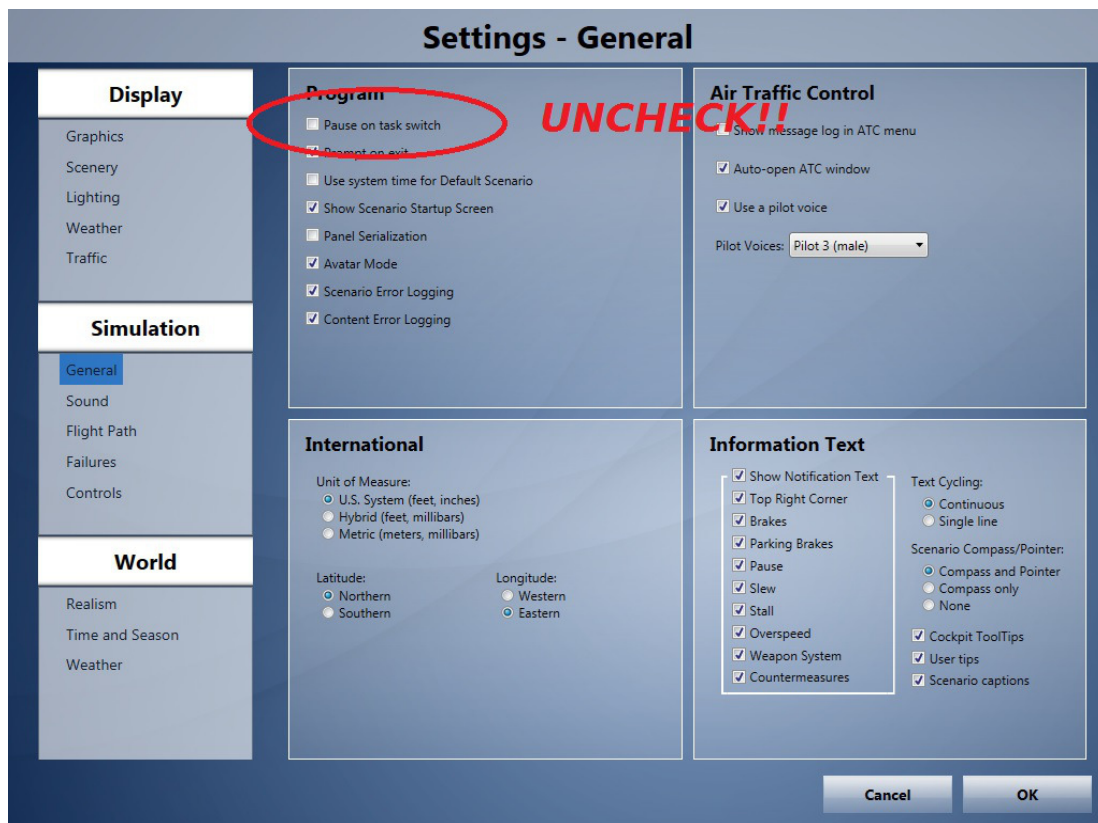
2.6 Run as Administrator

CameraPosition X needs to change files inside your simulator's main directory. If that directory is inside the standard installation path ("Program Files" or "Program Files (x86)", then the standard UAC (user access control) mechanism of Windows 7 and above may interfere with this, causing errors when you try to save cameras. To avoid this, please run this application as Administrator.

2.7 EZDOK compatibility

Starting with version 1.14, CameraPosition X is largely compatible with EZDOK.

One thing needs to set up in advance: the global definition 203 "EZCA Aircraft cam" is hidden from the view cycle (parameter "CycleHidden=Yes". This prevents the app from calling up aircraft cameras. Please change this parameter to "No", either by using the CameraPosition X or by editing the "cameras.cfg" file with Notepad.

There will still be interference, but generally all features worked in our tests.

- To move the camera with CPX, EZDOK has to be disabled temporarily in the simulator Add-ons menu (Add-ons\EZdok camera addon\global disable).

- On occasion the camera switching mechanism will get out of sync. In that case, please restart the CameraPosition X, connect to the sim and then switch to the "EZCA VC cam" manually before proceeding.

3.   Main Window

3.1 Description
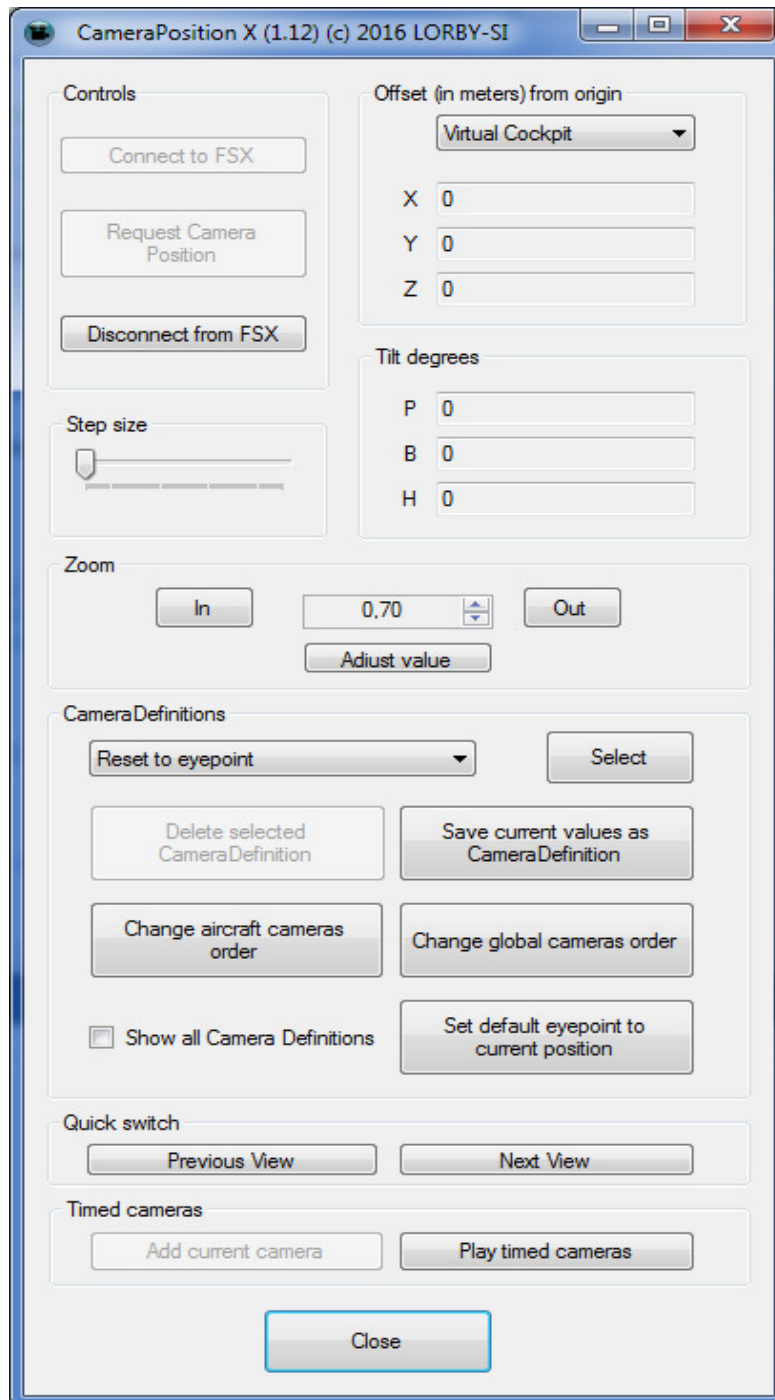
The Elements explained:

- Button "Connect to FSX" initializes SimConnect
- Button "Request Camera Position" starts the polling mechanism

- Button "Disconnect from FSX" terminates SimConnect
- Slider "Step Size" controls the amount of movement when you shift the camera around
- DropDown "Offset (in meters)" displays the camera definition origin – the X/Y/Z values below are always relative to this point
- X/Y/Z: the position of the camera as offset from the origin
- P/B/H: pitch, bank and heading of the camera
- Buttons Zoom "In" "Out": control the camera zoom in the sim
- Button "Adjust value": the zoom function can get out of sync and display a different value than the simulator window is set. Press this button and nudge the value to the correct zoom setting.
- CameraDefinitions: This dropdown list contains all camera definitions from your aircraft.cfg and your cameras.cfg that can be edited with the tool
- Button "Select" loads the selected camera definition.
- Button "Deleted selected CameraDefinition" removes the selected definition from the .cfg file.
- Button "Save current values as CameraDefinition" opens the Save Camera dialog where you can either replace the selected camera or save a new one.
- Button "Set default eyepoint to current position" will change the eyepoint setting of your aircraft to the current camera position. Use this with caution!
- Buttons "Previous View" and "Next View" cycle through the camera definitions in the drop down list.
- Button "Add current camera" adds the currently selected camera to the playlist
- Button "Play timed cameras" opens the Timed Cameras dialog
- Button "Close" ends the program

3.2 Connecting to the simulator

To connect the application to your simulator,

- First start the sim and load your aircraft.
- Wait until the loading process is complete, then select the Virtual Cockpit view
- Now you can start the CameraPosition X and press "Connect to FSX/P3D".
- If the connection to SimConnect has been established, the button "Request Camera Position" becomes active – click on it
- Now the X/Y/Z/P/B/H field should all show the value "0", as the camera is positioned at the default eyepoint of your aircraft.

IMPORTANT:
CameraPosition X assumes that your standard VC view is at the simulator default – looking forward and level, at the eyepoint position of the aircraft, with a zoom factor of 0.70.

Please make sure that your view matches this position before you proceed, or your camera definitions will be offset to what you are seeing.

The application switches to this position automatically, but depending on your simulator setup and other addons there might be interference.

3.3 Camera Control

The following keyboard commands move the camera either in the simulator or when the CameraPosition X window has the focus.

The movement is being accelerated as long as you keep on holding down the keys.

- Ctrl & NumPad 4   = pan left
- Ctrl & NumPad 6   = pan right
- Ctrl & NumPad 8   = pan down
- Ctrl & NumPad 2   = pan up
- Ctrl & NumPad 9   = tilt left
- Ctrl & NumPad 3   = tilt right
- Ctrl & "+"   = zoom in
- Ctrl & "-"   = zoom out

- Ctrl & Enter   = reset view

- Shift & Ctrl & NumPad 4   = move left
- Shift & Ctrl & NumPad 6   = move right
- Shift & Ctrl & NumPad 8   = move forward
- Shift & Ctrl & NumPad 2   = move back
- Shift & Ctrl & NumPad 9   = move up
- Shift & Ctrl & NumPad 3   = move down

The CameraPosition X will only track these exact viewing system events, any other way of moving the camera or the viewpoint will not be processed!

When using these keys in the simulator, the CameraPosition X will override all native simulator events that are associated with the above keys.

3.4 Selecting existing cameras

Existing cameras are read on startup from your aircraft.cfg and cameras.cfg. The cameras that you can select are limited to those that can be edited with the application.
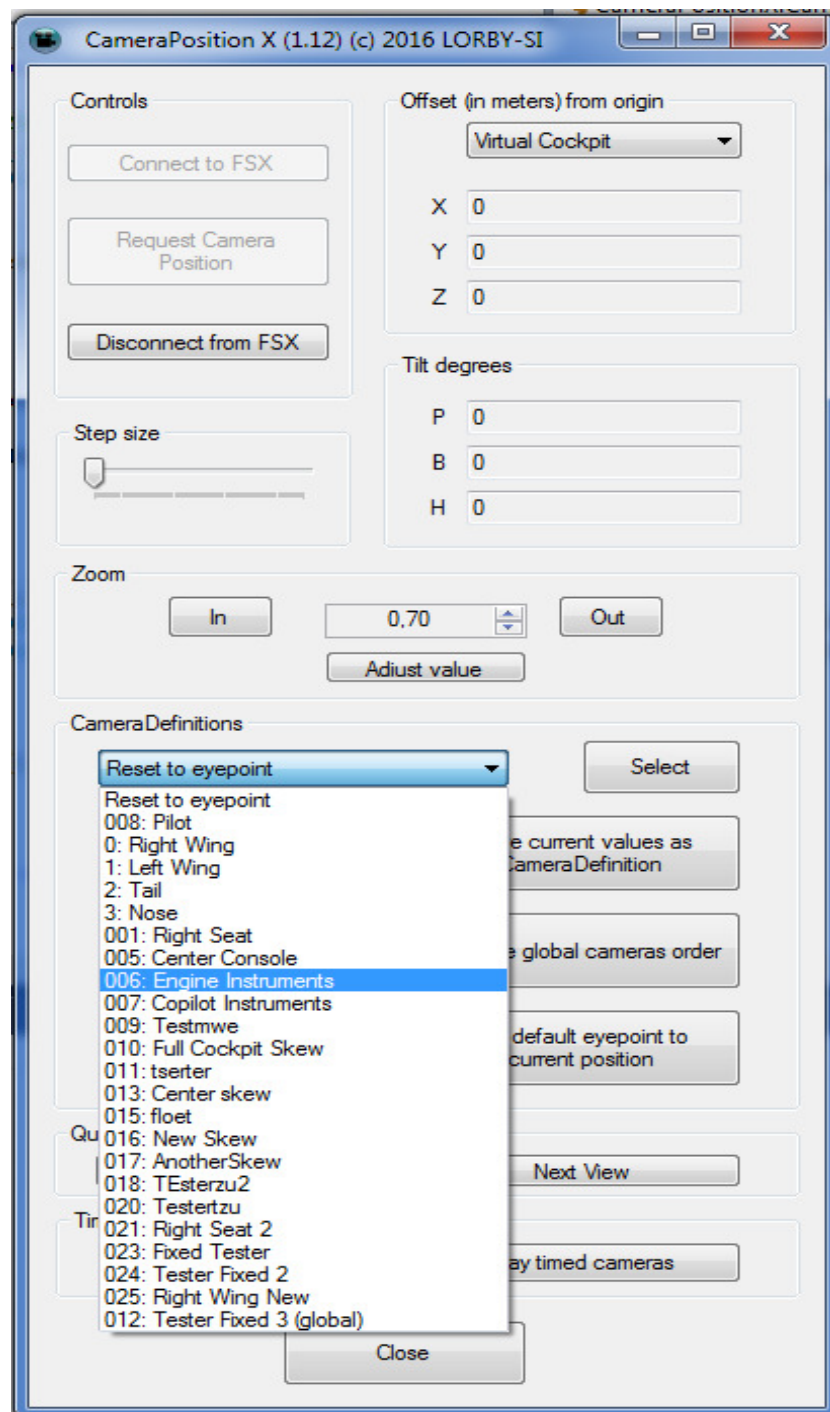
Select a camera from the dropdown list and press "Select" - the camera values will be loaded and the simulator view is shifted to the camera position.

"Reset to eyepoint": Reset the camera display to the default eyepoint.

Notes:
As the simulator viewing system does not allow the reading of values, the shifting of the camera is asynchronous and it can fail. In that case please use the controls in the simulator to load the intended camera position.

Zoom is especially critical and it will happen rather often, that the zoom setting in the sim will not correspond to the zoom setting in the app. In that case, please use the "Adjust value" button of the zoom section to adjust the value to the actual zoom in the simulator.

Sometimes it helps to use the "Reset to eyepoint" value, then switch back to the camera.

Some camera types may require you to switch to another view mode first (outside view, tower view).

3.4 Selecting cameras in the simulator

Once a camera definition has been saved, the application resets the viewpoint to the VC default. You can immideately select the new camera with the view system in the sim, either by using the main menu or the view context menu that you get when right-clicking on you simulator view.

(Right Click)

4. Save Camera Window

With this dialog, all parameters that can be edited in cfg files can be altered.

Note that you can create any type of camera defintion that you want, but the CameraPosition X app can only read, work with and display Virtual Cockpit, Aircraft and Fixed position cameras.

After the camera has been saved, the aircraft is reloaded in the simulator to make the camera available. Depending on the aircraft model, this may take a while.

4.1. Add a new camera

- The "Add" button is inactive until you type in a unique "Title" string.
- The GUID is calculated when the camera is saved

4.2. Replace an existing camera

- By default, the "Replace" button is active – the values will be saved to the existing camera.
- If you change the "Title", then the button "Add" will become active, and you can save the camera as an additional new definition. A new GUID is calculated when you press the button.

4.3. Adding a fixed camera

Fixed cameras can be saved either globally (=to the cameras.cfg) or individually for the current aircraft (=to the aircraft.cfg).

To position a fixed camera:
- Switch to the standard Virtual Cockpit view ("Reset to eyepoint")
- Select "Fixed" from the origin drop down
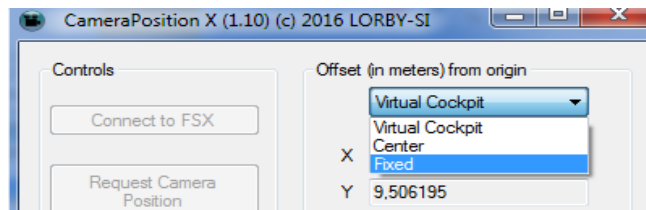
- move your aircraft close to the desired location
- then fine tune the camera position and orientation with the control keys.
- Save the camera. On the save dialog, make sure that the Origin is "Fixed" and the Category is "Custom".
- Fixed cameras can be saved as "Global" cameras to your cameras.cfg file, making them available in every aircraft. When saving a fixed camera, the appropriate button "Add Global" will be visible on the save dialog.

4.4. Editing a fixed camera

Unfortunately, fine tuning an existing fixed camera's lat/lon/alt position is next to impossible. The reason is, that the simulator overrides the camera control input with accelerated movements of its own, making the camera move wildly off it's intended track – and thus invalidating the lat/lon/alt readout on the main dialog (you never know if these values are correct or not).

Your only option is to delete the fixed camera and create a new one as described in the previous chapter.

P, B, H values on the other hand can be adjusted normally.

4.5. File backups

The CameraPosition X creates two types of backup files:

- When the application is first run and used to alter an existing aircraft.cfg or cameras.cfg, a backup file ending with "_orig" is created, containing the initial content of the file
- When the same config file is altered again at a later date, the last configuration is saved in a backup file ending with "_CPXBAK"

In case you want to revert to the original cfg or to the previous state, just delete the current cfg and rename the backup file to it's original name.

4.6.   Camera parameters

The following is an excerpt of the official FSX SDK documentation. Parameters that cannot be set with cfg changes have been abbreviated or removed. Values in bold print are the default settings.

Notes:
- The values "True/False" are translated to "Yes/No" in the CameraPosition X.
- Some Parameters that are not set in the dialog and keep their default values are not written to the config file (the simulator will use the default anyway).

Camera Definitions

Property	Type	Range	Description
title	String		Camera title; appears in the upper-right corner of the view window when changing cameras.
guid	GUID		Camera definition's unique identifier. This GUID must be unique.
description	string		Camera description. This is not used by the system, but can be used to provide a descriptive string in the configuration file.
origin	list	**Cockpit** Virtual Cockpit Center Pilot Tower Fixed	Every camera definition must have an origin that defines the object or point on which the camera is oriented: • Cockpit – Camera is locked at fixed position in the 2D cockpit. Forward views include 2D instrument panel. Oblique view angle show virtual cockpit interior. • Virtual Cockpit – Camera is mounted at the eye point defined in the aircraft's CFG file. • Center – External (spot plane) camera that points at the center of the aircraft's visual model. • Pilot – External (spot plane) camera that points at the pilot position inside the aircraft's visual model. • Tower – External camera mounted at a control tower defined via the facilities (BGLCOMP) database. • Fixed – External camera at a fixed position. Fixed camera definitions must include

			FixedLatitude, FixedLongitude and FixedAltitude values. Note that this does not affect the View menu that the camera title appears in, the menu is set by the [category](#) parameter.
showpanel	bool	Yes/**No**	Determines whether the 2D instrument panel is shown.
snappbhadjust	list	**None** Ordinal Swivel Orthogonal	These settings control how camera movement is handled when the camera system receives a view pan or "snap to" command. • None – Commands are ignored (position remains fixed). • Ordinal – Camera moves to the next ordinal compass position in the direction of the command. • Swivel – Camera moves incrementally in the direction of the command. • Orthogonal – Camera rotates in the direction of the command (used in top-down view).
panpbhadjust	list	**None** Ordinal Swivel Orthogonal	Same range of options as snappbhadjust.
snappbhreturn	bool	True/**False**	If true, camera position returns to its initial position when the snap movement command key is released.
panpbhreturn	bool	True/**False**	If true, camera position returns to its initial position when the pan movement command key is released.
track	list	**None** FlyBy Track TrackBank FlatChase FlatChaseLocked	External cameras have the ability to track a user or AI object. The Track parameter controls this behavior: • None – No tracking behavior. User has manual control over the camera. • FlyBy – Fly-by mode; the camera is positioned away from the user aircraft (at a location given by ChaseDistance, ChaseAltitude and ChaseHeading values) and tracks the aircraft for ChaseTime seconds before computing a new position. • Track – Camera tracks the object while maintaining its position. • TrackBank – Camera tracks the object while maintaining its position. • FlatChase – Camera moves with the object, maintaining a fixed distance from it. Camera movements are dampened.

			• FlatChaseLocked – Camera moves with the object, maintaining a fixed distance from it. Camera movements are rigid.
showaxis	list	Yes **No** FrontOnly	Determines whether the axis indicator is shown.
allowzoom	bool	**Yes**/No	Controls whether the camera responds to zoom commands.
initialzoom	float	0.0 to 512.0 Default: 1.0	Sets the initial zoom.
smoothzoomtime	float	0.0 to 30.0 Default: 5.0	The zoom time in seconds. By default, zooming in and out is "smoothed" by changing between old and new zoom levels over a small time period (5 seconds). This setting enables you to control this effect on a per-camera basis.
showweather	bool	Yes/**No**	Determines whether weather visuals are shown.
InitialXyz	XYZ (see [notes](#))	-500.0 to 500.0 (for each of the three) Defaults: 0.0	Camera XYZ position offset from the default location in meters.
InitialPbh	XYZ (see [notes](#))	-90 to 90.0 (pitch) -180 to 180.0 (bank and heading) Defaults: 0.0	Camera pitch, bank and heading orientation offset from the default in degrees. Note that positive pitches give a downward view. Positive headings are to the right.
xyzAdjust	bool	**True**/False	Controls whether the camera responds to position change commands.
xyzRate	float	Default: 0.25	The desired speed of the camera in meters per second. The direction of movement is determined by the camera control keys that are pressed.
xyzAccelleratorTime	float	Default: 5.0	The time in seconds it will take for the camera to reach the speed set by xyzRate. A value of 0 will disable acceleration. Note that xyzAdjust must be set to True for this feature to be enabled.
AllowPbhAdjust	bool	**Yes**/No	Controls whether the camera responds to pitch, bank and heading change commands.
showlensflare	bool	True/**False**	Determines whether lens flare effect can be shown (based on user setting).

category	list	Aircraft AirTraffic **Cockpit** Custom Outside Multiplayer Runway Scenery Tower	Every camera definition must include a category that defines how the camera is exposed in the user interface. Categories define the view cycling behavior (S and A keys) as well as the menu structure. Some categories (AirTraffic, Runway, Multiplayer and Tower) can also be instance-based, meaning new cameras are created automatically based on the object type.
momentumeffect	bool	Yes/**No**	Controls whether the camera exhibits momentum effect. This is determined by the settings in the [Dynamic Head Movement](#) section.
zoompanscalar	float	0.0 to 100.0 Default: 0.0	One side effect of zooming in on an object is that it becomes difficult to make fine camera panning adjustments because the absolute movement of the camera around its position remains constant. The ZoomPanScalar setting compensates for this by adjusting panning movements by the given factor in relation to zoom level. Movement is scaled by dividing the ZoomPanScalar value by the zoom level. For example, with a ZoomPanScalar setting of 1, camera panning is reduced by half at 2x zoom (1 / 2). A setting of 2, on the other hand, accelerates panning to twice the normal rate at 1x zoom (2 / 1) and is exactly the normal rate at 2x zoom (2 / 2).
pitchpanrate	float	0.0 to 100.0 Default: 10.0	Controls the rate at which pitch is changed in degrees per second.
headingpanrate	float	0.0 to 100.0 Default: 30.0	Controls the rate at which heading is changed in degrees per second.
panacceleratortime	float	0.0 to 30.0 Default: 5.0	Pan acceleration time in seconds. When panning the camera, an acceleration/deceleration effect is added over a period of time. The larger this value is the longer it takes for the pan movement to reach its full rate (as controlled by PitchPanRate and HeadingPanRate), thus yielding smoother panning movement. Lower numbers yield more abrupt panning.
hotkeyselect	integer	1 to 10 No default.	Links the camera to one of the 10 pre-defined key events for activating cameras; see the Control Assignments dialog.
transition	bool	Yes/**No**	When switching between camera views a "smooth" transition is obtained by moving the camera in real time from its old location to the new one. Note that this behavior is only applied if the Transition settings for both cameras are set to yes. If either or both are set to No then the view switch is instantaneous.

clipmode	string	**Normal** Minimum Spot Tower	This setting is used to control how the clip planes are computed. Clip planes are used to set the minimum and maximum distances for rendering in a 3D graphics program. The relative location of these planes determines how precise the graphics engine can maintain the Z-order of objects. A discussion of clip plane management is beyond the scope of this document. However, the concept is relevant to the camera system because it determines whether the camera favors near or far objects in the view: • Normal – The near clip plane is scaled along with the zoom level. Useful for most views. • Minimum – Clamps the near clip plane at its absolute minimum value (1 meter). Useful for cameras where the camera is placed close to object geometry (e.g., aircraft cameras). • Spot – Favors distant objects by scaling the near clip plane with altitude and distance. Useful when the camera is positioned a reasonable distance away from the target object (e.g., spot view). • Tower – Favors near objects by scaling the near clip plane by one-half the zoom level and clamping the far plane based on visibility settings with an absolute limit of 20km. Useful when objects at the limits of visibility aren't important.
chasedistance	float	0.0 to 3000.0 Default: 0.0	Initial distance in meters of the camera from the target object in external views.
chaseheading	float	-180.0 to 180.0 Default: 0.0	Initial angular offset in degrees of the camera relative to the target object in external views.
chasealtitude	float	-1000.0 to 3000.0 Default: 0.0	Initial altitude in feet of the camera relative to the target object in external views.
chasetime	float	0.0 to 200.0 Default: 0.0	Length of time in seconds an aircraft is kept in Fly-By view before a new position is computed.
instancedbased	Bool	Yes/**No**	If Yes, a new instance of the camera is created for each instance of the object referenced by the TargetCategory setting.
cyclehideradius	float	0.0 to 100.0 Default: 0.0	For instance based cameras, sets the distance (in nautical miles) beyond which the camera is skipped in the cycling order.
targetcategory	list	**None** AI Planes Fixed	Determines which object class, when a new instance is created, triggers the creation of a new InstanceBased camera.

cyclehidden	bool	Yes/**No**	If Yes, the camera is hidden from view cycling—it does not appear when cycling through views using the keyboard.
FixedLatitude	latitude	-90.0 to 90.0 Latitude values can be expressed in decimal (-90 to +90) or hemispheric (N90 to S90) notation. Default: 0.0	For Fixed camera types, the latitude of the cameras position.
FixedLongitude	longitude	-180.0 to 180.0 Longitude values can be expressed in decimal (-180 to +180) or hemispheric (W180 to E180) notation. Default: 0.0	For Fixed camera types, the longitude of the cameras position.
FixedAltitude	float	-500.0 to 30,000,000.0 Default: 0.0	For Fixed camera types, the altitude of the cameras position in meters.

5. Timed Cameras

5.1. Overview

The "Timed Cameras" feature makes it possible to run an automated cycle of camera definitions indefinitely at pre-defined times. This can be useful for demo applications or YouTube videos.
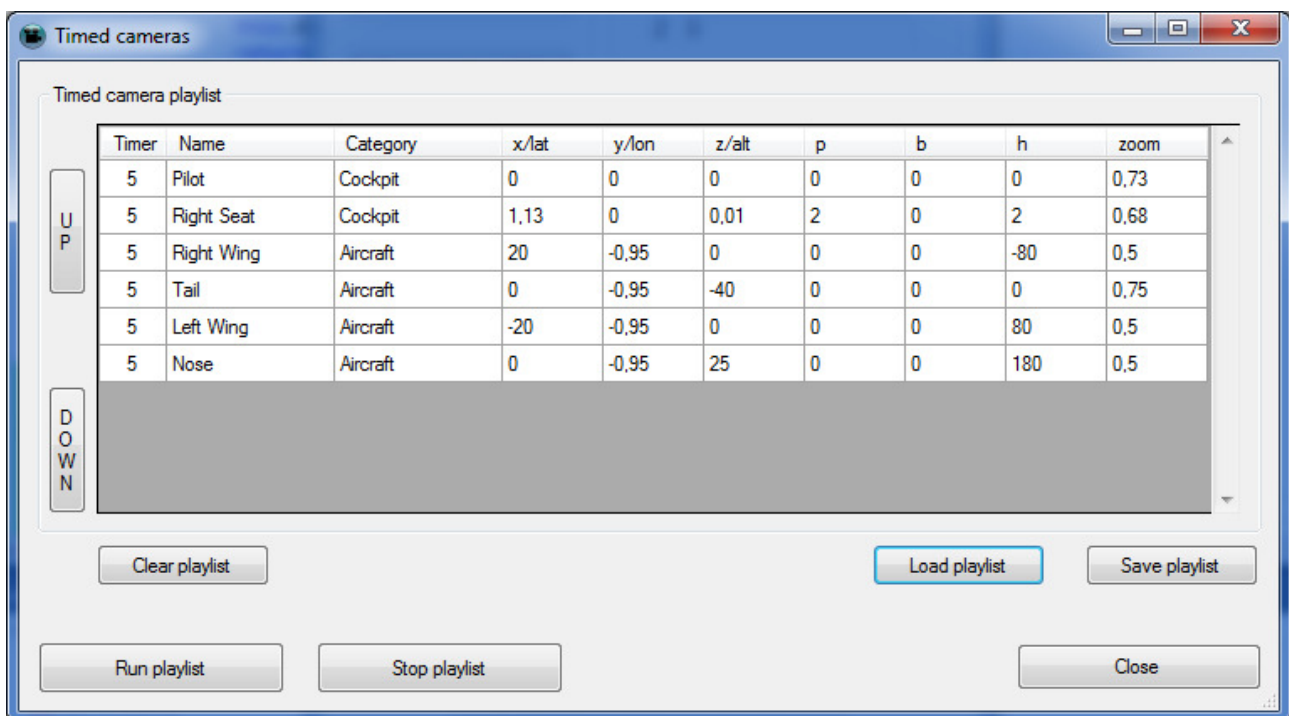
Note: the CameraDefinitionX application has to be running alongside your sim to used the timer feature.

5.2. Add a camera to the playlist

On the main window, after you have selected a camera and it is displayed in the sim, you can user the "Add current camera" in the "Timed cameras" section to add that camera to the playlist.

5.3. Show Playlist

On the main window, use the "Play timed cameras" button to open the playlist dialog:

Timer	Name	Category	x/lat	y/lon	z/alt	p	b	h	zoom
5	Pilot	Cockpit	0	0	0	0	0	0	0,73
5	Right Seat	Cockpit	1,13	0	0,01	2	0	2	0,68
5	Right Wing	Aircraft	20	-0,95	0	0	0	-80	0,5
5	Tail	Aircraft	0	-0,95	-40	0	0	0	0,75
5	Left Wing	Aircraft	-20	-0,95	0	0	0	80	0,5
5	Nose	Aircraft	0	-0,95	25	0	0	180	0,5

This dialog displays a list of all cameras, that you have added to the play list.

5.4. Change timing

The column "Timer" contains the number of seconds that the app will wait before it displays the next camera.

The timer value can be changed like this:
- left click on the number reduces it by one second
- right click on the number adds one second

5.5. Change camera order

To change the order of the playlist, highlight the desired row with the mouse and use the "UP" / "DOWN" buttons to shift it's position in the list.

5.6. Remove camera from the playlist

To remove a camera from the list, right-click on any column other than the "Timer". A context menu with "Delete" appears – click on it, to remove the row from the list.

5.7. Run playlist / Stop playlist

The button "Run playlist" starts the camera sequence. It will be cycling through the camera positions in the playlist until either the playlist window is closed or until you press the button "Stop playlist".
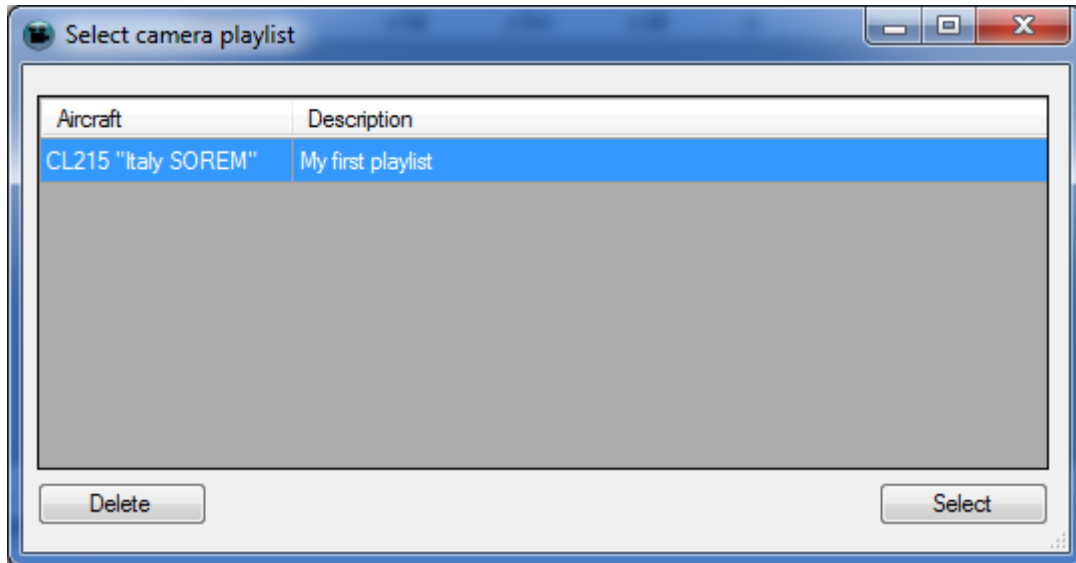
5.8. Save playlist

The button "Save playlist" opens the save dialog:
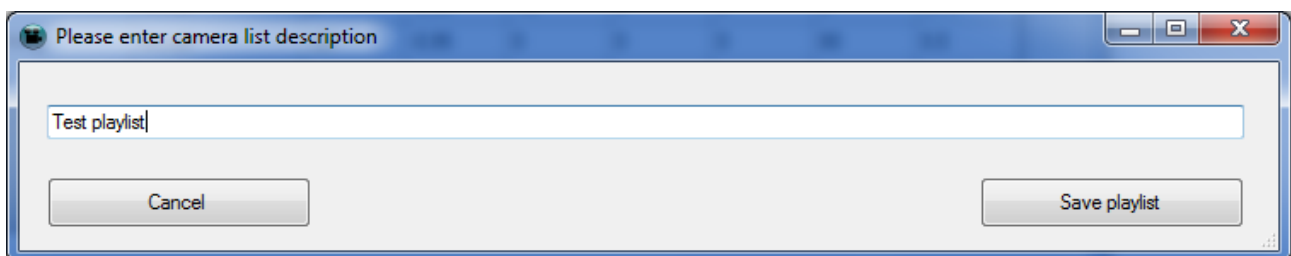
Add a description to identify the playlist, then the button "Save playlist" will save the current playlist.

5.9.   Load playlist

The button "Load playlist" opens the selection dialog:

Highlight a row and choose "Select" to load the playlist.

Clicking on "Delete" removes the selected playlist from the database.

5.10.   Clear playlist

Pressing the button "Clear playlist" will reset the currently displayed list and remove all camera definitions.

6. Disclaimer

CameraPosition X is licensed for private, non-commercial use only. It is not sold, any property rights remain with the author.

You may not distribute this package or parts of it.

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- any results, output, or data provided through or generated by the software will be accurate, up-to-date, complete or reliable;
- the software will be compatible with third party software;
- any errors in the software will be corrected.
- the software will not cause errors or damage to the computer system where it is installed.

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