



X-Camera

X-Camera Version 2.4.4

User's Guide

10/4/2025

Stick and Rudder Studios

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Change Log

Version	Changes
2.4.4	<ul style="list-style-type: none">• Fixed a bug where the TrackIR offsets were not getting rotated based on the camera's heading.• Fixed a bug where camera move commands would not work if executed via a XPLMCommandOnce operation that started and completed in the same flightloop.• Extended the XPLMCommandOnce fix to the rotational commands• Added a Mouse Move Factor setting• Added the ability to sort the traffic display by call-sign or distance• Fixed a bug where the pan speed factor and movement speed factor settings were not getting saved to the X-Camera.ini file• Fixed a minor bug that caused a slight camera jitter when restoring a camera that had HeadShake enabled.• Fixed a bug where the mouse move inputs were not being properly rotated based on the camera pitch and heading.• Fixed a bug where the External Head Tracking API offsets were not getting rotated based on the camera's heading.• If you try to set the mouse smoothing factor to < 1 it will force it to 1 instead of the 10 which was the previous behavior• If you are running X-Plane 12.4.1 or higher the Cinema Verite feature has been replaced by the G-Loaded Camera option.• Fixed a crash issue on X-Plane 12 if you had a set of camera transitions that never end do to the last camera in the transition having an auto advance. Some people used this for a never ending orbit.• For X-Plane 12 we now monitor the G-Loaded camera X-Plane toggle command and toggle the G-Loaded option on the current camera.• Added support for the Skunkcrafts Updater• Stop loading the cinema_verite dataref when G-Loaded camera is available in X-Plane 12• Added a setting to suppress duplicate view ID warning when saving cameras, Issue #18• Added Passive Camera option• Added support for hand-help camera on external cameras when running X-Plane 12• Added additional information in the traffic display, Issue #10• Added styles to smooth transitions• Added support for a custom curve smooth transition style• Improved the Validate License UI to warn users if invalid characters are entered in the key field• Added support for optionally saving the last control panel position so that it will open in that saved location when X-Plane is started• Made the Disable Cockpit Zoom work with the new X-Plane 12 zoom feature• Changed the check for updates dialog to provide details of where to get

	<p>the SkunkCrafts Updater.</p> <ul style="list-style-type: none"> Fixed issue #21 where the X-Camera was not getting enabled if being managed from the PluginAdmin UI
2.4.3	<ul style="list-style-type: none"> Switched to a new update server so the community aircraft file updates will work
2.4.2	<ul style="list-style-type: none"> Added support to rotate the circle camera using View Axis inputs Improved support for control panel window placement when multi-monitor configurations were using 2D panel windows (like with Real Sim Gear) Fixed a bug where X-Camera was not following a scenery folder link when searching for an airport layout Added support to save the state of the target reciprocal checkbox when doing a SAVE_ALL Removed the unused reference to <code>sim/flightmodel/misc/cgz_ref_to_default</code> in order to silence the X-Plane 12 deprecated dataref warning Updated X-Camera to work with the latest version of Scenic Flyer Built with X-Plane 12 SDK which supports the Apple M1 chip when used with X-Plane 12 Made adjustments to text to speech for X-Plane 12
2.4.1	<ul style="list-style-type: none"> Added a backup and import from backup feature Fixed a problem with generating airport cameras where the stand name could get corrupted if the scenery had stand names with just numbers in them Added additional camera paste functions that allow you to insert a copy of a camera below or above the current camera Added full copy paste support for categories that match the functionality of the camera copy and paste functions Added a setting to optionally change the mouse wheel behavior on a circle camera to zoom rather than move forward / back Changed location of <code>Imgui.ini</code> file to be in the X-Camera home folder so it does not conflict with other plugins Fixed a bug where airport viewpoint names did not default to something reasonable when the airport author did not specify a viewpoint name Added an ability to import a camera file directly from the operating system file system Added a Check for Updates function Removed the feature that automatically refreshed community aircraft files on start. This is now accomplished as part of the check for updates menu item OSX xpl now signed with an official developer certificate Fixed a rare crash bug that can occur if you load an X-Plane .SIT file from an unusual folder outside the X-Plane folder structure. Added an indicator in the View ID drop-down if the view id is currently assign to one or more cameras.

- Added an Always On Top option to the popped-out mini control panel. This is only available on the Windows OS.
- Added a new dataref “SelectedCamera” that allows you to see which camera is selected and to selected cameras even when they do not have an assigned view ID.
- Added a voice confirmation when saving cameras
- Circle Cameras will now move with hat switch inputs
- Reduced the amount of rotational movement using the arrow keys on a circle view.
- Added an option to optionally reverse the mouse Y axis in a circle camera so that its behavior more closely matches the X-Plane circle view
- Added a new Traffic Display window that will show you the TCAS traffic near your plane and allow you to select them when in AI Perspective mode
- Added a new feature where you can set the camera origin on an external camera to either the Frigate or the Aircraft Carrier. When you select these cameras they will be located relative to position of that ship.
- Fixed a bug where if you disabled X-Camera in the plugin admin window and re-enabled it the X-Camera menu was showing up twice in the plugin menu
- Fixed issues with not finding all the airports in the loaded scenery
- Fixed bugs with transitions with free cameras where the cameras were not getting their X,Y,Z coordinates updated from the camera’s latitude and longitude after an X-Plane restart.
- Added support for disabling X-Camera if you enter VR mode.
- Added a Level Camera option to the Create Orbit dialog
- Added the ability to select the next camera with the same View_ID when View_ID’s are duplicated to create a camera set
- Fixed AI perspective issue that could cause erroneous fmod errors when in AI perspective mode and all AI aircraft disappear.
- Fix double click detection issue with very high frame rates
- Fixed a bug where X-Camera could not import more than 10 quick look views
- Fixed a bug where the Traffic Global aircraft view camera was not working when X-Camera was enabled
- Fixed a problem where the Mini-Control panel might not be displayed with a multi-monitor configuration if the main monitor was not in the multi-monitor set. Also added the ability to specify which monitor in the set you would like to see the Min-Control panel displayed on.
- Fixed a bug where the initial positions of imported quick-look views were not being saved for the Temporary Positioning option. This positions would reset to 0,0,0 as soon as you moved off the imported quick-look

Table 1

Release Notes

2.4.4

This release is primarily focused on supporting some of the new X-Plane 12 camera features the G-Loaded and hand-held cameras as well as the cockpit zoom features. The release also contains some new features as well as numerous bug fixes which are articulated in the 2.4.4 change log.

The following is a list of the new X-Camera features:

- Support custom curves and styles on smooth transitions
- Added support for optionally saving the last control panel position so that it will open in that saved location when X-Plane is started
- Added a setting to suppress duplicate view ID warning when saving cameras, Issue #18
- Added Passive Camera option
- Added additional information in the traffic display, Issue #10
- Added support for the Skunkcrafts Updater
- Added a Mouse Move Factor setting
- Added the ability to sort the traffic display by call-sign or distance
- Extended the XPLMCommandOnce fix to the rotational commands

2.4.3

- Switched to a new update server so the community aircraft file updates will work

Introduction

X-Camera is an enhanced view system plugin for X-Plane 11 and 12. With X-Camera you can define multiple view categories and multiple camera views within each category. These categories and views are unique to each aircraft allowing a high degree of customization.

The position of the camera in each view can be controlled using keyboard commands or the X-Camera control panel. After you have defined and configured all the views they can be saved to an aircraft specific CSV file in the current aircraft directory.

X-Camera also supports the creation of camera transition affects that can be used to create a series of panned views that can be executed in sequence. This is a great feature for making flight videos or setting up pre-flight inspections or fly-by scenes.

Tutorials

For those of you who prefer to watch videos rather than reading a user guide here is a link to a series of tutorial videos you can watch.

<https://www.stickandrudderstudios.com/x-camera-2-4-tutorial-videos/>

Licensing

X-Camera is offered in both an unregistered and a registered version.

- The unregistered version currently supports all available features with the exception of saving the advanced transition features and external camera capabilities; please see the next paragraph concerning the registered version. It also supports [TrackIR](#), an integration to the [HeadShake](#) plugin V1.3 or higher from [SimCoders](#), an integration to [LinuxTrack](#) via the newest version of the [xlinuxtrack](#) plugin, an integration to [XPRealistic](#), an integration to [SimHat](#), and an integration to the Scenic Flyer plugin.
- The registered version will allow you to save the linear and Bezier transition definitions, any advanced transition settings, and external camera definitions between X-Plane starts. It also supports Airport Camera Files and automatically generating airport camera files from your installed scenery. You can try out all of the advanced features in the unregistered version but you need to register your copy of X-Camera to save them. The following features can be saved with the registered version:
 - Linear Transition
 - Bezier Transition
 - Smooth Camera Joins
 - Auto Advance
 - Track Camera Heading
 - Track Camera Pitch

- Level Camera
- External Camera
- Cineflex Camera
- Free Camera
- Target Following Camera
- X-Plane 9 Chase Camera
- Airport Cameras
- Full set of generated airport cameras

If you are running an unregistered version of X-Camera you can still generate airport cameras from your scenery but the number of runway, starting location, and sign cameras will be limited. These generated cameras will also only be available for the current running instance of X-Plane. This will give you the ability to try out the airport camera generation feature before deciding to register X-Camera.

You can register X-Camera at <https://www.stickandrudderstudios.com/register-x-camera>. You can also purchase a key at the X-Plane.org store. The price is the same.

https://store.x-plane.org/X-Camera_p_889.html

We encourage you to try out X-Camera and if you find it useful consider registering your copy.

When you have registered X-Camera on the Stick and Rudder Studios website we will send you an email that contains your key. You may need to look in your email Spam directory as some email clients may block the email with the license file attachment. If you don't get the key in 30 minutes after registering please mail us at :

Support@StickandRudderStudios.com.

Use the X-Camera plugin menu "Validate Registration" to enter your key. You can copy your key to the clip board and paste it using the paste button on the key validation UI. Your key will be stored in the license.txt file so it will automatically validate when X-Plane is started in the future.

If you purchased a key from the [X-Plane.org store](https://store.x-plane.org) you will be provided a key during the checkout process.

Do not share your license key with anyone else.

Requirements

X-Camera will run on X-Plane 11.3 or higher. Microsoft Windows, Apple Macintosh, and Linux are all supported. If you are running on OSX you need to be at 10.15 or higher.

Updates

We recommend that you install the Skunkcrafts stand-alone updater. This tool can be used to get updates for X-Camera as well as other plugins and aircrafts:

<https://www.xcrafts.com/how-to-update-download-new-version>

You can also follow us on the X-Plane.org forums for information about updates and open betas:

<https://forums.x-plane.org/forums/forum/400-x-camera/>

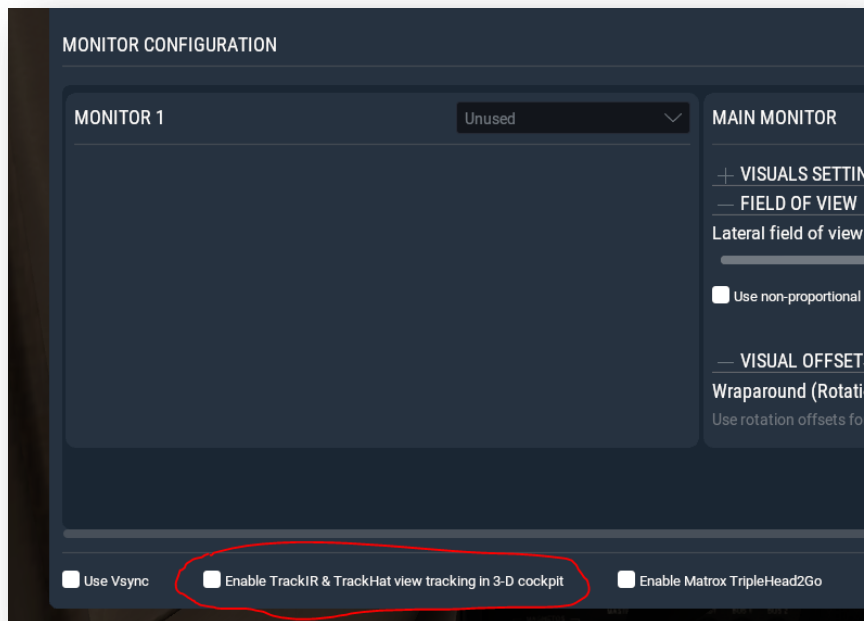
If you are interested in getting release updates and other information from Stick and Rudder Studios please join our mailing list.

<https://www.stickandrudderstudios.com/mailling-list/>

Limitations

- X-Camera only works with 3D cockpits and the free camera view of X-Plane. With X-Plane 11 only the free camera view from X-Plane will be unavailable. All other X-Plane views such as chase, etc. should continue to work but without the X-Camera features.
- You will not be able to change your horizontal field of view in the X-Plane rendering options while X-Camera is enabled if you have the “Enable Force FOV” setting enabled. Disable X-Camera using the X-Camera plugin menu option to adjust you default X-Plane horizontal field of view. You should also disable the “Enable Force FOV” option if you are running a Multi-Monitor configuration as you might encounter some very strange behavior.
- Time based camera transitions are based on the frame rate reported by X-Plane. When X-Plane is in replay mode and video recording is enabled the reported frame rate is incorrect and any time based transitions will occur very fast and not at the specified time. This problem only occurs when you are using X-Plane to capture video. Alternatively you can use a frame count for the transition or you could consider using an alternate video capture technique such as [FRAPS](#).
- If you plan on using X-Camera with [TrackIR](#) you must disable [TrackIR](#) in the X-Plane equipment settings. If you don’t, X-Camera will not retrieve accurate data from the [TrackIR](#) interface.
- [TrackIR](#) is directly supported on the Windows platform via the native [NaturalPoint](#) drivers and via [LinuxTrack](#) and the [xlinuxtrack](#) plugin on Linux and Mac OSX. You must make sure that X-Camera is in the TrackIR games list if you are running on Windows. If you don’t see it, execute a “Games Update” from the TrackIR UI.

We also know that a few users have had success with OpenTrack as it can emulate the TrackIR protocol.



Optional Integrations

TrackIR

X-Camera is built to work with Natural Point's [TrackIR](#). If you have this great product installed it can be enabled or disabled for each defined view. Please see the camera options section for more details on this feature.

X-Camera must be in the TrackIR games list. If you don't see X-Camera in the TrackIR games list you will need to update your games from the TrackIR UI.

The TrackIR software must be running before you start X-Plane, particularly if you load a plane that has an X-Camera definition, as X-Camera will attempt to auto-enable when the plane loads and it needs to have the TrackIR software running to enable the TrackIR feature. If you forget to start the TrackIR software before X-Plane all you need to do is start the TrackIR software, disable and then immediately re-enable X-Camera. That will cause X-Camera to initialize the TrackIR interface.

If you have problems getting TrackIR to work use the System Check item in the plugins/X-Camera menu to view any diagnostic messages.

X-Camera can also accept tracking input for 3rd party solutions that don't emulate the TrackIR interface. The datarefs and their use are outlined in the appendix under integrations.

Tobii Eye Tracking

Tobii Eye is similar to TrackIR where it can monitor your eye and head movement. Your head and eye movements can optionally be applied to any X-Camera camera. You need version 3.3.0 of the Tobii Game Hub X-Plane plugin in order for the integration to work with X-Camera.

If you do use Tobii Eye Tracking the Third Person Camera options in the Tobii Game Hub have no effect when X-Camera is enabled. This is because the X-Camera external cameras allow you setup a wide variety of external camera views all of which can accept head / eye tracking input.

<https://gaming.tobii.com/product/eye-tracker-5/>

SimHat

SimHat is an iPhone app that allows you to use your iPhone as a head tracking device. It has functionality similar to TrackIR. You can read more about SimHat here:

<http://www.simhat.com/>

If you have configured SimHat as your head tracking device you will want to check the TrackIR head tracking option on any camera that you want SimHat input applied.

Scenic Flyer

Scenic Flyer is a plugin that will optionally display a small GA or Glass instrument panel on the screen. This is useful if you like to fly with an exterior view but you still want to keep an eye on your speed, heading, etc. You will need V1.5 or above and you can get the plugin from this web archive:

<https://web.archive.org/web/20230518053216/http://www.digital-avionics.com/scenic/>

If X-Camera detects that the plugin is installed it will allow you to control Scenic Flyer panels by camera. Please see the camera options section of this manual for more information and an image of what the Scenic Flyer panels look like.

<https://www.youtube.com/watch?v=SAP-ySvCtIc&t=5m07s>

Tutorial Link 1

HeadShake

X-Camera is also built to work with the HeadShake plugin from SimCoders:

<http://www.simcoders.com>

HeadShake monitors the g-forces on the aircraft and will “shake” the camera according to those forces. If the HeadShake plugin is installed, X-Camera will allow you to enable or disable the HeadShake effect by each camera view. Note: HeadShake only works with X-Plane 10 and above.

XPRealistic

XPRealistic is similar to HeadShake but has even more immersive features. You can read about XPRealistic at <http://www.xprealistic.com/>. XPRealistic must be at version 1.0.6 for the integration to X-Camera to work.

RealView

RealView is similar to HeadShake and XPRealistic. You can read about RealView at https://store.x-plane.org/RealView_p_985.html.

LinuxTrack

X-Camera is also built to work with LinuxTrack. The integration works very similar to the HeadShake integration where X-Camera is able to detect the presence of the xlinuxtrack plugin. If it is detected X-Camera will read the offsets published by the xlinuxtrack plugin and will apply them to the camera position if the TrackIR option is enabled on that camera.

LinuxTrack needs to be at version 0.99.11 or higher.

Recommended Hardware

X-Camera can make extensive use of keyboard and controller button assignments to manipulate the cameras. Many of these button assignments you will do on either your yoke or joystick. We have found that a gaming mouse that has programmable buttons that can be mapped to keyboard keys adds an additional level of control in X-Camera. Here is an example of one of these gaming mice.

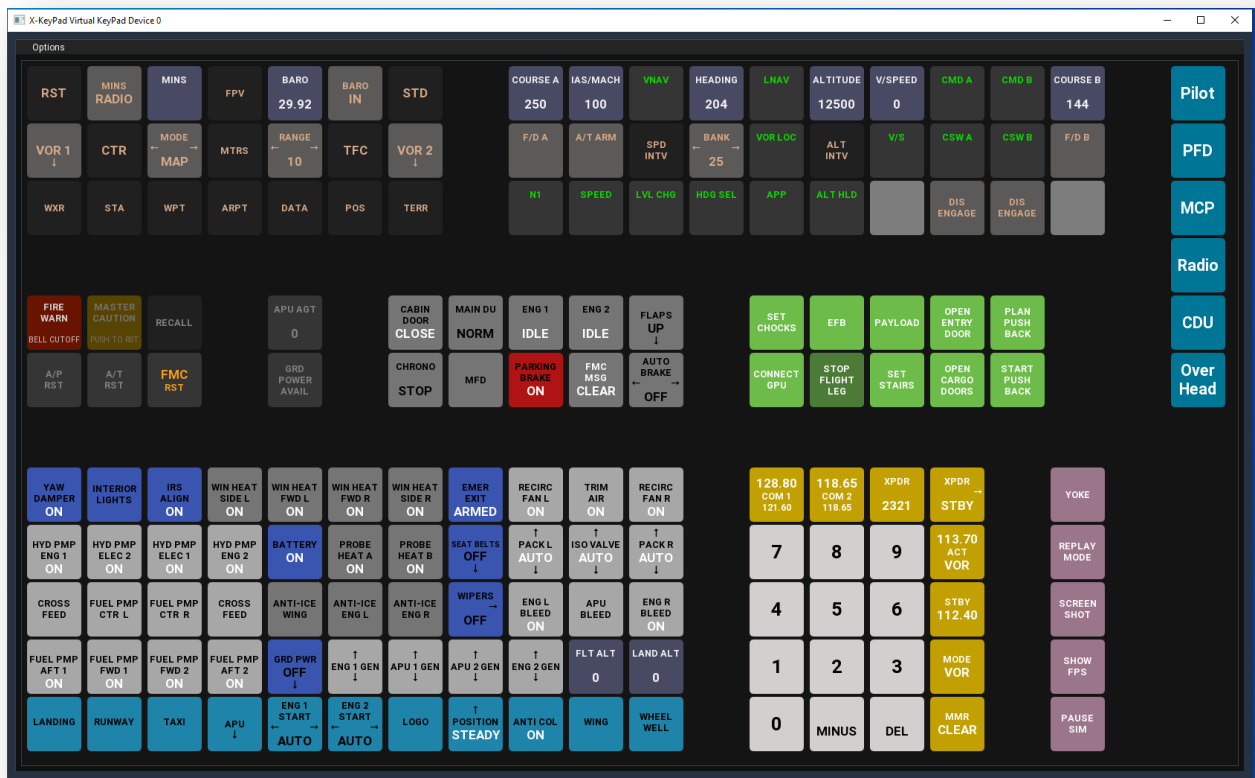


You can quickly run out of joystick buttons for all the X-Camera command actions. There are a number of optional game controllers that can significantly increase the number of buttons available. The Thrustmaster MFD Cougar Pack is one such controller.



Optional Software

In most cases you can control your X-Camera configurations easily by mapping keys to your joystick. If you happen to have a lot of cameras you might want to consider something like X-KeyPad that will allow you to create Virtual Device panels that will allow you to select X-Camera views as well as control many other aspects of the simulator. The following image is an X-KeyPad virtual device panel created for the Zibo 737:



X-KeyPad also supports Elgato Stream Deck devices which also can be used for selecting views as well as other simulator functions.



You can learn more about X-KeyPad and watch a demo video here:

<https://www.stickandrudderstudios.com/x-keypad-for-x-keys/>

Installation

X-Camera is available as a download from www.StickandRudderStudios.com as well as the download area on X-Plane.org. It is packaged as a fat plugin in a zip file. Use your favorite zip utility to extract the contents of the archive into your X-Plane plugin directory. Example:

C:\X-Plane 11\Resources\plugins

Don't change the directory name of the X-Camera directory. It needs to be:

Resources\plugins\X-Camera

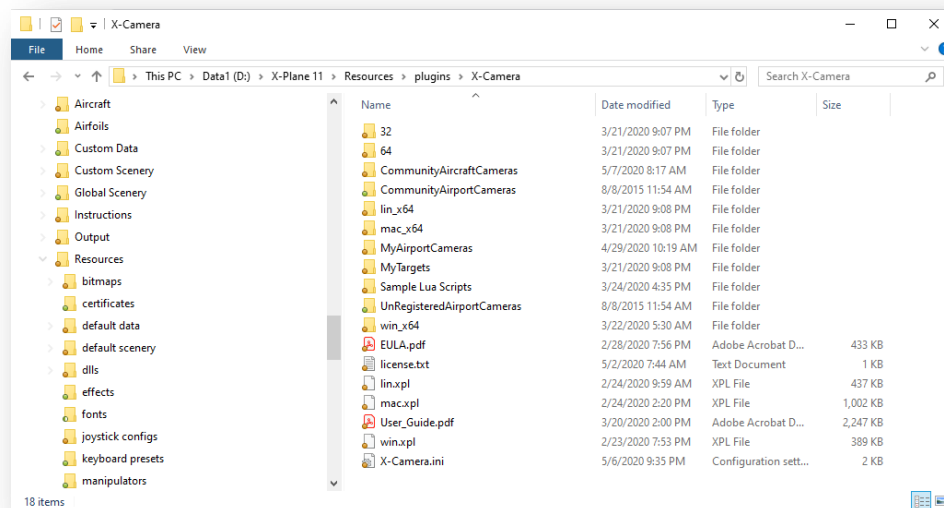
X-Plane 11 and 12 are very fussy about the plugin folder name matching the XPL file name in the win_x64, mac_x64, and lin_x64 folders. If you change the X-Camera folder name then X-Plane 11/12 will not find the 2.4 binaries and it will load the binaries in the 64 folder which will be version 2.3.3.

Note: If you are upgrading X-Camera to a new version we suggest the following steps:

1. Make a backup copy of your X-Camera directory
2. Unzip the downloaded X-Camera archive into a temporary directory
3. Use Windows Explorer or an appropriate file explorer for your operating system to copy the resulting X-Camera directory into your X-Plane\Resources\plugins directory, allowing the copy utility to over-write / merge the contents with the original X-Camera directory.

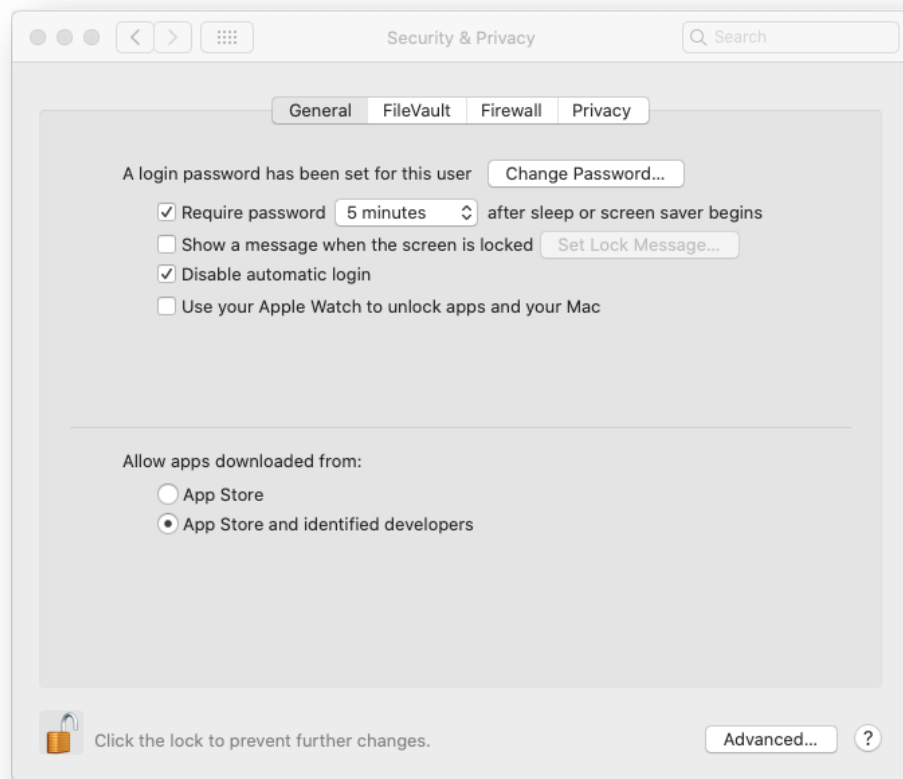
Using the above process will preserve your license.txt file as well as any settings and airport camera files you may have created while updating any documentation and binaries associated with the new version of X-Camera.

Your X-Plane directory tree should look like this after installation:



OSX

The newer versions of OSX include the GateKeeper application that protect your mac from running malicious software. Since X-Plane plugins are not normally distributed via the Apple App Store you will need to change your privacy settings to also allow apps from identified Apple developers such as Stick and Rudder Studios.

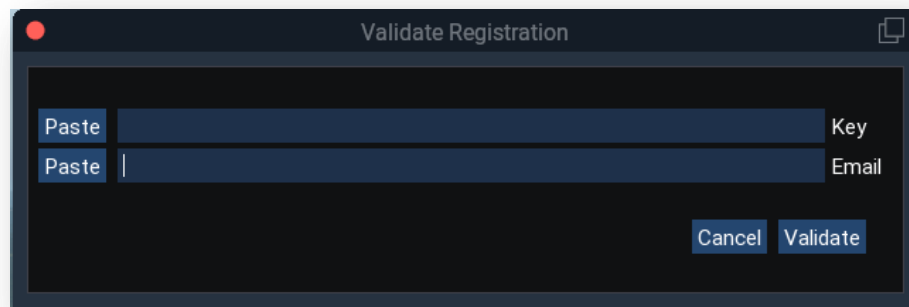
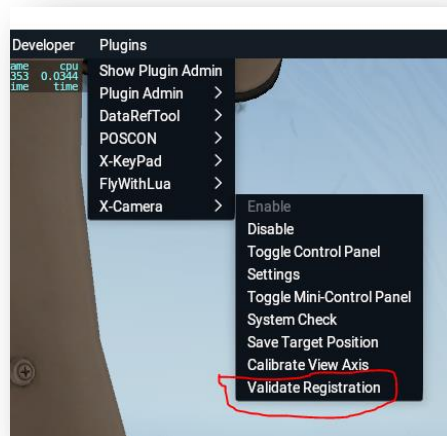


Go to the OSX Control panel and open the Security and Privacy settings as illustrated above. Click on the padlock in the lower left corner of the window and when prompted enter your administrator password. Make sure the “Allows apps downloaded from:” setting is set to “App Store and identified developers”.

Installing Your Registration Key

If you choose to purchase a registration key to enable the more advanced features of X-Camera you will need to validate the key. Simply use the X-Camera Validate Registration menu to open the registration dialog where you can paste the key and your email address.

Note: If you purchase X-Camera from the X-Plane.org store they refer to keys as serial numbers. Keys and serial numbers are the same thing as far as X-Camera is concerned.



Updates

X-Camera supports the [Skunkcrafts Stand Alone Updater](https://www.xcrafts.com/how-to-update-download-new-version). This is an executable that runs on all three operating systems and resided in the X-Plane root folder after you have installed it. You can run this program when X-Plane is shut down to see if there are any updates or beta releases of X-Camera. The Updater can download those new versions for you if you wish.

You can read more about the Skunkcrafts Stand Alone Updater and learn how to download and install it here:

<https://www.xcrafts.com/how-to-update-download-new-version>

You can also learn about beta programs and new versions by following the X-Camera forum on X-Plane.org

<https://forums.x-plane.org/index.php?/forums/forum/400-x-camera/>

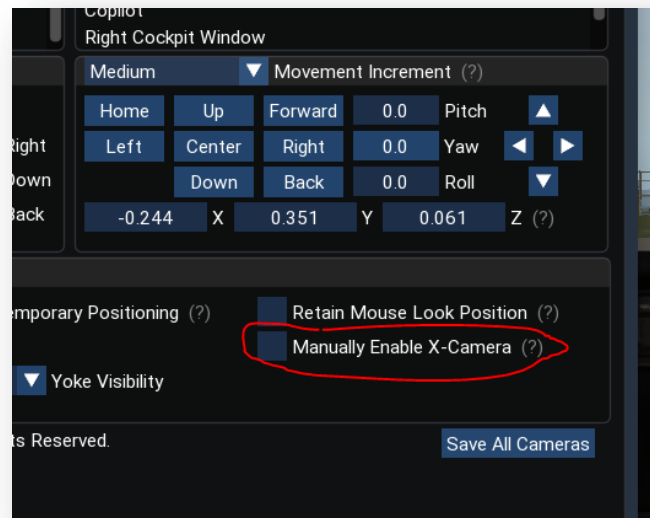
Enabling X-Camera

X-Camera can be enabled or disabled from the X-Plane plugin menu or via a command assignment. When you enable X-Camera it will look for an aircraft specific camera configuration file in your current aircraft directory. If it does not find one it will create one with one category and view. The category will be named Cockpit and the one camera in that view will be called Pilot View. It will be initialized to the current pilot's head position in the 3D cockpit.

If you have multiple .ACF files in an aircraft directory you will need to create views in X-Camera for each one. X-Camera's camera coordinates are relative to the plane model's center of gravity. Since this can vary with each .ACF file we need to save X-Camera settings for each aircraft model.

X-Camera can also be enabled by selecting a specific view via a joystick button or key assignment. See the section on assigning joystick keys to specific views.

When you change aircraft in X-Plane or on the initial load of an aircraft X-Camera will see if there is a camera configuration file for the selected plane. If the configuration file is found X-Camera will auto enable and will select the first camera in the first category, normally the cockpit and the pilot view if you didn't move that camera up or down in the category. You can optionally disable this feature by checking the "Manually enable X-Camera for this aircraft" on the control panel.



Note: X-Camera will automatically be disabled when a new aircraft is loaded and no existing camera configuration file is found for the newly loaded plane.

System Check

The first time you enable X-Camera we recommend running a System Check from the X-Camera plugin menu. System Check will scan your X-Plane configuration verifying that it is properly configured for X-Camera:

- Verify that TrackIR is properly configured if it is installed
- Verify the version of the HeadShake plugin if it is installed
- Check to see if the Scenic Flyer plugin is installed
- Verify that incompatible plugins are not installed or are not enabled, PilotView is an example of one such an incompatible plugin

If you come across other plugins that are incompatible with X-Camera please let us know so we can correct the problem or include them in the System Check function.

Configuring X-Camera

After you have enabled X-Camera for the first time on an aircraft you will most likely want to define some additional categories and camera views. This can be done with the control panel which you can activate or deactivate from the X-Camera plugin menu.

If you have X-Plane Quick Look views defined for the plane, X-Camera will give you the option to import them when X-Camera is enabled for the first time on a plane that is missing the camera file. If you had a quick look view saved for the pilot view you may wish to delete the Pilot View camera that is automatically added prior to the import.

Note: The X-Plane chase, circle, and ride-along views do not have exact replacements in X-Camera. During import X-Camera will do the best it can to replicate those views but be aware that they do behave slightly differently.

Control Panel



The control panel is a window that allows you to do the following actions:

- Browse community supported aircraft camera files and import them as a base set of camera definitions
- Navigate between various categories and camera views
- Create new categories and cameras
- Insert new categories and cameras before the currently selected category or camera
- Remove categories and cameras
- Alter the names of categories and cameras

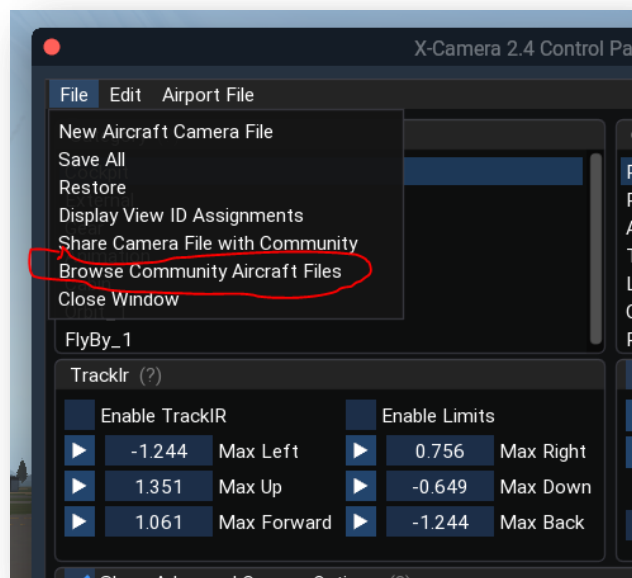
- Adjust the order of categories and cameras
- Adjust the X, Y, Z, Heading, Pitch, and Roll of the cameras
- Assign a view ID to a camera so that it can be selected with a joystick button or specific key combination
- Turn on or off features for a camera
 - Enable or Disable TrackIR (also works with LinuxTrack)
 - Enable or Disable TrackIR Limits (also works with LinuxTrack)
 - Enable or Disable HeadShake, XPRealistic, RealView, or Lua special camera effects scripts
 - Enable or Disable smooth transitions to this camera
 - Retain Mouse Look Position
 - Enable Temporary Positioning
 - Disable Cockpit Zooming
 - Enable View Axis Input
 - Enable or Disable linear transitions to this camera
 - Enable or Disable 3D Bezier curve transitions to this camera
 - Enable or Disable auto advance to the next camera in the current category
 - Enable Camera Heading Tracking
 - Enable Camera Pitch Tracking
 - Enable Camera Leveling
 - Enable Camera Join Smoothing
 - Specify center of gravity (CG) offsets for Z,Y, and X
 - Enable External Camera
 - Enable Cineflex Camera
 - Select Scenic Flyer Panels
 - Enable Target Following

- Enable Free Camera
 - Enable an X-Plane 9 like chase view camera
 - Enable Cinema Verite or G-Loaded camera for each camera
 - Adjust yoke visibility on supported planes
 - Toggle between editing Aircraft Cameras or Airport Cameras
 - Enable Circle View
 - Enable Passive Camera
- Save cameras to “X-Camera_{*aircraft model*}.csv” in the current aircraft directory or in the case of an Airport Camera file, X-Camera/MyAirportCameras.{icao}.csv
 - Optionally save a backup copy of an aircraft camera file to X-Camera/AircraftCameraBackups. The backup file name will contain text indicating the full path in the X-Plane 11/Aircraft from which the backup was made
 - Restore cameras from “X-Camera_{*aircraft model*}.csv” or the associated Airport camera file.
 - Copy a single camera and then paste it over another one or insert a copy above or below the current camera
 - Copy a single category and then paste it over another one or insert a copy above or below the current category. The copy category function will copy the View ID’s on the cameras. It is possible that after inserting a category copy you could end up with the same View ID on different cameras in different categories. The context menus will have an option to clear all the view IDs in a category if needed.
 - Copy the entire camera set, reload a new plane, and then paste that camera set into the plane with an option to automatically adjust the cockpit cameras.
 - Snap the camera base position to the current TrackIR offsets. This lets you use your TrackIR head piece to position the view as you want it and then “snap” the camera to that position.
 - Increase or decrease the distance the camera will move with each position key or button activity
 - Set TrackIR Limits
 - Enable and specify a specific field of view (FOV) for each camera if you have the “Enable Force FOV setting enabled in the settings dialog. Please read the settings section for more detail on this option and its side effects.
 - Set an initial zoom factor for a camera

- Manually enable X-Camera for this aircraft. This stops X-Camera from automatically enabling when this plane is loaded. You will need to enable X-Camera manually.
- Generate Orbit and Fly-By animations
- Share your camera definition file with the X-Camera user community

Community Camera Files

X-Camera contains a set of camera files that have been created by other users. You may want to browse those files to see if a definition exists for your particular plane or if there is one for a plane similar in size. After browsing you can load those definitions as a base for creating your camera definitions.





Community files are stored in a local cache which is updated periodically and shipped with X-Camera. However, users are submitting new files all the time. You can use the **Check for Updates** button to compare the local cache with the community file server and refresh the local cache by downloading any new files and removing obsolete files.

X-Camera requires an outbound internet connection to communicate with the community file server. Your firewall software may require you to grant internet access to X-Plane for this to work. Users have different preferences and may be using different default horizontal field of view settings. You will most likely need to adjust the camera definitions to suit your taste or need but the community files may help you to get started more quickly.

You can edit the filter field with text that will be used as a case-insensitive filter on the aircraft type and author data in the community files. This limits the list to the most likely compatible planes. You can navigate through the filtered list with the next and previous arrow buttons. Leaving the filter field blank will show you all the community files sorted by aircraft type.

When you find the file that most closely matches your plane you can use the load button to read that camera definition file into X-Camera. There is an option called “Try Auto-Correct Cockpit” that will attempt to adjust the imported cockpit cameras using “fuzzy logic”.

Auto Correct

Unless the community camera is an exact match of your plane and using a very similar field of view, most imported camera files need to have their cameras adjusted. The more different the plane is the more correction is required after the import.

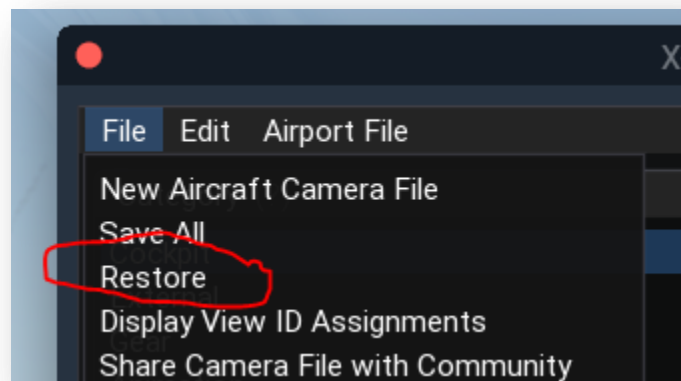
The auto correct feature uses fuzzy logic in an attempt to automatically adjust cameras that appear to be cockpit cameras. The standard convention in X-Camera is to have the first category be for internal cockpit cameras and for the very first camera in that first category to be the default pilot view. As a matter of fact, when you enable X-Camera for the first time it automatically creates that category and camera.

The auto correct feature relies on people sticking to the convention that any shared files have the pilot view and in the first category and camera. Furthermore, it relies on that same condition being setup in X-Camera before trying to load a camera file.

Using the above assumption, X-Camera compares the difference in X, Y, and Z coordinates of the pilot camera in X-Camera prior to the load and those same coordinates with the pilot camera in the community file. X-Camera then calculates the necessary offsets that would need to be applied to the community file to get the pilot close to where the cockpit is for the loaded plane.

Next, X-Camera searches for other internal cameras in the community file that are within five meters of the pilot view camera. The assumption is that all of these are likely cockpit cameras and they should have the same offsets applied to them. X-Camera then adjusts those cameras so they will be placed and similarly aligned to the original pilot camera.

The process is not perfect but it does a reasonable good job of getting the cockpit cameras very close to where they should be. After loading a plane using this feature we suggest that you review all the cameras before saving the file. If you don't like them you can restore the original camera definition and then try another community file that may be closer to what you need.



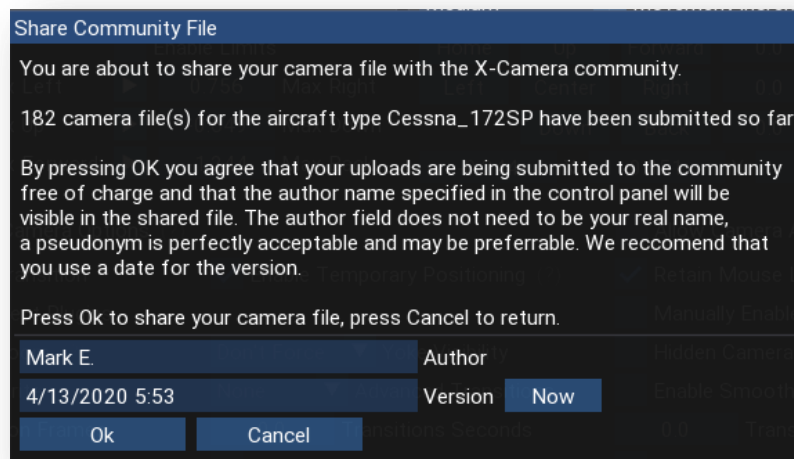
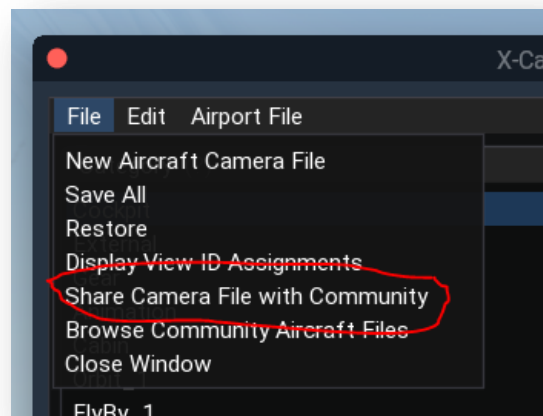
The auto adjust feature will not touch any external cameras or any other internal cameras that are more than five meters from the pilot camera in any coordinate direction. These cameras will need to be adjusted by hand.

Note: The Auto Adjust capability is also available when you paste a camera set from the control panel.

Sharing Your Camera Definition

After you have a well-defined and working camera file we encourage you to share it with the community. This is particularly useful if you find that the existing community files are lacking in support for your favorite plane or if you added significant functionality to the definition with more views and cool transitions like walk-around inspections.

You can share your definition directly from the main control panel using the “Share Camera File with Community”. When activated, this capability will show you how many files have already been submitted to the community for the current aircraft loaded.



If you do choose to share the file you will need to fill in the author and version fields on the main control panel. It is perfectly acceptable to use a pseudonym for the author. We recommend using a date for the version. Keep in mind that shared camera definition files are just text files and are easily read and are open to the public. Although it is unlikely you would do this, we do want you to be aware of any

personally identifying information you might put in category names, camera names, author, version, and target name fields. All other data in the file is simply numeric in nature.

After the file is shared X-Camera will remember the version and present you with an opportunity to update the shared file with a new version later when you make enhancements. If you do update the file you will need to change the version. Your old version will be deleted from the community server and other user's local cache when they do an update.

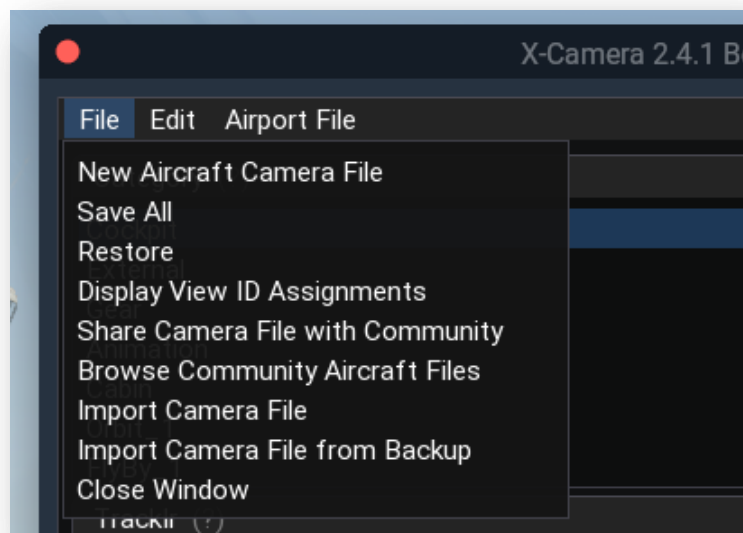
Importing Camera Files from the OS File System

Importing From the Aircraft Folders

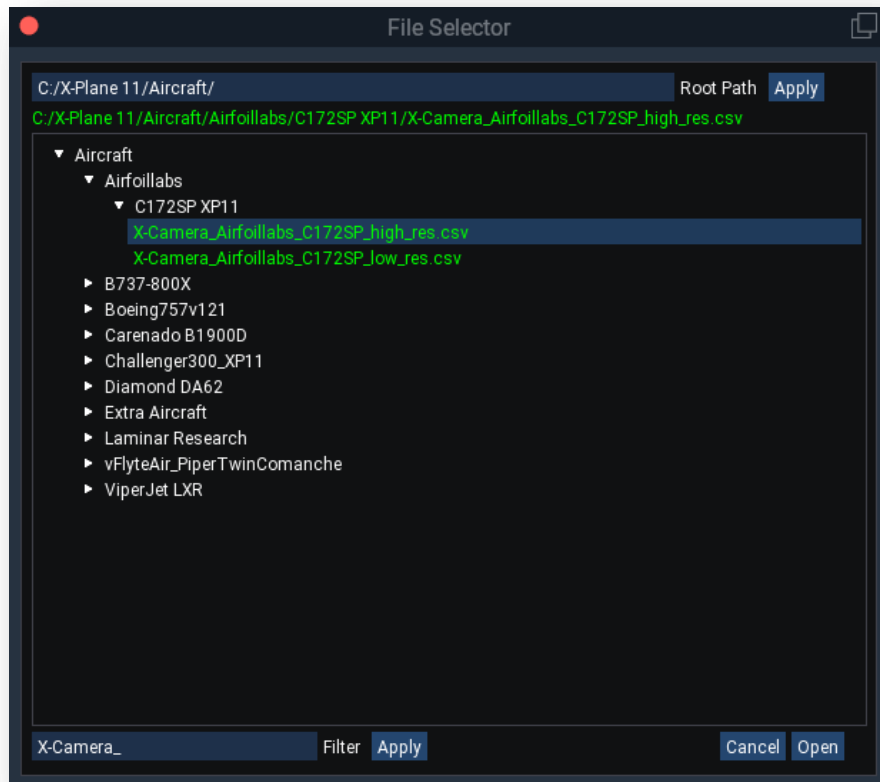
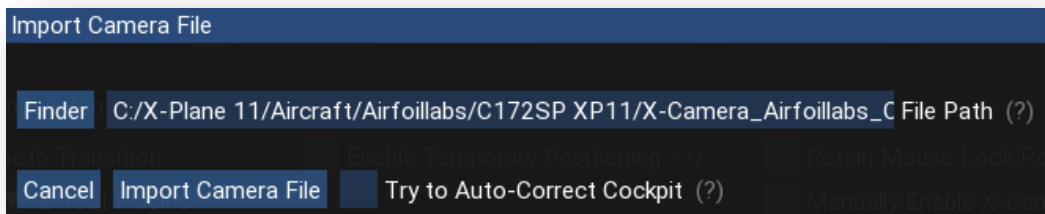
Some users will post camera files they wish to share with the community on a forum site like X-Plane.org. You also may have created a camera file for one plane and wish to import it a new plane.

In both of these cases you can import a camera file directly from the OS file system. When X-Camera saves a camera file it is saved in the aircraft folder using a naming convention. The camera file name will always start with X-Camera_ and will then be followed by the base name of the Aircraft Configuration File (.ACF). It will then end with a .csv extension.

Use the File menu on the control panel and choose the **Import Camera File** menu item.



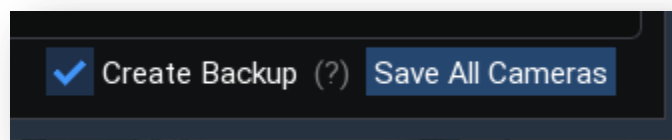
You can then use the Finder button to browse for a camera file on the file system. The Finder will start looking in the X-Plane 11/Aircraft folder and all sub folders for file names that start with X-Camera_. You can change the starting path by modifying the root path entry on the Finder.



The Try to Auto-Correct Cockpit works exactly the same as it does when importing a community file.

Importing a Backup

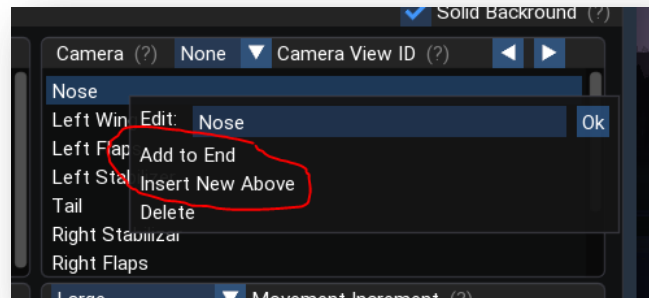
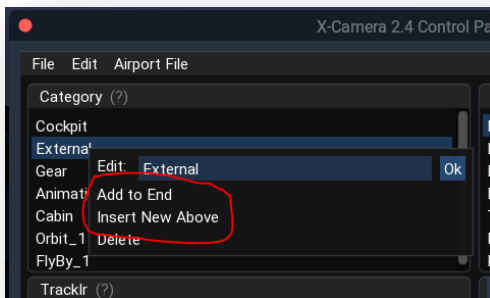
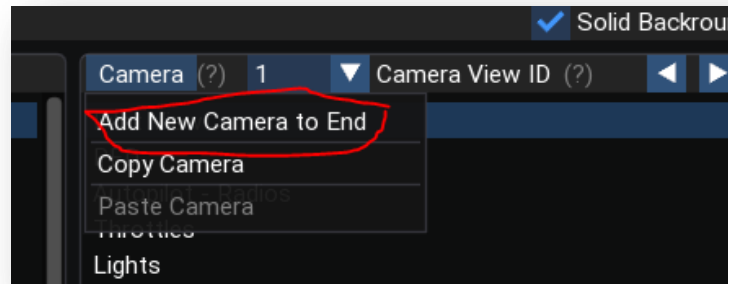
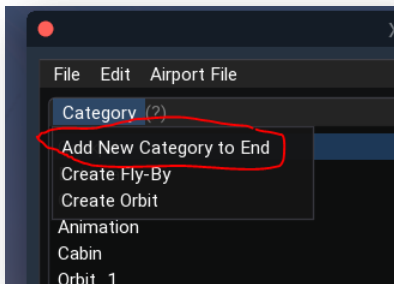
When you save a camera file from the control panel you have the option to create a backup copy in the X-Camera/AircraftCameraBackups folder.



You can use the same import process to import camera files from that backup folder. Use the **Import Camera File from Backup** menu item to import from the X-Camera/AircraftCameraBackups folder.

Adding Cameras and Categories

Adding categories and cameras is done by using the top menus on the category and camera list windows or via the right click pop-up context menus.

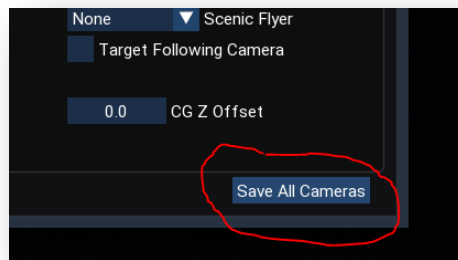


When you create a new category X-Camera will automatically clone the current camera and add it as the first camera in the category. The added category and camera will be given assigned names based upon their position in the category/camera tree. You can change the name by selecting the category and then opening the context menu with a right click and editing the name field. You can order the categories by a left click and then drag to the position in the list you want to see the category.

Adding a camera to an existing category is similar to adding a new category. Use either the top camera list menu to add a new camera to the end or use the right click context menu to insert the new camera above the current selected camera. As with the category you can change the name using the context menu and you can change the camera's position in the category by a left click and drag to the new position.

Cameras or categories can be deleted but there needs to be at least one camera in a category and at least one category left. X-Camera will not allow you reduce the category and camera count to zero.

! Don't forget to save your cameras.

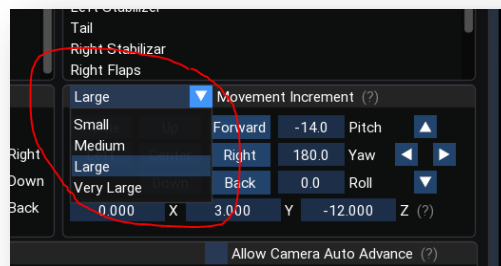


Positioning Cameras

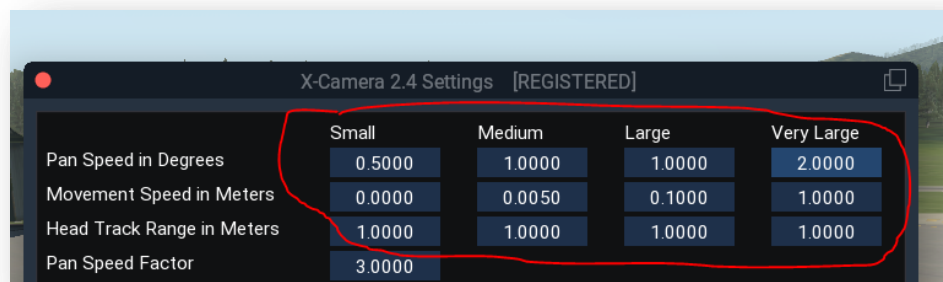
All cameras, except the free camera, are attached to the plane. This means that if the plane moves the camera moves with it. All camera positions are relative to the plane's center of gravity (GC).

Just because a camera is attached to a plane does not mean you can't move it a significant distance from the plane. You can use this to temporarily explore the exterior of the plane and its surrounding's including gate equipment and airport structures.

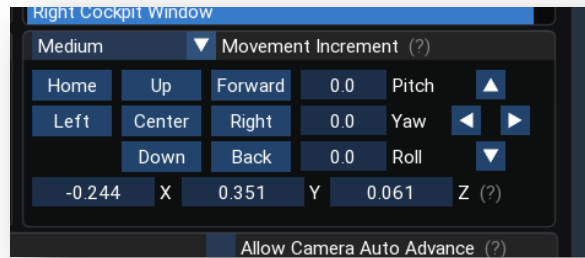
Cameras can be positioned with the control panel, the keyboard, the mouse, or any combination of the three. The size of the movement will depend on the current movement range setting, small, medium, large, or very large and the movement command modifier, slow or fast.



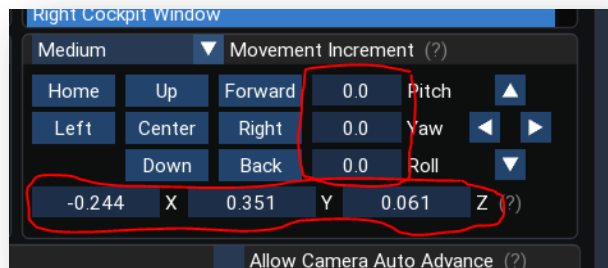
The values for each of these settings can be adjusted using X-Camera's settings option.



You can also use the control panel movement buttons to move the camera around.



The numeric fields for X, Y, Z, Pitch, Roll, and Yaw are also drag controls. You can left click on these fields and drag the mouse to change them. You can also double click them to make them editable with the keyboard so that you can set a specific value.



A Free camera is not attached to the plane. As soon as you check the free camera checkbox in the control panel the camera will be “dropped” at the plane’s current location in the world. The camera will not move when the plane moves. Free cameras associated with an aircraft camera file have limited use as they are saved with the camera’s latitude, longitude, and elevation. These coordinates would only be valuable when you load the plane at the same airport where you created the free camera. That said, free cameras can be useful for creating a temporary camera that you want to use to explore the world around the plane.

As a side note, free cameras are used extensively for the airport and target camera features which are discussed later in this guide.

Keyboard Control

X-Camera uses the same positioning commands as X-Plane. Assuming that you have not re-mapped the default keys, Table 2 shows the keyboard assignments for moving the camera. Note: that Page Up / Down and . / , mappings vary by operating system.

Key	X-Plane Command	Action
→	sim/general/right	Move the camera to the right
←	sim/general/left	Move the camera to the left
↑	sim/general/up	Move the camera up
↓	sim/general/down	Move the camera down
Page Up or .	sim/general/forward	Move the camera forward
Page Down or ,	sim/general/backward	Move the camera back
Shift →	sim/general/right_fast	Move the camera to the right quickly
Shift ←	sim/general/left_fast	Move the camera to the left quickly
Shift ↑	sim/general/up_fast	Move the camera up quickly
Shift ↓	sim/general/down_fast	Move the camera down quickly
Shift Page Up or .	sim/general/forward_fast	Move the camera forward quickly
Shift Page Down or ,	sim/general/backward_fast	Move the camera back quickly
Ctrl →	sim/general/right_slow	Move the camera to the right slowly
Ctrl ←	sim/general/left_slow	Move the camera to the left slowly
Ctrl ↑	sim/general/up_slow	Move the camera up slowly
Ctrl ↓	sim/general/down_slow	Move the camera down slowly
Ctrl Page Up or .	sim/general/forward_slow	Move the camera forward slowly
Ctrl Page Down or ,	sim/general/backward_slow	Move the camera back slowly
Q	sim/view/pan_left	Rotate left
E	sim/view/pan_right	Rotate right
S	sim/view/pan_down	Pitch down
No Default Key	sim/view/pan_up	Pitch up

Table 2

The camera position will continually move as long as the key is depressed. Movement will stop when the key is released. The amount of distance is controlled by the distance increments on the control panel. The distance increments are small, medium, and large. Each increment has a fast, normal, and slow setting that can be mapped to X-Plane's fast/normal/slow movement and panning commands.

Tip: Keyboard input is not accepted for camera movement if the focus is one of the text edit fields of the control panel, category name, camera name, View ID, etc. Simply click anywhere else in the control panel to defocus the edit field then keyboard input will be directed to X-Plane so you can move the camera with your keys.

Tip: If you are trying to position an external camera that is some distance away from the aircraft's center of gravity you may need to put the positioning system into the larger range using the control panel. It is hard to see the changes when the range is set to small or medium when the camera is a long distance away from the plane.

Tip: Due to some recent changes in X-Plane a conflict arose around the X-Plane `general_up` and `general_down` commands with regard to using these to respond to ATC. X-Camera has these commands mapped to camera move up and down and was intercepting the commands when the ATC window was open. There is an option in the settings dialog that allows you to lock out keyboard control for camera movement when the X-Camera control panel is not open. When this option is set you will not be able to move the camera with the keyboard if the control panel is not open but the commands will go to the ATC window restoring the ATC response functionality. See the settings section of this manual for more information.

X-Camera also supports many of the built in X-Plane view commands such as `"sim/view/left_up"`, `"sim/view/glance_right"`, `"sim/view/right_135"`, etc.

Mouse Move and Mouse Zoom

Cameras can be placed using a feature very similar to mouse look. Before you can use this feature you must map keys or joy stick buttons to the following X-Camera commands:

```
SRS/X-Camera/MouseMove_X_Y  
SRS/X-Camera/MouseMove_X_Z  
SRS/X-Camera/MouseMove_Heading_Pitch  
SRS/X-Camera/MouseMove_Zoom
```

Pressing and holding down the key or button mapped to a mouse move axis will activate the feature. You can then move your mouse to position the camera along the two axis associated with the command. Releasing the key or button disables mouse move.

To adjust the camera left-right / up-down, press and hold down the key or button mapped to the `MouseMove_X_Y` command. While the key is held down, move the mouse to adjust the camera's position. How far the camera moves will depend on the mouse movement and the current range setting in effect.

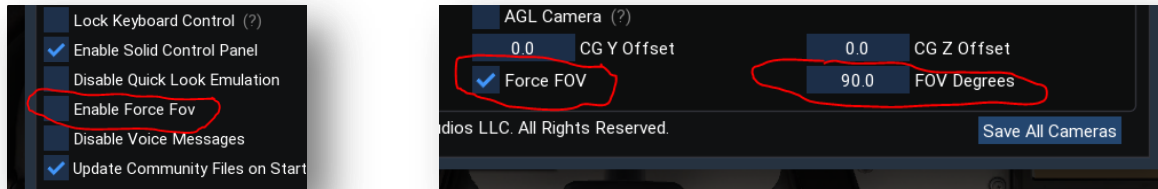
Use the key mapped to `MouseMove_X_Z` to use the mouse to move the camera left-right / forward-back. Use the key mapped to `MouseMove_Heading_Pitch` to rotate and pitch the camera left-right and up-down.

Mouse Zoom is only available on external cameras and is an alternative to using the mouse scroll wheel. Use the key mapped to `MouseMove_Zoom`. While holding down the key move the mouse forward and backward to zoom in and out.

Tip: Investing in a gaming mouse that has additional buttons that can be mapped to keystrokes can enhance camera control by allowing you to map mouse move, mouse look, mouse zoom, and camera centering commands to the additional mouse buttons. See **Error! Reference source not found.**

Field of View

If you enabled the “Enable Force FOV” setting in the settings dialog you will see additional controls displayed on the control panel.



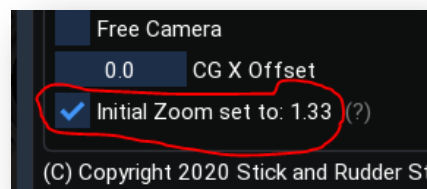
With these controls you can enable each camera to have a specific horizontal field of view (FOV). When the checkbox is enabled you can set the FOV from 15° to 170° for each camera. When the FOV checkbox is disabled the camera will use the FOV setting in X-Plane’s rendering options at the time X-Camera was enabled.

If you have the setting option “Enable Force FOV” enabled you will not be able to change your horizontal field of view in the X-Plane rendering options while X-Camera is enabled. Disable X-Camera using the X-Camera plugin menu option to adjust your default X-Plane horizontal field of view.

The force FOV option will not work when you have X-Plane configured to use more than one monitor for the simulator display.

Initial Zoom Factor

Each camera can have an initial zoom factor. The default is 1.0. You can set the zoom factor in the control panel by first selecting the camera you want to adjust, then zoom the camera in or out using the mouse scroll wheel, the = / - keyboard keys, or any joystick buttons you have assigned to X-Plane’s zoom commands. Once you have the zoom where you want it, click the “Set Initial Zoom” checkbox in the control panel. When this camera is selected in the future the zoom factor will be initially set to this value.



Note: The current version of X-Camera does not support transition animation of the zoom setting between cameras.

Panning

X-Camera will work with your HAT switch. X-Plane supports a four position HAT switch. You can map your HAT switch to X-Plane's panning commands and X-Camera will respond accordingly. X-Camera also has a few extra features that you may find useful.

- Pan speed toggle is an X-Camera command that can be mapped to a joystick button or key press. When activated, X-Camera will increment the panning speed from slow, to normal, to fast, and back to slow within the movement ranges of small, medium, and large. This allows you to have one hat switch that can support both fast and slow panning.

Pan speed toggle only works if you have it enabled in the settings menu. When disabled your pan commands will react according to the pan speed command to have it mapped to, i.e. `sim/view/pan_left_slow`, `sim/view/pan_left`, `sim/view/pan_left_fast` for X-Plane 10.

- Eight-way hat switch support can be used with X-Camera by mapping your eight-way 45° HAT switch buttons to X-Camera's pan commands, `SRS/X-Camera/Pan_Left_And_Up`, etc. If you want your HAT switch to work with X-Plane's four-way panning support we suggest mapping the 0°, 90°, 180°, and 270° pan commands to X-Plane's pan commands and map the 45° commands to X-Camera's commands. This will allow your HAT switch to work with X-Plane when X-Camera is disabled.

The camera can also be panned using X-Plane's view axis. Many joystick controllers will have a spare rocker or other axis that can be assigned to the left/right up/down view axis. If you have assigned a joystick axis to the view control in X-Plane, X-Camera will use it to rotate the camera left/right and up/down. Use the Enable View Axis Input checkbox on the control panel to enable this feature for each camera.

Note: this is disabled if you have TrackIR enabled for a camera.

You must assign the view axis before you enable X-Camera. If you need to alter the axis assignment disable X-Camera, make the change, then enable X-Camera. This procedure is also needed for axis calibration. Calibration must be done with X-Camera disabled.

Mouse Look

X-Camera supports panning the camera using a right mouse click. While mouse look is enabled the camera's heading and pitch can be adjusted with mouse movement. There is an optional camera setting that retains the mouse look position when the mouse button is released. If you disable this setting the camera will revert to its original heading and pitch as soon as the mouse button is released. Mouse look is disabled when TrackIR is enabled on a camera.

Camera Positioning with a Spare Joystick Controller

Cameras position, heading, and pitch can be adjusted by mapping a spare joystick / game controller to X-Plane's camera and view axis and by enabling Camera Axis Input on a specific camera. The following table outlines how the camera will behave based on the specific axis input.

X-Plane Axis	Camera Behavior
View Left / Right	Camera heading is adjusted left or right
View Up / Down	Camera pitches up or down based
View Zoom	Camera zooms on external cameras
Camera Left / Right	Camera moves left / right of its current heading
Camera Up / Down	Camera moves up / down based on its current heading and pitch
Camera Zoom	Camera moves forward or backward of its current heading and pitch

You must enable the checkbox "Enable Camera Axis Input" in order for X-Camera to respond to these axis inputs. You can also toggle this checkbox on or off by mapping a key or joystick button to the command "SRS/X-Camera/Toggle_Camera_Axis_Input".

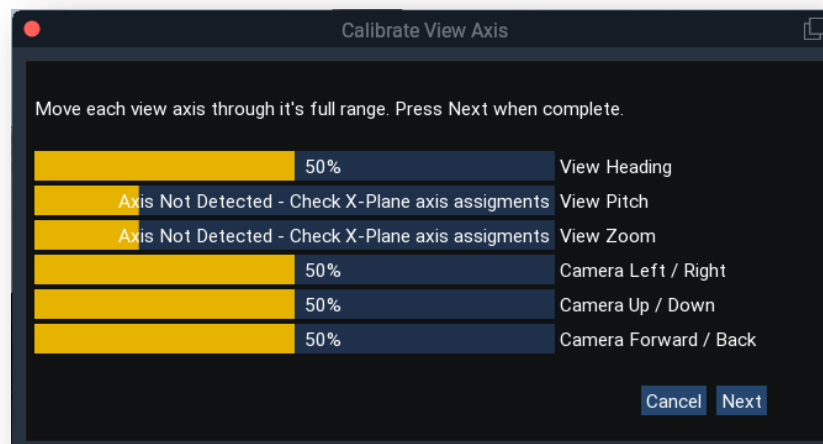
After selecting a new camera with the axis input enabled you will need to move the controller slightly to start getting input. Once the axis is returned to center camera movement will cease. The speed of camera movement is based on the amount of axis deflection as well as the current movement increment setting for the camera.

It is entirely possible to map an axis to a joystick axis that is not spring loaded. An example of this might be to map the Camera Up / Down axis to a throttle lever. These are typically not spring loaded so the center of travel must be found by feel. This is one of the reasons why we may not always want to be accepting axis input and why there is a checkbox to turn it on and off. If such an axis is not dead center the camera will just start moving.

Make sure the joystick you are using is properly calibrated. X-Camera depends on this calibration to know where the center travel is for a joystick. There is a built-in +/- 2.5% null zone around any axis meaning you will need to move the stick slightly off center to get the camera to move.

You can also specify a view axis smoothing factor on the settings dialog. You may find value of 4 – 10 for view axis smoothing will help smooth out noisy joystick controllers.

Some spring loaded joysticks axis may not be at a perfect center position when released. This can cause camera drift when accepting camera axis input on a camera. This can be corrected by activating the view axis calibration item in the X-Camera plugin menu. The calibration process is similar to the one it X-Plane. Simply follow the instructions in the dialog.



At the end of the process you will have an opportunity to adjust the null zone for the camera / view axis. A larger null zone will compensate for slop at the center position. Note: The larger the null zone is the larger the joystick movement will be required to initiate camera movement.

Basic Camera Options

TrackIR vs Tobii

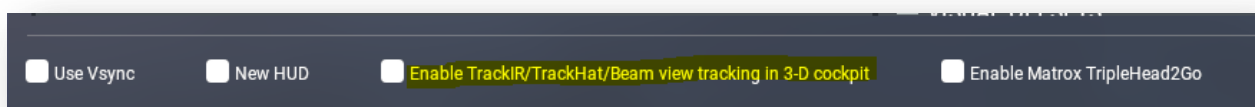
X-Camera will work with either TrackIR or the Tobii Eye X-Plane Plugin. If X-Camera detects that the Tobii Eye X-Plane plugin is installed the labels for the following UI fields will change from TrackIR to Tobii. The following description of TrackIR functions on the camera are the same if you are using Tobii Eye tracking.

TrackIR

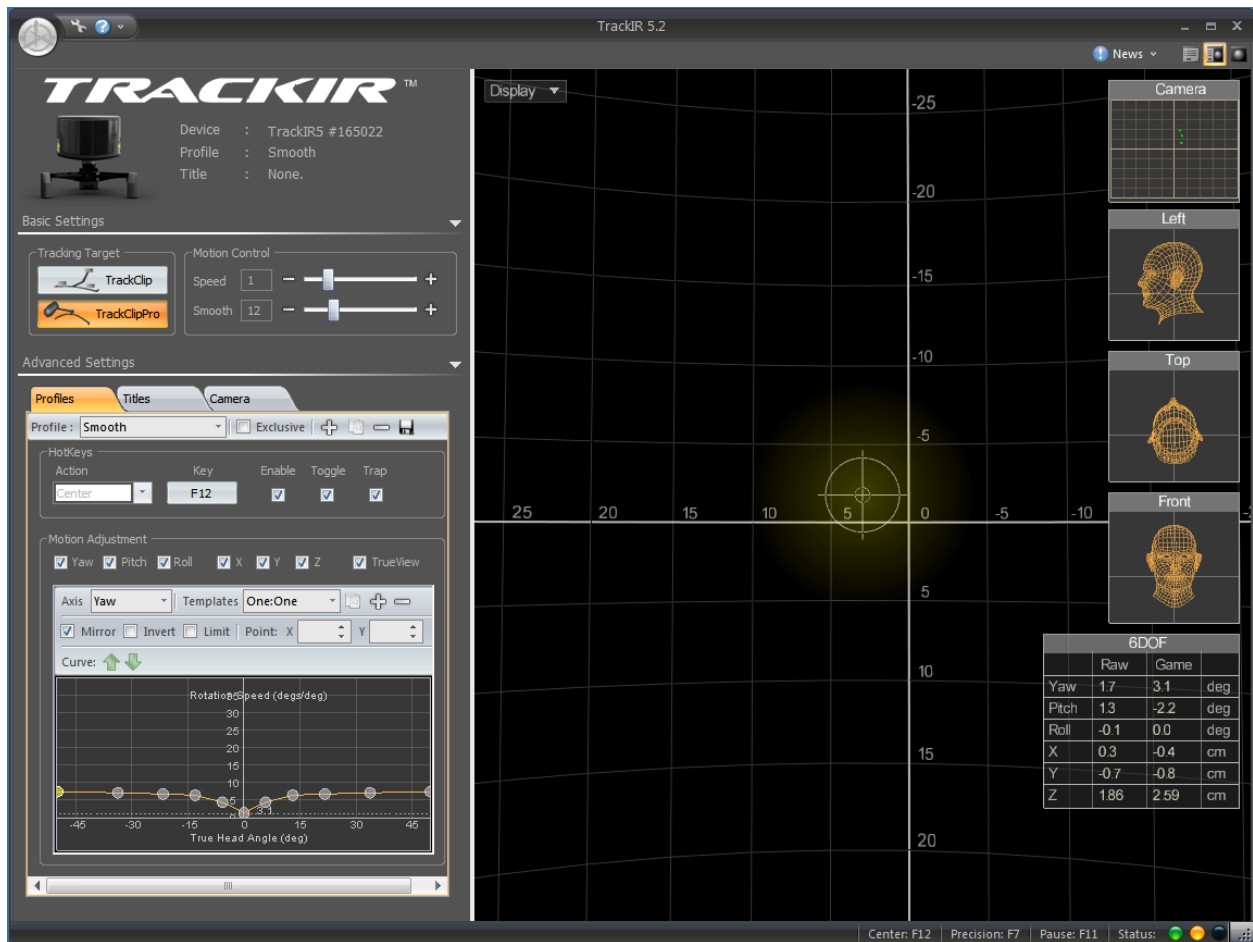
TrackIR from Natural Point is a unique device that tracks the movement of your head using a camera and either a reflective device or set of active LEDs that you attach to your headset or a hat. X-Camera can accept input from TrackIR and add the current head position offsets to the camera's base position. Using TrackIR you can look around the environment very naturally.

TrackIR can be turned on or off for each camera. The reason you might want to do this is if your camera definition is a close-up of an instrument panel. By disabling TrackIR input for this camera you can have a very stable view which eliminates any head movement so you can easily use the mouse to activate cockpit knobs and switches.

X-Plane also supports TrackIR for its 3D cockpit view. However, you cannot have TrackIR enabled for both X-Plane and X-Camera simultaneously. Disable the TrackIR equipment option when you plan on using X-Camera for all your 3D views.



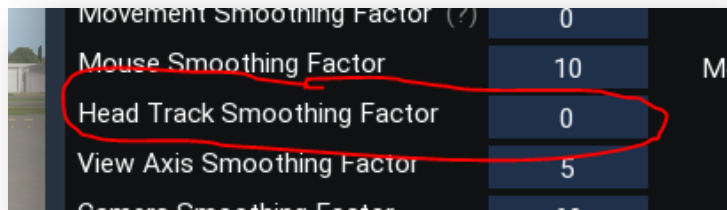
You need to make sure that you get the latest Game Update by using the associated menu action in the TrackIR control panel.



Verify that you see X-Camera in the title list after getting the Game Update. The TrackIR software must be running before you start X-Plane. If you forget to do that you will need to disable and then re-enable X-Camera after you have started the TrackIR software.

TrackIR is likely going to need some tuning to make the head movement smooth. In the Motion Control box in the figure above you will find the speed and smooth settings. You will need to spend some time experimenting with these setting to get a smooth but responsive experience with TrackIR. The settings of 1 for speed and 12 for smooth seemed to work well with our rig.

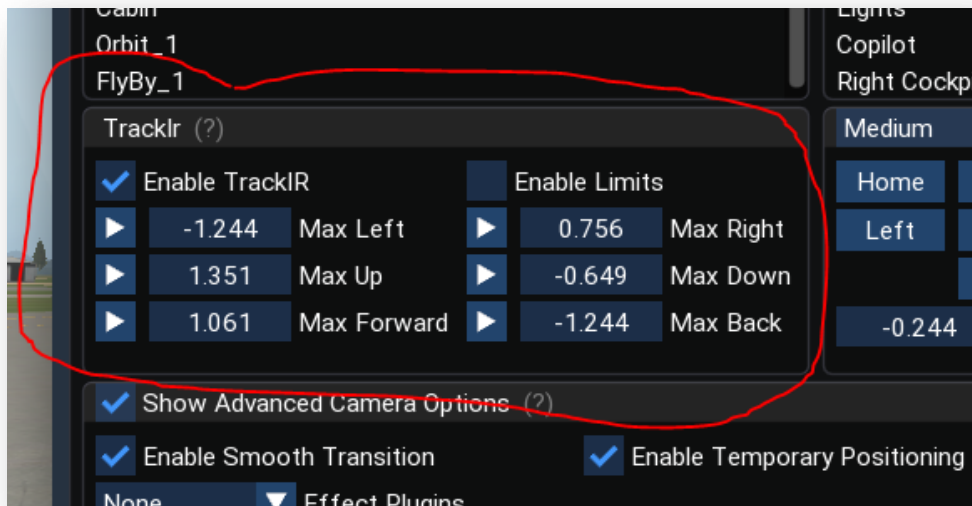
There is also a head track smoothing factor that can be specified on the settings dialog. A value of 4 – 10 may help smooth out stutters when panning with your head quickly. Higher smoothing factors will inject a lag that you may find unacceptable.



Note: Native TrackIR support is only available on the Windows platform; however, you can use LinuxTrack to extend support to Linux and Mac OSX. LinuxTrack needs to be at version 0.99.11 or higher.

Limit TrackIR

This option works in conjunction with TrackIR. You can set min/max X,Y, and Z camera limits which will prevent TrackIR or LinuxTrack head movements from positioning the camera outside the limits. This is useful when you have a TrackIR enabled cockpit camera and you don't want the pilot to be able to stick his/her head outside the hard cockpit walls or past the seat head rest.



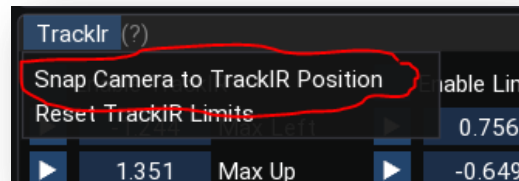
You can set the limits by either dragging the limits control to the values you want or you can double click them and edit the values directly with the keyboard. You can also use the arrow buttons to set the limit to the current position of your head. Note that you may want to turn off enable limits if you want to lean to max values and then set the limits using those arrow buttons. Once the limits are set, enable limits to test them.

Tip: The limits are oriented with you facing forward. If you happen to have a camera that is facing the rear of the aircraft, i.e. a rear facing cabin camera, you need to remember that the left limit is now really your right limit and the forward limit is really your back limit.

Note: When TrackIR limits are enabled it does not prevent the camera coordinates from being positioned past the limits with the movement commands, however, the camera view will be restricted.

Snap to TrackIR

This TrackIR menu item allows you to position a camera view using TrackIR head movement. When the view looks the way you want after positioning your head simply select this menu item and the current TrackIR position will be the new camera base position.



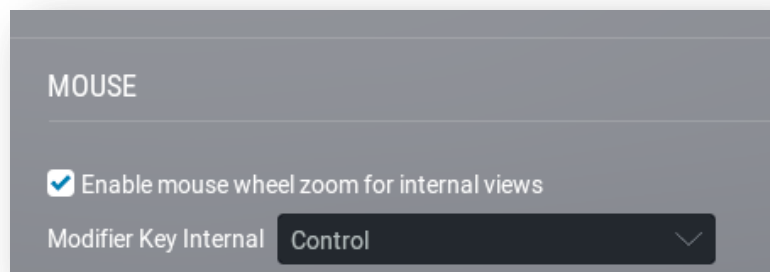
Disable Cockpit Zoom

By default X-Plane use the middle mouse wheel to zoom the camera. Many modern aircraft also use the mouse as a manipulator to turn knobs and adjust controls in the 3D cockpit. It can be frustrating if you are trying to adjust a control and slip off the control and then end up zooming your view.

This camera option will disable the wheel zoom on this camera.

Note: Although the option is labeled as Disable Cockpit Zoom it will in fact also disable wheel zooming on external cameras. This may be useful if you have other plugins that require mouse wheel input. With this option enabled on an external camera, X-Camera will ignore the mouse wheel activity and pass it on to other plugins to process.

On the newer versions of X-Plane 12 there is an Accessibility option to disable mouse wheel zoom globally:



If you have it disabled in X-Plane 12, X-Camera does not have the ability to enable it on a per camera basis. If you do have it enabled in X-Plane 12 then X-Camera can control if it is on or off on a per camera basis. **Note:** if you have it configured to use a Modifier key then you must press that key while scrolling the wheel when it is enabled via the camera option.

X-Camera external views have wheel zoom either enabled or disabled per the camera option. The wheel zoom operation is not affected by the X-Plane 12 external view zoom settings.

Effect Plugins

X-Camera can blend special effects data from 3rd party plugins. Only one of these plugins can supply special effect offset data at a time.

HeadShake

HeadShake is a cool plugin from SimCoders that monitors the G-Forces on your aircraft and will inject camera shake to simulate the head movement you would experience during a hard landing or turbulence. Stick and Rudder Studios collaborated with SimCoders to make our two plugins work together.

You need to install HeadShake version 1.3 or higher. Note: that as of this writing HeadShake only supports X-Plane 10 and above not X-Plane 9. If you enable HeadShake for a specific camera then X-Camera will add any calculated offset from HeadShake to the camera's base position. It also adds in anything from TrackIR if that is enabled.

HeadShake was unable to support TrackIR directly so now you can get the best of both worlds by using them together with X-Camera.

Enable XPRealistic

XPRealistic is a commercial lua script that is similar to HeadShake but more expansive in its immersion options. If you have XPRealistic installed and you want to have the camera effects added to this camera then enable this checkbox. You must be running XPRealistic version 1.0.6 or higher for this option to work.

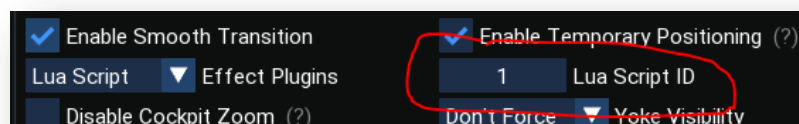
Note: The XPRealistic and HeadShake options are mutually exclusive. You cannot have both enabled at the same time on the same camera.

Real View

Real View is yet another special effect plugin that can be used with X-Camera

Lua Script

X-Camera has an API that allows FlyWithLua scripts to provide special effect data to a camera. When you enable this option you will also see a field for a script ID:



This script ID can be read by Lua scripts to indicate if the script should supply offset information that will be blended with the position of this camera. Generally you would never want two Lua scripts to use the same script ID as they would then fight with each other for control of the offsets. You want to set this value to value programmed in the Lua script that you want for this camera's special effects.

The Wingman View is a good example of an advanced Lua script that can supply some very cool special effects for a camera.

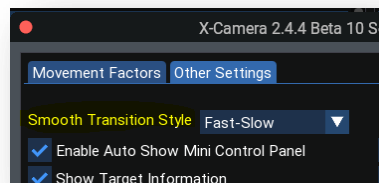
<https://forums.x-plane.org/index.php?/files/file/50170-wingman-view-flywithlua-script-for-x-camera/>

Smooth Transition

The smooth transition camera option will cause the camera to smoothly transition from a previous camera view to this one over roughly 500 milliseconds, or 15 frames by default. If you want the transition to last longer specify a transition frame count or transition time in seconds. Transitions only work within a view category as the affect is pretty strange going from an external camera to a say a cockpit camera.

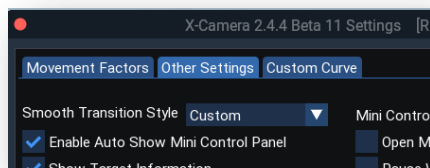
Smooth Transition Styles

The default smooth transition follows a sine wave from 0 to 180 degrees. This results in a transition that starts slow, peaks at the mid-point, and then slows down toward the end. In settings you optionally choose a smooth transition style that starts fast and then slows toward the end of the transition.



Custom Transition Style

You also have the ability to define your own custom curve.



If you choose the custom style the additional "Custom Curve" tab will appear on the settings dialog.



You can manipulate the X/Y sliders for the four control points to adjust the shape of the Bezier 2D curve.

Notes:

- The shape of the curve determines the acceleration of the camera movement through the smooth transition.
- Acceleration is related to the steepness of the curve
- You can use the Transition Preset dropdown and the Set button to set the control points to preset transition styles.

Retain Mouse Look Position

If the Retain Mouse Look Position option is enabled the camera's base position will be updated to the mouse look position when mouse look is toggle off. If this option is disabled the camera will revert back to its original orientation prior to activating mouse look.

There is an X-Camera command, "SRS/X-Camera/Restore_Current_Camera_Position" that can be mapped to a joystick button that will allow you to restore a camera to its previously saved position.

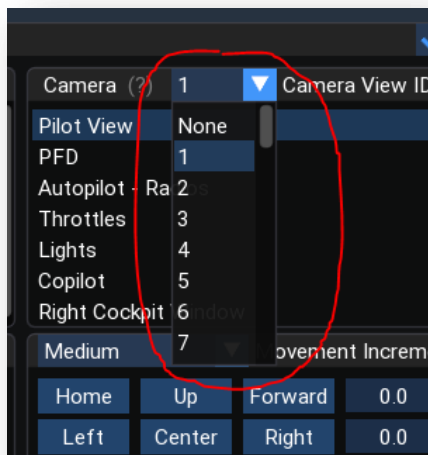
Note: Mouse Look mode is disabled if TrackIR is enabled and the TrackIR hardware has been detected. This is done so that your head movement and mouse movement don't fight each other

Enable Temporary Positioning

With this option enabled the camera will not retain position changes if you move off the camera and select a different view. This is particularly useful when you want to use mouse look or walk mode to move the camera around but you would like the camera to revert back to its original orientation as soon as it is deselected.

View ID

The view ID is a positive number you can assign to this particular view. It is used to map joystick buttons to select specific views.



Aircraft cameras can be assigned view_ID's 1 – 50. Airport camera files can be assigned view ID's 51 – 65. X-Camera allows you to assign lower number view ID's to airport cameras but we recommend not overlapping view ID's between aircraft and airport camera files.

View ID numbers 1 through 50 map directly to the X-Camera commands:

SRS/X-Camera/Select_View_ID_1 through SRS/X-Camera/Select_View_ID_50

As an example if you select 1 in the View ID drop-down of the pilot camera you can then map a keyboard key or joystick button the command SRS/X-Camera/Select_View_ID_1. When that key or button is pressed the pilot camera will be selected regardless of the current category or camera.

The “Joystick Button and Key Assignments” section of the manual shows you how to create these mappings.

Although you will get a warning if you assign the same view ID to multiple cameras X-Camera does allow this. When more than one camera has the same view ID sequential activation of the Select_View_ID_n commands will select the next camera with that view ID.

Momentary Camera Selection by View ID

There are also 50 momentary view selection commands:

SRS/X-Camera/Momentary_Select_View_ID_1 through SRS/X-Camera/Momentary_Select_View_ID_50

These commands are similar the Select_View_ID commands mentioned above except that the camera only remains selected while you continue to press the assigned key or joystick button. As soon as you release the key the previous camera will be selected.

Airport Camera Selection by View ID

There are 15 view selection commands specifically for selecting airport cameras.

SRS/X-Camera/Select_Airport_View_ID_51 through SRS/X-Camera/Select_Airport_View_ID_65

If your aircraft cameras are currently active and you activate one of the airport view ID select commands, X-Camera will first load a near airport file if one exists. If an airport file does not exist the command is ignored.

If an airport file is found then the camera with the selected view ID will be selected.

X-Plane Quick Look Emulation

X-Camera also has the ability to use the View ID concept by emulating the X-Plane quick look functionality. X-Plane quick look allows you to save and recall later, up to twenty views. The commands to do this are typically mapped to the numpad on your keyboard. Note that it is possible to map those commands to other keys. The <ctrl> key is used as a modifier to indicate that a view should be saved.

X-Camera will respond to these X-Plane commands and use the view ID concept to emulate the quick look function. View ID 1 – 20 will be used to emulate quick look.

Hide Yoke

There is an X-Plane dataref that most planes will honor that controls the visibility of the yoke. The dataref documentation is a bit ambiguous so some aircraft developers interpret its value a little differently. Setting it to one or zero could mean hidden or shown, it is dependent on the aircraft so some experimentation is needed. Furthermore, some aircraft don't even look at this dataref so it is not guaranteed you will always be able to control the yoke visibility with this.

The feature is implemented as a tri-state option. Each time you press the button the state will cycle through the three states and the button text will be updated with the current state. These are the states:

- Don't Force – In this mode X-Camera will make no attempt to modify the yoke visibility dataref. Its state will be governed by X-Plane and the aircraft model.
- Force to zero – In this mode X-Camera will write a zero to the dataref. This may either hide or show the yoke based on the plane's model.
- Force to one – In this mode X-Camera will write a one to the dataref. This may either hide or show the yoke based on the plane's model.

Advanced Camera Options

Linear Transition, Bezier Transition, Auto Advance, Transition Frames, and Tracking Options

These options make up the Advanced Transition features of X-Camera. They are discussed in the Advanced Transitions section of this manual.

Transitions

X-Camera supports the definition of advanced transition affects that can be used to create a number of cool camera affects. Here are a few examples of what this feature can be used for.

- Creating linked transitions that will simulate an external pre-flight inspection of the aircraft
- Create very smooth and slow transitions that can be used to create dramatic camera panning affects for making slick flight videos
- Create transitions for unique spot views and fly-bys of the aircraft

Advanced transitions are created using the following options on the X-Camera control panel:

- Enable Linear Transitions
- Enable Bezier Transitions
- Auto Advance to the next Camera
- Transition Frame count
- Smooth Camera Joins
- Track Camera Heading
- Track Camera Pitch
- Level Camera
- Center of Gravity (CG) offsets
- Hidden Camera

Linear Transition

When this advanced transition option is selected the camera will transition from a previous camera position in the same category to this camera over the number of frames specified by the Transition Frame Count. The difference between previous and new camera coordinates for X,Y,Z, Pitch, and Heading are divided by the Transition Frame Count. Then, as X-Plane renders each frame, the camera will be moved by the divided increment for each coordinate point. The result is some pretty cool panning affects.

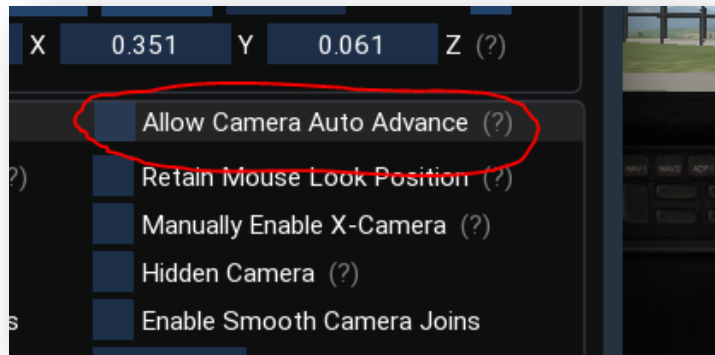
Bezier Transition

Bezier transitions will join 3 – 32 cameras using a 3D Bezier Curve algorithm. The result will be an ultra-smooth animation of joined cameras with no discernable stitch at the join points. You need a minimum of three cameras to make a Bezier transition work, a starting camera, a set of middle cameras that all have the auto-advance and Bezier Transition options set, and an ending camera that has the Bezier transition option set and either no auto advance or an auto advance to either a linear or smooth transition.

The transition frame counts of all the Bezier enabled cameras will be added to create one continuous frame buffer that the 3D Bezier routine will use for its output. If you do not specify a frame count for a camera or a frame count below ten then ten frames will be used at that transition point.

The 3D Bezier routine will calculate X, Z, and Y points for the camera over the total frame count. Camera heading and pitch between cameras uses a linear transition algorithm between cameras. As an example, if camera one has a heading of 000 and camera two has a heading of 045 and a transition frame count of 100 then the camera's heading will be adjusted .45 degrees to the right over 100 frames. The same approach is used for camera pitch transitions between cameras.

The animation of a Bezier transition cannot be seen with the control panel open and the "Allow Auto Advance" checkbox in the upper right corner of the control panel options window is not checked.



This allows you to step through each camera in a Bezier transition set and make changes to the camera without the animation automatically starting and preventing individual camera editing. If you want to see the full animation simply check the "Allow Auto Advance" checkbox. Bezier transitions will always work if setup properly when the control is not being displayed.

Transition Frame Count

The transition frame count specifies how many X-Plane rendering frames it takes to complete a linear or smooth transition. You can roughly calculate the number of frames needed based on how long you would like the transition to take and what your average X-Plane frame-rate is. As an example, suppose you would like a transition to take roughly 10 seconds and your average frame-rate is 30 FPS. Then you want to set your frame count to 300.

Transition Seconds

You can optionally specify the number of seconds you want a transition to occur. If transition seconds are specified then this will over-ride the frame count. X-Camera will calculate the required number of frames in real-time based on the simulator's frame rate at the time the transition is started.

Note: the transition seconds option will assume a 30 FPS frame rate if the simulator is paused.

Enable Auto Advance to the Next Camera

This allows you to link cameras in the same category together into one continuous animation cycle. When this is enabled on a camera and the next camera in the category has either smooth, Bezier, or

linear transition enabled, the view will automatically advance to the next camera in the sequence as soon as the transition to this camera is completed.

The auto advance feature is disabled whenever the X-Camera control panel is being displayed. This helps prevent endless animation loops where all cameras have auto advance set with the next camera having a transition option. This also allows you to manually advance through the sequence using the next and previous camera buttons on the control panel and make changes to each step without having to wait for the entire sequence to complete. As soon as you close the control panel window the auto advance option will be re-enabled. You can enable the “Allow Auto Advance” option in the lower left corner of the control panel to temporarily allow auto advancing while the control panel is open.

Smooth Camera Joins

Smooth camera joins works in conjunction with the smooth and linear transitions and the auto advance feature. When this option is enabled X-Camera will create a Bezier curve around the camera join points. The curve is defined by the “Camera Smoothing Window” which defaults to 60 frames.

A three point Bezier curve is created 30 (half of 60) frames before and after the join point which will result in a smoother transition.

The Camera Smoothing Window can be adjusted to a higher value in the Settings Dialog.

Transition Delay

The Transition Delay parameter specifies how long of a delay in seconds you want before a transition to this camera will be started. It can be useful when defining walk-around style animation where you want to stop the transition for a few seconds at the inspection station. Transition delays on Bezier curve cameras in between the start and end cameras are ignored.

Tracking Cameras

There are four flavors of tracking cameras:

- Track Heading
- Track Pitch
- Level Camera
- Target Following Camera

A tracking camera will automatically calculate the camera heading, pitch, and roll to keep the camera pointed at the plane’s center of gravity.

Tip: If you are trying to position a camera to a specific location around the aircraft it is generally a good idea to shut the tracking options off while you are moving the camera. The reason for this is that a new camera angle is calculated with each camera position change. The camera angle then affects the position as you try to move the camera. The interaction of the two operations can become frustrating .

Track Heading

With this option enabled the heading of the camera will automatically be adjusted to keep the camera's heading pointed to the plane's center of gravity. The CG point varies from aircraft to aircraft but it is typically near the wing and toward the center of the fuselage. You can adjust the CG for any camera by enter numbers in the Z and Y CG offsets fields. These offsets are roughly in meters.

If you want the camera to track a little further forward than the default CG put a negative number in for the Y offset.

Track Pitch

With this option enabled the pitch of the camera will automatically be adjusted to keep the camera's pitch pointed to the plane's center of gravity. Similar to the track heading option above you can adjust the pitch focal point for a camera by enter numbers in the Y CG offsets fields. If you want the camera's pitch to be a little higher put a positive number in the Y field.

Level Camera

Think of an external camera as if it were attached to a pole that is welded to the plane's fuselage. As the plane pitches and rolls the camera's elevation, pitch, and roll angles will be adjusted. The further away the camera is from the plane's center of gravity the more pronounced the elevation change will be.

The level camera option has the effect of attaching the camera pole to the fuselage using a gyro stabilized gimbal mount. This means that as the plane pitches and rolls the pole will stay level with the ground. The camera's pitch and roll angles can still be controlled independently.

The level camera option is primarily designed to work with external cameras. It is still available with an internal camera but its functionality is more limited and it is mutually exclusive with the track pitch option when used with an internal camera i.e. External Camera option NOT set.

Cinema Verite / G-Loaded Camera

If you are running a version of X-Plane earlier than 12.4.1 the X-Plane Cinema Verite option will be available. This gives the camera a hand-held effective by injecting a slight wobbling of the camera. This probably makes the most sense for cabin cameras that are looking out the window to simulate a passenger filming with a hand held video camera. This option only works with internal cameras.

If you are running X-Plane 12.4.1 or higher this will enable the X-Plane 12 G-Loaded camera feature.

Target Following Camera

A target following camera will track a predefined target defined by a latitude, longitude, and elevation in meters. Targets and target following cameras are explained in detail in the targets section of this manual.

Hidden Camera

Some camera animations can have multiple cameras joined together with auto advance to make a complete animation. The Orbit animations described in the following paragraph use such a technique. In this situation you typically are interested in the first camera in sequence to initiate the animation either by selecting it in the mini-control panel or by a next / previous camera command.

The hidden camera option tells X-Camera to NOT display the camera in the mini control panel and also to skip it when using a next and previous camera command when the main control panel is closed.

Note: You do not want to hide the starting camera in a sequence.

Passive Camera

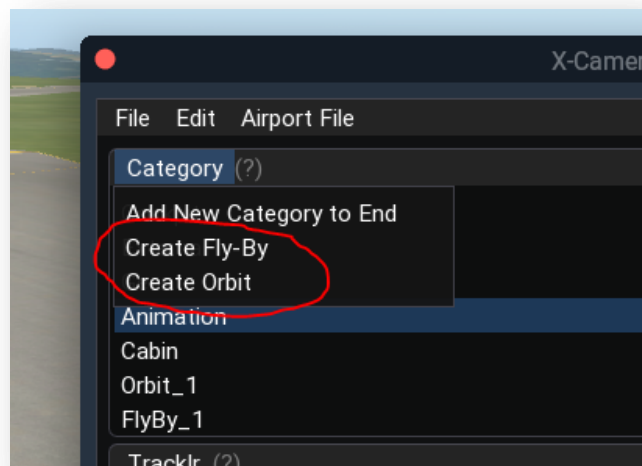
By default X-Camera actively controls the X-Plane camera's position and orientation on every frame. This prevents any other plugins or Aircraft Custom views from moving the camera. If you enable Passive Camera X-Camera will only update the 3D cockpit camera position and orientation of you select a new camera, restore the current camera, or have offset inputs from sources such as head tracking, special effect plugins, FlyWithLua scripts, etc.

When enabled it may be possible to allow Aircraft Custom Views to operate the camera until one of the above mention actions cases X-Camera to think there is a change to the camera's position or orientation.

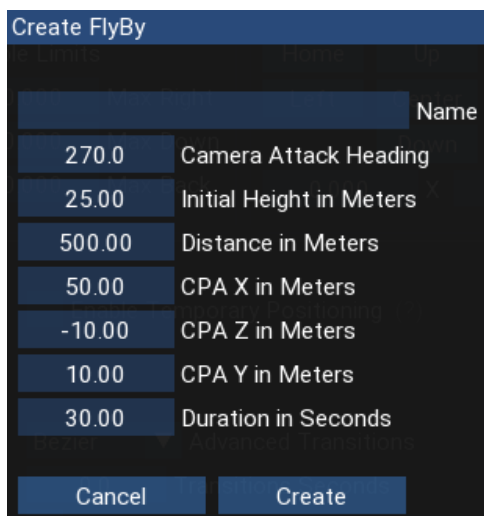
Automatically Creating Orbit and Fly-By Animations

X-Camera can generate categories that are populated with orbit or fly-by animations based on some user provided parameters. Each orbit or fly-by will be placed in its own category based on the name of the orbit or fly-by name.

You can start the generation by selecting either the "Create Orbit" or "Create Fly-By" menu items in the Category list menu.



The following figures illustrate the additional parameters you will provide to create these animations:



The 'Create FlyBy' dialog box contains the following parameters:

Value	Parameter
	Name
270.0	Camera Attack Heading
25.00	Initial Height in Meters
500.00	Distance in Meters
50.00	CPA X in Meters
-10.00	CPA Z in Meters
10.00	CPA Y in Meters
30.00	Duration in Seconds

Buttons: Cancel, Create



The 'Create Orbit' dialog box contains the following parameters:

Value	Parameter
	Name
270.0	Initial Camera Heading
10.00	Radius in Meters
-3.00	Min Height in Meters
3.00	Max Height in Meters
30.00	Duration in Seconds
<input type="checkbox"/>	Reverse Rotation
<input type="checkbox"/>	Continuous

Buttons: Cancel, Create

Orbit Parameters

- Name is used to create a category of that name and each camera in the category will use this parameter as the first part of the camera name with a – n appended where n is the camera number in the sequence.
- Heading is the starting angle of the camera. The nose of the aircraft is a 360 so in the example above the camera starts the orbit on the right side of the aircraft facing to the plane's left.
- Radius is how far away the camera is from the center of gravity of the plane. You will need to increase this number for large jets.
- Min and Max height specify how high the camera will be placed in the orbit during the cycle. If min and max are the same value the camera will remain at that height offset throughout the rotation. If min and max are different the animation will oscillate from the mid-point to max, to mid-point, to min, and then back to mid-point.
- Duration is specified in seconds and will determine roughly how long the orbit will last.
- Reverse rotation will cause the animation to occur in the opposite direction of rotation
- Continuous will allow the orbit to repeat itself up to approximately 60 times before stopping

When you press the create button on the dialog X-Camera will create the category and populate it with the cameras. If you do this multiple times with the same name the existing category will have its cameras replaced with new ones.

Fly-By Parameters

- Name is used to create a category of that name and each camera in the category will use this parameter as the first part of the camera name with a – n appended where n is the camera number in the sequence.
- Attack Heading specifies the camera heading as it approaches the aircraft. The example of 170 degrees has the camera starting the Fly-By off to the left of the plane
- Initial Height is the camera's height above the plane's current altitude.
- Distance specifies how far away the camera is at the start of the fly-by.

- CPA X, Y, and Z specify the closest point of approach (CPA) between the camera and the aircraft. If you specify 0,0,0 then the camera will pass directly through the aircraft's center of gravity. These three coordinates allow you to specify where the camera will be when it passes the plane at its nearest distance. Positive X will be off to the right of the plane, positive Y will be above the plane, and positive Z will be behind the plane.
- Duration specifies roughly how long the fly-by will last.

You can create additional orbits and fly-bys by just specifying a different name. Then only limit is the number of categories.

Some Notes on Advanced Animations

- Transitions only work between cameras in the same category. The reason for this is to prevent some strange animations between cameras from very differing categories, as an example, when switching from interior to exterior views.
- Pressing any positioning key in the middle of a transition will cause the transition to stop at the final camera position.
- Avoid creating endless loops in a camera category. Do this by making sure that at least one camera in the category does not have auto advance enabled or at least one camera has neither linear nor smooth transition enabled.
- Mouse look and TrackIR will continue to work during transitions but panning with the HAT switch is disabled until the transition is complete.
- High values in the Transition Frame Count are going to cause the transition to take a long time to complete. We do not restrict high values but it is unlikely you will need anything over 1,000 frames. Conversely, very low values, below 10 as an example, may make the transition appear immediate.
- Transitions between cameras with different tracking options will likely result in some abrupt changes at the beginning and end point of the transitions. For fluid transition between cameras it is recommended to keep the tracking options similar.
- Tracking cameras are generally not used in the cockpit; they were primarily designed for external views. Although they work, they produce some pretty odd results.
- When the tracking options are enabled the camera's heading and pitch will be updated. As you try to position the camera with the keyboard a new heading and pitch will be calculated affecting the next camera movement. This can cause very confusing movement when using the positioning keys. As an example, with both heading and pitch tracking turned on a continuous press of the right arrow key will cause the camera to orbit the aircraft since the camera heading is constantly updated to point to the aircraft center on each movement.

You may want to disable the Tracking options while you are positioning the camera to new base coordinates.

- The coordinate system between the 3D cockpit view and the Free (External) camera view of X-Plane is not in perfect alignment. Transitioning between External and Internal (3D Cockpit) cameras will likely result in some odd behavior.
- If you do create some cool videos please let people know you used X-Camera to create the panning affects.

External Cameras

External cameras operate using X-Plane's free camera view. Although you can place a 3D cockpit camera outside the plane some payware aircraft may not render the plane's exterior properly when in 3D cockpit mode. You may also notice that sounds are not rendered properly if you use a 3D cockpit camera as an external view camera.

Marking a camera as an external camera will instruct X-Camera to operate in the X-Plane Free Camera view mode.

Using transitions between a 3D cockpit camera and an external camera will likely exhibit some strange behavior. We recommend setting up categories with either all 3D cockpit cameras or all external cameras if you want to use transition effects between cameras in the same category.

X-Plane 12 Hand-Held Camera

X-Camera has the ability to emulate the hand-held camera option available in X-Plane 12. When that X-Plane view option is enabled any X-Camera external view will gently adjust the camera's pitch, roll, and yaw to simulate looking through a hand-held camera view finder.

External Camera

By default a basic external camera is still attached to the plane assuming you leave the camera origin set to Aircraft. As the plane moves the camera will move with it and the camera's heading, pitch, and roll relative to the scenery will adjust in sync with the plane. Pitch and roll can be forced to a level state by selecting Level Camera.

Camera Origin

A non-free external camera can have three origins:

1. Aircraft.
2. Aircraft Carrier
3. Frigate

The camera will move as the selected origin moves. The camera X,Y,Z values are relative to that origin. You can use the camera position controls to place the camera anywhere on the ship, just like on your aircraft. You can even create transitions between two cameras with the same origin.

Depending on where you are flying the X-Plane Aircraft Carrier and Frigate can be quite some distance from your plane. If these objects are too far away from you aircraft the scenery around them may not look correct since X-Plane only loads scenery tiles with detail near your aircrafts position.

Depending on the origin of the camera you have selected additional targets will be automatically added to the target list. As an example, if you have a camera selected with its origin set to the carrier or frigate a target for your aircraft will be added so that you may use the target following option on that camera to track your aircraft.

Similarly if your origin is aircraft then targets for the carrier and the frigate will appear allowing you to use a target following camera in your plane to determine a bearing and distance to the ship.

Note: Camera Origins are not available for free cameras since free cameras have an origin based on their exact latitude, longitude, and elevation specifications.



Scenic Flyer Panels

X-Camera supports an optional integration to the Scenic Flyer plugin, see the section on optional integrations. If you have the Scenic Flyer plugin (V1.5 or above) installed you can use the GA Panel and Glass panel camera options to show the Scenic Flyer panels when that camera is selected. See the following figure for an example.



Cineflex Camera

A Cineflex camera is an external camera where the camera heading, pitch, and roll are independent of the plane but the X, Y, and Z coordinates of the camera continue to move with the plane. This camera is attempting to simulate the gyro-stabilized Cineflex Camera system which is popular on helicopters.

Free Camera

The free camera is basically a world camera. As soon as you mark a camera as a free camera the camera will be anchored to the plane's current location in the world and will no longer be attached to the plane. You can force a free camera to automatically adjust its heading and pitch to track the plane by using the Track Heading and Track pitch options.

Although you can define free cameras associated with an aircraft it makes much more sense to use them with Airport camera definitions. See the section on Airport Cameras for further detail.

Target Following Camera

A target following camera will track a predefined target defined by a latitude, longitude, and elevation in meters. Targets and target following cameras are explained in detail in the targets section of this manual.

X-Plane 9 Chase Camera

This type of camera attempts to replicate the X-Plane 9 chase view which is sometimes preferred by users over the X-Plane 10 and 11 chase view. With this option enabled X-Camera will place a camera directly behind the plane. You can adjust the distance behind the plane but you cannot move the camera left, right, up, down, or adjust its pitch and heading.

X-Camera will keep the camera level during flight but it will adjust the pitch of the camera to match the plane's pitch. This will come close to replicating the behavior of the X-Plane 9 chase view on X-Plane 10.

AI Perspective

By default the orientation of any external "non-free" camera is oriented relative to the user's aircraft. X-Camera has the ability to change that orientation to any of the configured X-Plane AI aircraft. As an example, if you have a tail camera setup on your plane and you have AI planes configured in X-Plane you can toggle the orientation to an AI perspective and your camera will now give you a tail view of the currently selected AI plane.

You can toggle AI perspective on or off from the Mini Control panel. You can also select the next or previous AI plane from the Mini Control panel.

Note: You must have some AI planes configured and you must have an external camera selected. AI orientation does not work with internal cockpit cameras.

There are also five commands you can map to keys or joystick buttons that will toggle AI orientations and allow you to select AI aircraft.

1. "SRS/X-Camera/Toggle_AI_Perspective"
2. "SRS/X-Camera/Select_Next_AI_Plane"
3. "SRS/X-Camera/Select_Previous_AI_Plane"
4. "SRS/X-Camera/AI_Scale_Up"
5. "SRS/X-Camera/AI_Scale_Down"

When you have a free camera, such as an airport camera, and you have pitch and heading tracking on the camera will track the currently selected AI plane when AI perspective is enabled.

There are some limitations to AI perspective:

- X-Camera is not currently aware of the size difference between your plane and the AI aircraft. A tail view on a Cessana 172 that is only ten meters away from your plane's center of gravity is going to be to be in the middle of a 747's fuselage when you select AI perspective.

There is a potential for X-Camera to be smarter about this in the future so that it can either up-scale and down-scale the cameras based on the difference between the users aircraft size and the selected AI plane. In the mean time scale up and scale down buttons will appear in the mini control panel when AI Perspective is enabled.

These buttons will add a scaling modifier to the camera coordinates to move it in or out allowing you to adjust for the difference in plane size. The scaling is temporary and does not affect the camera definitions in your camera file.

- AI Aircraft can roam a fair distance from your user's aircraft. Your scenery may not render to the same fidelity when you have an AI perspective selected.
- Do not expect to hear the sounds from an AI plane. As a matter of fact, some user aircraft sound systems are not that sophisticated and they may not be aware of the fact that your camera is

many miles away from the user's plane when AI perspective is selected. It is not uncommon to hear the sounds of your Baron 58 even when you have an AI perspective on a heavy metal 747.

Traffic Display

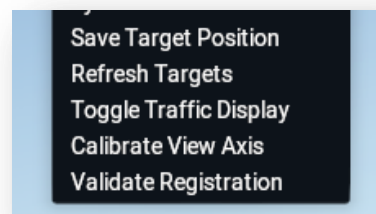
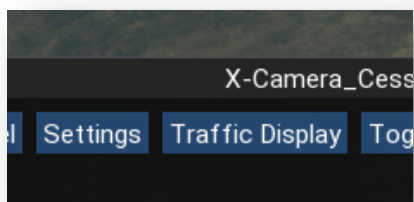
Another feature that is useful with AI Perspective is the Traffic Display window. This is a floating window that can also be popped-out to an OS level window and placed on another monitor. The Traffic display will show you the nearby TCAS aircraft with their call sign and distance from your aircraft. Traffic can be sorted by call sign or distance from your aircraft.



If you hover your mouse over the ? Tooltip you will get additional information about the TCAS aircraft.

There is also a camera zoom slider that can be used to zoom the camera in on a TCAS plane. This is particularly useful when using AI Perspective with an airport tower camera.

You can toggle the Traffic Display from the mini-control panel or the X-Camera menu.



Airport Cameras

Overview

Airport cameras have all the same features as aircraft cameras but they are associated with an airport icao code rather than an aircraft model. Free cameras are the most logical camera type to use as airport cameras as they are fixed to a location at an airport or nearby terrain and do not move with the aircraft.

If you toggle to an airport camera view, X-Camera will locate the airport camera file that is the closest to the plane's current position within a 20 nautical mile radius. If no airport camera files can be found within 20 nautical miles X-Camera will keep the view associated with the aircraft.

Airport Camera File Types and Names

There are two types of airport camera files, My Airport Cameras and Community Airport Cameras. The file layout and naming convention are identical for both types of files, the only difference is where they are stored and the how they are selected.

My Airport Cameras are stored in:

X-Plane/Resources/plugins/X-Camera/MyAirportCameras

Community Airport Cameras are stored in:

X-Plane/Resources/plugins/X-Camera/ CommunityAirportCameras

Airport camera files are named by the ICAO code of the airport they represent. As an example KSFO.csv is the airport camera file for San Francisco International. The name of the file is critical as this is the way X-Camera finds the nearest airport camera file. If X-Camera finds a matching file in both the MyAirportCameras directory and also in the CommunityAirportCameras directory, the file in the MyAirportCameras directory takes precedence.

Sometimes you will have airports in extremely close proximity to each other and it might make sense to combine them into one file. A very good example of this is KSFO. At that airport there is a helipad, SFO1 and an FBO pad SFO2. You could define three separate airport files for each of these but the challenge is your plane may really be interested in a KSFO camera that is physically nearer SFO1. X-Camera might load the wrong camera file. The way to overcome this is to rename KSFO.csv to KSFO-SFO1-SFO2.csv. X-Camera will look for the four character icao code anywhere in the file name. If it finds it, it will use that file.

It may also be possible that the scenery definition for KSFO may already include the helipads mentioned above. In this case you just need to create the airport file for KSFO.

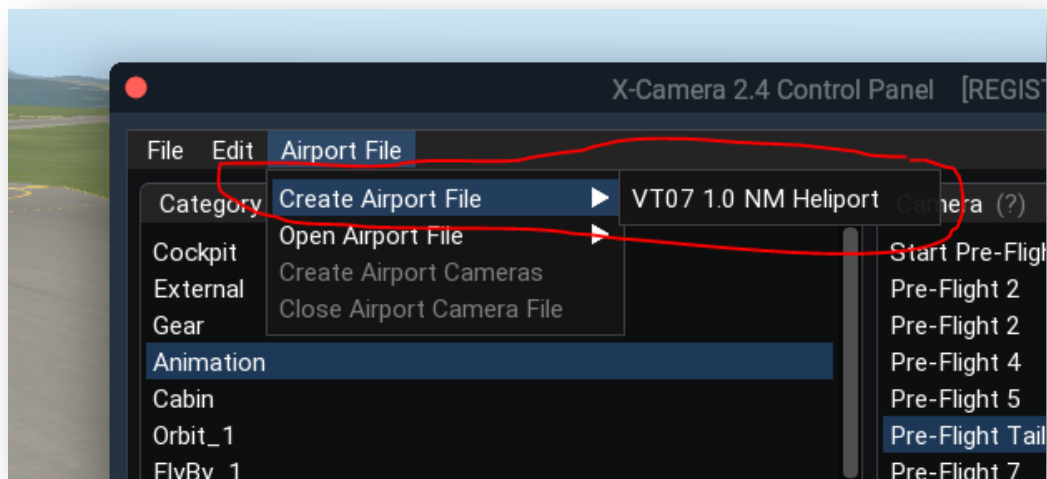
Camera files are simple comma separated text files. You can use a plain text editor, Microsoft Excel, or Google Sheets to edit these files. You would use one of these editors to manually combine airport files. Make sure you do not have more than 20 unique category names and no more than 150 camera lines for each category.

Note: You do not want to combine airports that are more than a few miles from each other. X-Plane's coordinate system has variable reference points based on the loaded scenery. The physical location of a camera will not be at the exact same place with different scenery tiles loaded. In other words you can't place a free camera in New York into a San Francisco airport file and expect it to render properly when the plane is in San Francisco.

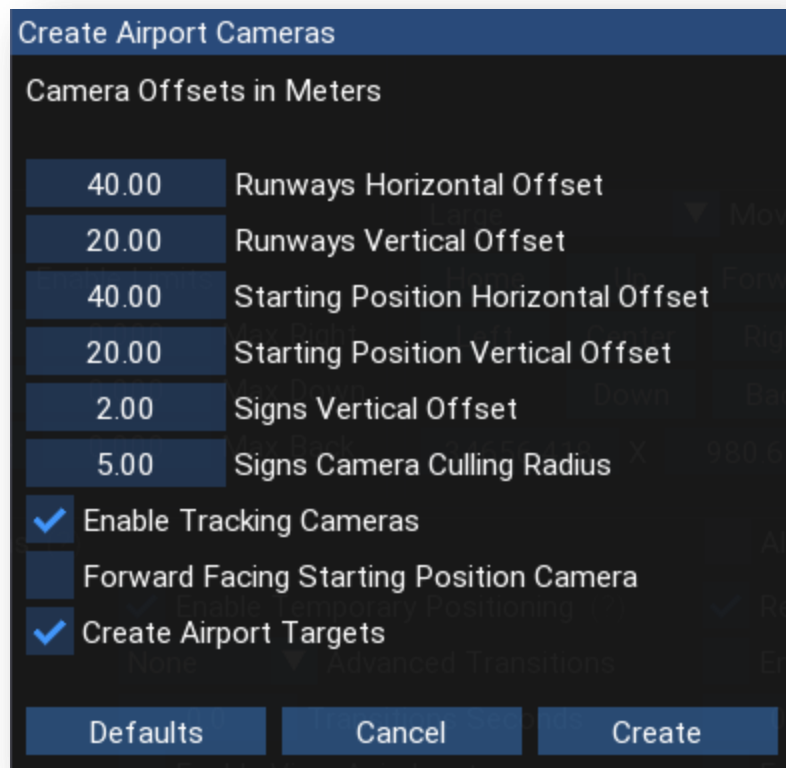
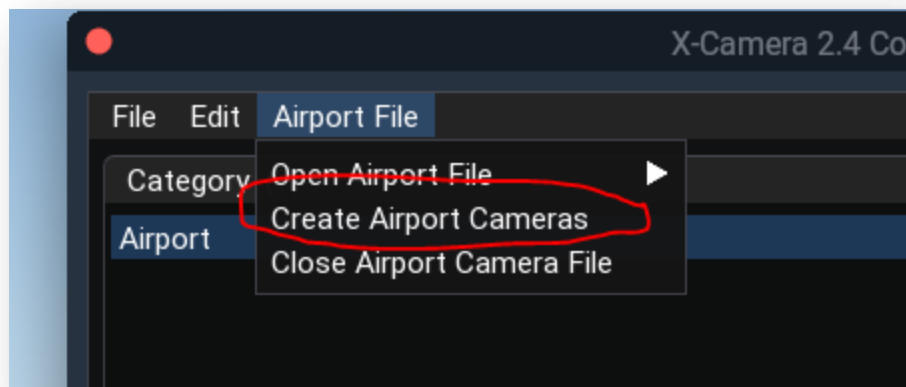
Creating Airport Camera

X-Camera does not currently ship with Airport cameras defined. However, you can use X-Camera to automatically populate airport cameras from the scenery for that airport. You can enhance the generated files by adjusting camera placement and options and you can add additional viewpoints.

This is accomplished by locating the aircraft at the airport you want to define cameras for and then use the Create Airport File menu item under the Airport File menu.



X-Camera will create an appropriately named airport file and will place one camera in it approximately 1,000 feet AGL above the center of the airport. Once the bare bones file is create you can now either add cameras manually or use the Create Airport Cameras menu item to automatically create cameras at runways, gates, view points and airport signs.



Offsets

You can specify a horizontal and vertical offset from the scenery's specified latitude and longitude of the runway or starting location. This is used so the camera is not right on top of those locations.

Sign cameras are placed directly over the sign so you can't specify a horizontal offset but you can specify how high the camera will be off the ground.

Sign Camera Culling Radius

Depending on your scenery there can be numerous taxiway signs, many of them in very close proximity to each other. You can specify how far away each sign camera needs to be from an adjacent sign camera. If a sign camera is within the specified radius of an already added sign camera then it will not be added to the category.

Forward Facing Starting Position Camera

The default placement of starting locations cameras is to put them in front of the aircraft starting position by the specified horizontal and vertical offset. If you check this option the camera will be placed behind the aircraft at the starting location.

Create Airport Targets

Targets are locations defined by latitude, longitude, and elevation in meters. X-Camera can create targets for airport runways, viewpoints (like towers), and helipads. Enable this option to create targets for this airport. Refer to the targets section of this manual for greater detail on targets and target following cameras.

Airport Camera Creation Notes

When you generate airport cameras any existing camera definitions in the currently loaded airport camera file will be deleted. If you save the camera file or switch to an aircraft camera which will cause the airport camera file to be saved, you will lose any previously defined airport cameras that were in the file prior to generating cameras. It is a good idea to make a copy of any airport camera file that you put a bunch of time into creating specific cameras prior to running the generation option on that file.

The cameras generated are very dependent on the airport detail defined in the corresponding scenery file. If you are at an airport with only the default scenery available then it is highly likely you won't get any sign cameras and you may be limited to just runways.

Generated cameras will have the track heading and pitch option set by default. This allows the airport camera to always track the position of the plane. You can disable this if you want a camera to have a static heading and pitch.

Cameras created for a specific scenery set may not be placed properly on a different scenery set. Say, as an example, you created airport cameras for an airport but then you upgraded that airport to a more advanced scenery set. The previously defined cameras may not be in the proper locations.

Joining Airports

On occasion there are a number of airports in very close proximity to each other. A very good example of this is the heliport and FBO pad at KSFO. It makes sense to combine these into one airport camera file. The way this is done is to create the KSFO.csv using the instructions in the previous paragraphs. Exit X-Plane and go to the X-Plane/Resources/plugins/X-Camera/MyAirportCameras directory and rename KSFO.csv to KSFO-SFO1-SFO2.csv.

After restarting X-Plane and editing airport cameras while at KSFO you will notice that the newly renamed file is the one actually being used. The same thing will happen if you place your plane at the KSFO heliport or FBO pad.

Selecting Airport Cameras

Whenever you are in an aircraft view and you attempt to select an airport camera, X-Camera will first try to find the nearest airport camera file that is within 20 nautical miles of your plane. If X-Camera cannot find a matching file it will not change the view.

There are five X-Camera commands that can be mapped to joystick buttons or keys to select airport cameras.

- **Toggle Airport Cameras**
 - This command will toggle back and forth between the last aircraft camera and the last selected airport camera. If you are currently on an aircraft camera view and no airport camera file can be located for the nearest airport, then the view will not change and will stay in the current aircraft camera.
- **Toggle Nearest Airport Camera**
 - This command is very similar to Toggle Airport Cameras with the difference being that X-Camera will locate and select the camera nearest to the aircraft if an airport camera is being toggled in.
- **Select Nearest Airport Camera**
 - This command will load the nearest airport camera file if it is not the current active camera file and then it will select the nearest camera to the aircraft. Subsequent operations of this command will continue to find and select the nearest camera.
- **Auto Select Nearest Airport Camera**
 - This command will load the nearest airport camera file if it is not the current active camera file and then it will select the nearest camera to the aircraft. While you stay in the airport camera view X-Camera will continuously evaluate which airport camera is closest to your plane as it moves. As soon as X-Camera detects a closer camera it will automatically select it.
- **Toggle Auto Nearest Airport Camera**
 - Similar to Auto Select Nearest Airport Camera but the command will toggle back to the aircraft file if the airport file is currently selected.

Airport Cameras with an Unregistered Version of X-Camera

Airport cameras are a registered feature of X-Camera. If you are running an unregistered version of X-Camera no airport camera files will be available. However, you can try out the feature. X-Camera will allow you to define airport camera files that will work for the current active session of X-Plane.

Experiment with them at your favorite airport. The airport files will be properly formatted and saved to the X-Camera/UnRegisteredAirportCameras directory. You can copy them to the MyAirportCameras directory and use them once you are registered.

The airport camera generation feature works in the unregistered version of X-Camera but it will create a limited set of runway, starting locations, and sign cameras. Hopefully enough so that you can get a sense of how the feature works.

Note: If you shut down X-Plane and restart it any airport cameras defined for a given airport will overwrite the same file in the UnRegisteredAirportCameras directory. We don't recommend spending a lot of time defining a lot of cameras using an unregistered version of X-Camera. It is all too easy to forget the above behavior and accidentally delete all your hard work.

Targets and Target Following Cameras

Targets are locations defined by a latitude, longitude, and elevation in meters. Target following cameras are a special type of external camera that is attached to your plane and it has the ability to track a selected target.

Creating Targets

Targets can be created a number of ways depending on the type of camera that is currently selected and by using the X-Camera menu command "Save Target Position".

1. Targets can be created by simply flying your plane, helicopter, or VTOL to a location in space. Use the X-Camera menu command to "Save Target Position". A dialog box will open allowing you to name the target and save it.
2. Use your plane, helicopter, or VTOL to get close to the target location. Using the X-Camera control panel create a temporary free camera. Use your arrow keys or mouse move keys to position the free camera exactly where you want it in the scenery. Use the X-Camera menu command to "Save Target Position".
 - a. **Note:** when saving a target from a free camera the free camera's location is saved as the target, not the plane's location and elevation.
 - b. **Note:** You will probably want to restore your plane cameras or delete the free camera from your aircraft once you have saved the target.
3. Select a target following camera and then select the free target. Use the right mouse button to position the free target at the red X on the middle of the screen. This will adjust the free target's location. Use the X-Camera menu command to "Save Target Position". This will save the free target's location as a permanent named target.
4. Edit the comma delimited file in X-Plane/Resources/Plugins/X-Camera/My Targets/MyTargets.csv and manually add a target by specifying the target name, date of creation, latitude, longitude, and elevation in meters.

Target Following Cameras

Target following cameras are an option on an external aircraft camera that will track a selected target. You can choose this option on a camera using the control panel.

When a target following camera is selected X-Camera will find all the targets within a 30 nautical mile radius. Targets can be selected using the target commands outlined in the next section. Once a target is selected the camera will track the target as the aircraft moves.

X-Camera will evaluate the new set of targets as soon as the plane moves more than 15 nautical miles from the last location targets were collected. This will happen automatically but you can also force new targets to be collected using the command: "SRS/X-Camera/Select_Nearest_Target".

Free Target

A free target is a temporary target that is created each time X-Camera collects targets. The free target is initially set to a location ahead of the aircraft. The distance to the free target is determined by the aircraft's altitude above ground, it's heading, and an initial target camera pitch of -10 degrees.

You can reposition the target by using the middle mouse button, or simulated middle mouse button on a MAC or Linux system. When a target camera is selected a red X will appear in the center of the screen. While continuing to activate the middle mouse button move the mouse to position the red X to where you want the target.

It can be difficult to aim a free target using mouse look while the sim is operating and the plane is moving. There is an option in the settings menu that will optionally pause the simulation when you are aiming a free target. The pause will be toggled as soon as you release the middle mouse button.

Free Targets Note:

- The camera must be pitched with the mouse to an angle less than zero so that it intersects with a location on level ground. It is generally easier to position a free target if the plane is up in the air.
- X-Camera calculates the free targets position by calculating the point on the ground that the camera is aimed at. This is not going to be an extremely precise way of creating a target but it is a fast way to track a ground location without having to create a permanent target.
- Free targets will be reinitialized as soon as it is detected that they are more than 30 nautical miles away from the plane.
- The target aiming functionality looks for a hard or water surface under the aiming point and then attempts to place the target one meter above the surface. You can place targets on roof tops assuming the scenery defines the roof as have a hard surface. You can also place targets on objects like aircraft carriers but if the carrier is moving the target does not follow the moving aircraft carrier. It might be a cool feature to add in the future if I can figure out how to make that work.

Target Commands

There are a number of commands associated with targets that can be mapped to joystick buttons or keys:

Command	Description
SRS/X-Camera/Select_Nearest_Target	Collects targets within a 30 nautical mile radius and selects the one nearest the plane
SRS/X-Camera/Select_Next_Target	Selects the next target in the collection. It will wrap to the first target when at the end of the list
SRS/X-Camera/Select_Previous_Target	Selects the previous target in the collection. It will wrap to the last target when it is at the beginning of the list
SRS/X-Camera/Toggle_Target_Information	Turn the target display information at the bottom of the screen on or off.
SRS/X-Camera/Toggle_Target_Reciprocal	Switches the view on a target following camera to either be looking at the target or from the target to the plane.
SRS/X-Camera/Save_Camera_As_Target	Saves the current camera location as a named target. Note: the behavior of this command varies with the type of camera. See the section “Creating Targets”
SRS/X-Camera/Toggle_Target_Following_Camera	Toggles target following on or off for the selected camera
SRS/X-Camera/Select_Free_Target	Selects the Free Target from the target collection

Any of the target selection commands, nearest target, free target, next / previous target etc. will cause X-Camera to search for and select the first target following camera if the current camera is not a target following camera. The search always starts from the first category and then sequentially through each camera in the category. Your primary target following camera should be ahead of any additional target following cameras.

Notes on Targets and Target Following Cameras

The further the target is away from the plane the less detail will be rendered when you select the target reciprocal view. This is because X-Plane limits scenery detail the further away the scenery is from the plane. This helps keep frame rates high and it is also the reason why targets are limited to a 30 nautical mile radius.

Targets are automatically recollected whenever the plane moves more than 15 nautical miles from the last location that targets were collected.

Mini Control Panel

There is an optional mini-control panel that can be activated by mapping a key or joystick button to the command:

SRS/X-Camera/Toggle_Mini_Control_Panel

When activated a control panel will appear at the bottom of the screen that will show 3 – 4 rows of buttons. Each row is color codes and will show available commands, cameras with view ID's assigned, categories, and the cameras in the category.

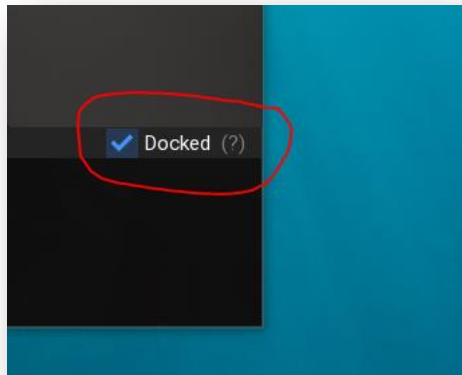
You can also set the mini control panel to open automatically the first time X-Camera is started. That option can be set in the settings menu as well as choosing if you want the mini control panel to have a solid or translucent background.



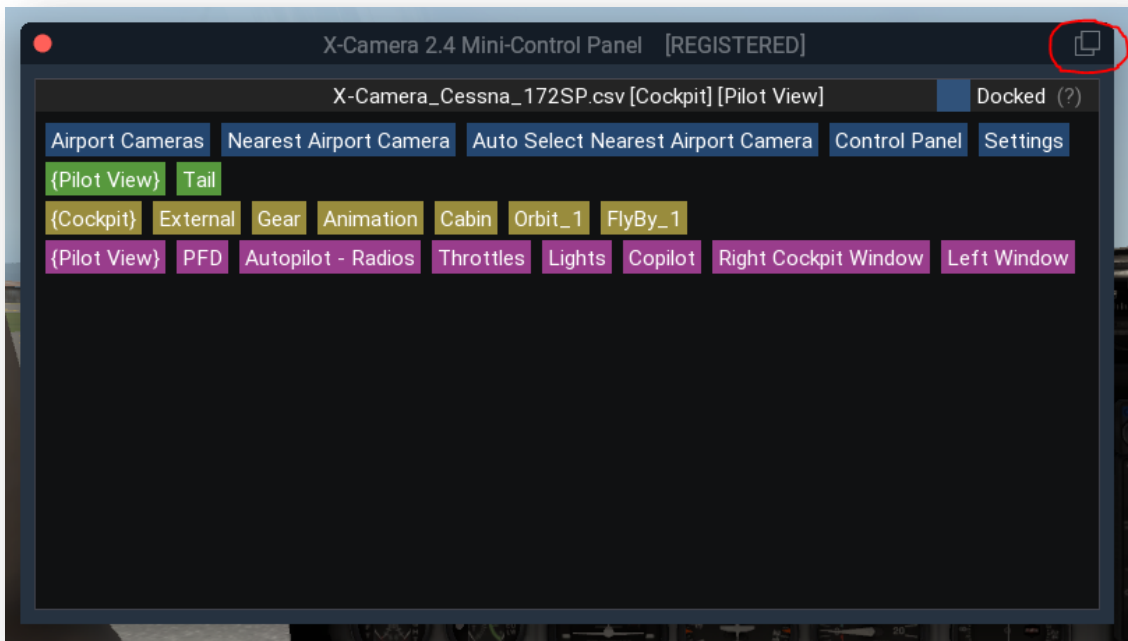
The min-control panel can also be activated by placing your mouse in the bottom 5 pixels of the screen or X-Plane window. The min-control panel will open and will remain open as long as the mouse is in the bounds of the min-control panel window or if the panel has been pinned open using the associated checkbox in the upper left corner of the mini control panel. The auto show mini-control panel feature can be disabled in the Settings dialog.

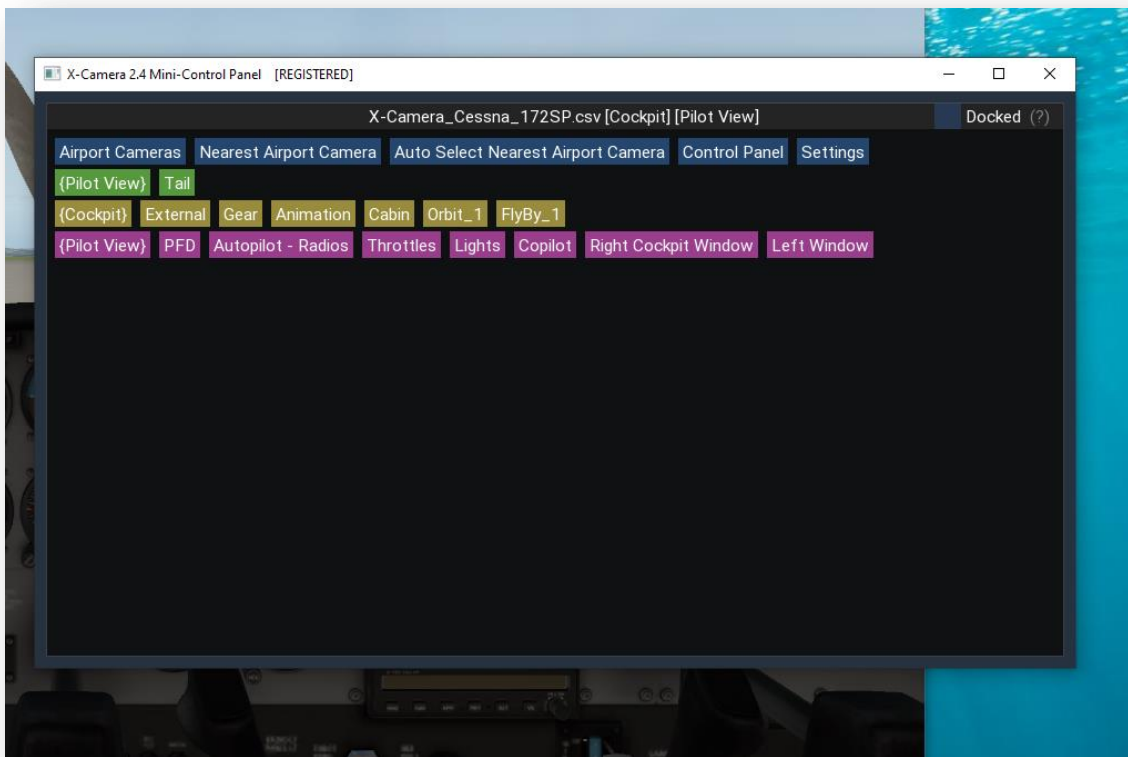
The mini-control panel can be resized by clicking toward the center of the title bar and dragging the mouse up or down. The mini-control panel will also display a scroll bar of camera set data will not fit in the window.

You can also undock the mini-control panel.



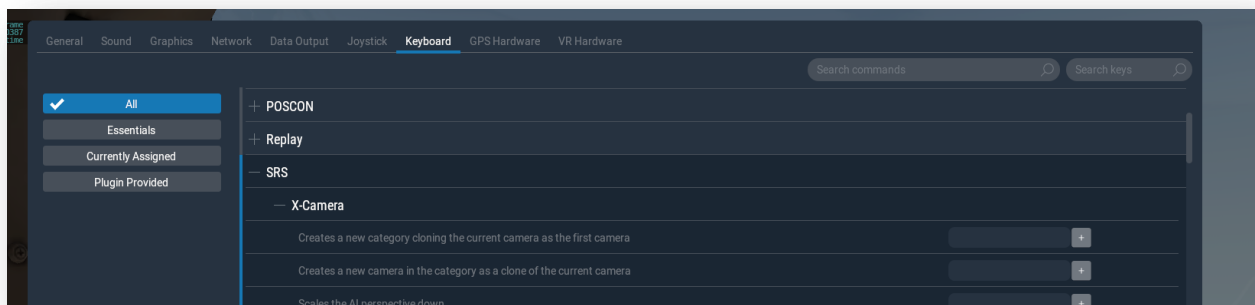
Once the mini-control panel is undocked you can then pop it out into a top level OS window and put it on another monitor.



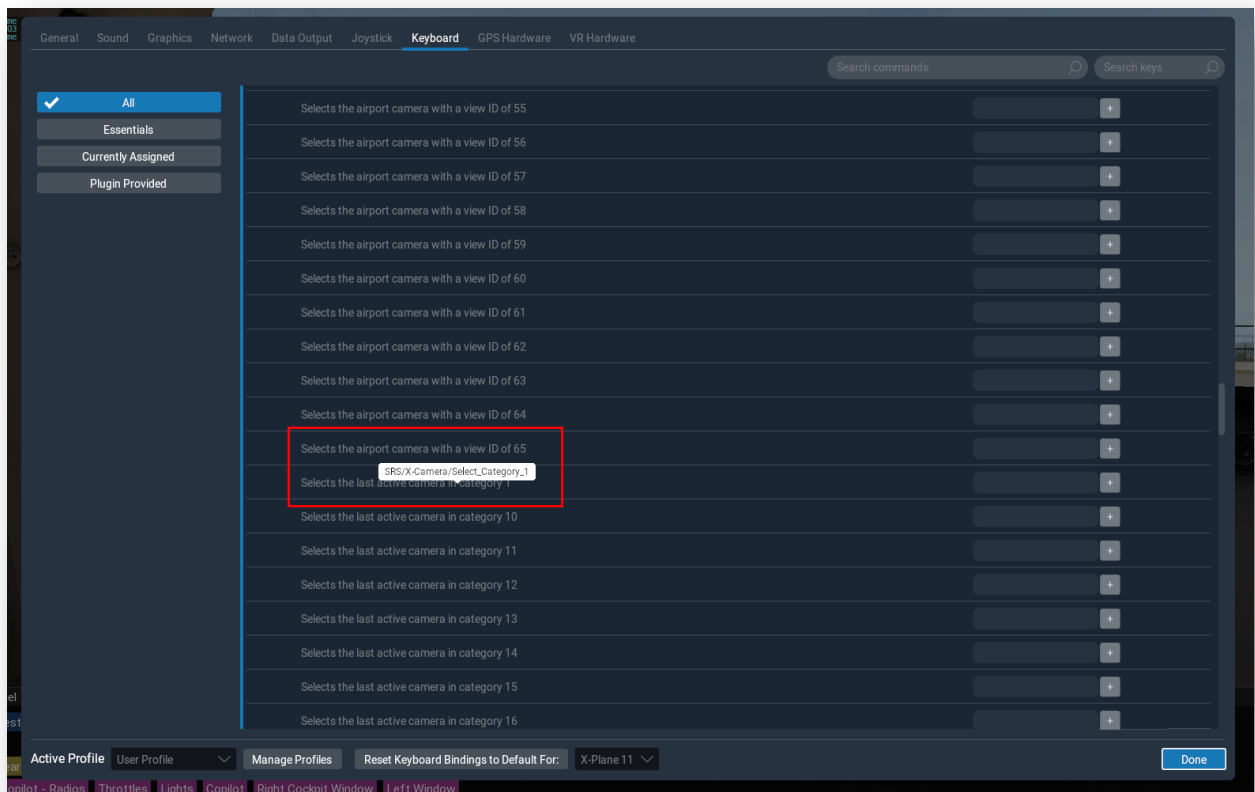


Joystick Button and Key Assignments

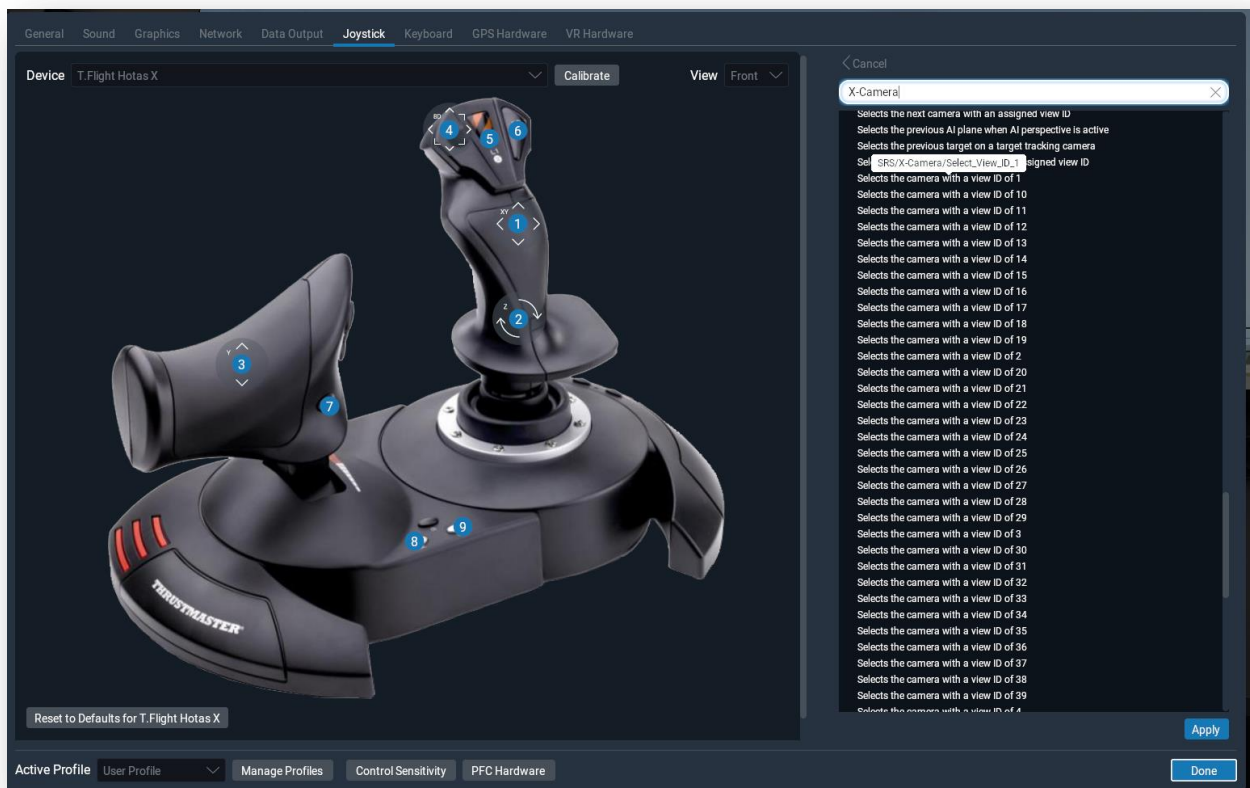
There are a many X-Camera commands that can be associated with Joystick buttons or keyboard commands. The very best way to see all of them is to open the X-Plane Keyboard assignment window and select the SRS/X-Camera tree.



You will then be able to scroll the entire list of command descriptions you can use with X-Camera. If you hover over a particular command description you will be able to see the exact command reference for that command.



Assigning command to joystick buttons is similar, just open the X-Plane Joystick option and then pick the button you want to assign. We suggest that you filter the list by putting X-Camera in the filter so you only see the X-Camera commands as options. As with the keyboard assignments, if you hover over the description you will see the actual command reference that will be used.



Sharing Camera Files

Camera files are simple CSV text files that can be shared easily right from the main control panel. There is a detailed explanation of the Community Files earlier in this manual.

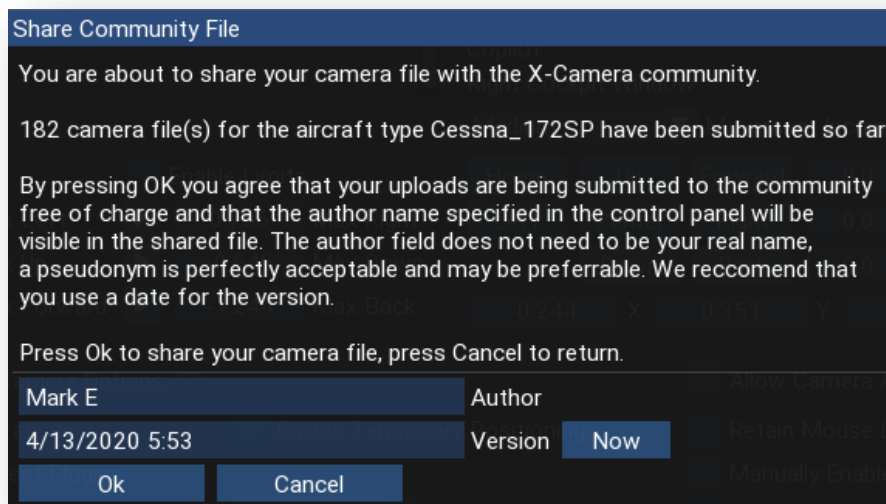
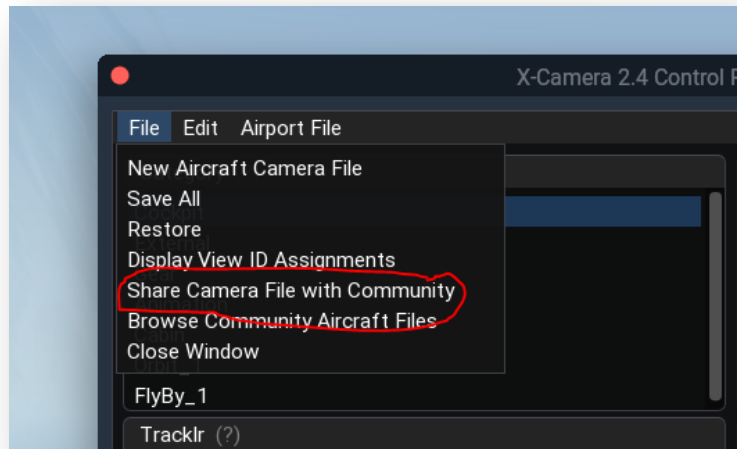
Sharing Guidelines

Here are a few guidelines for sharing your camera files:

- We recommend using a default 70 degree field of view in your rendering options when you create your camera definitions. This is not a hard and fast rule but the more variation there is in the field of view the more adjustments will need to be made when users download your camera file.
- Make sure the pilot view camera is always the first camera in the first category. This will ensure that the “Auto Correct” on load will be able to do the best job adjusting the cockpit cameras.
- Place cameras that generally go together in the same category. Cockpit, Cabin, External Flight, Animations, are examples of some common organizations. The reason for this is so that you can

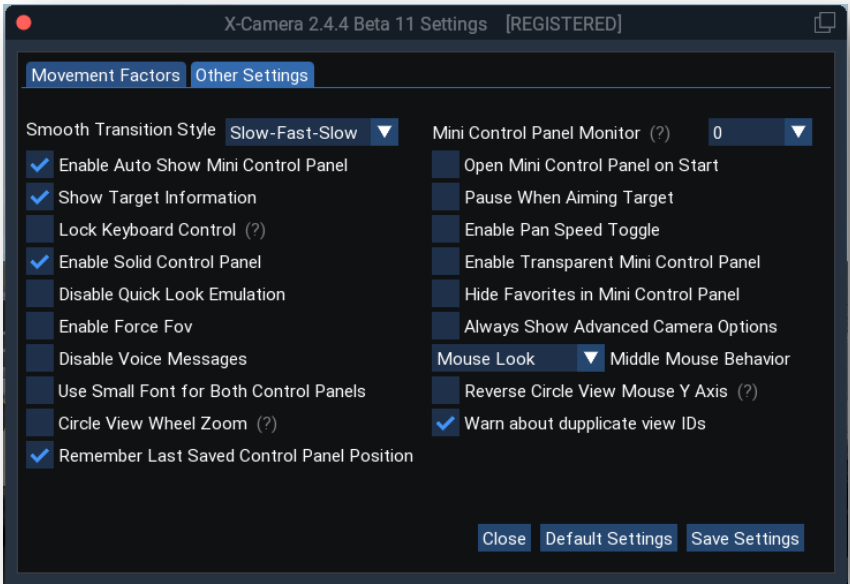
use Next and Previous command assignments to navigate easily between cameras of a similar nature, such as sequencing through all cockpit cameras.

- Be creative. Some of the coolest features of X-Camera are the very unique animated camera sequences you can do with transitions. If you come up with something cool, create a YouTube video and share it on X-Plane.org and let people know you used X-Camera to create it.



Settings

X-Camera has a few settings that are global, not specific to a camera or a plane’s set of cameras. These settings can be adjusted by accessing the settings menu item.



Pan and Movement Speeds

Pan speeds are in degrees. You can specify pan speeds for the four movement ranges, Small, Medium, Large, and Very Large.

Movement speed is in meters. Similar to the pan speeds you can specify the distance over the four movement ranges, Small, Medium, Large, and Very Large.

If you plan to use the mouse move feature you will likely want to adjust the movement ranges to suit your screen resolution and mouse sensitivity. Generally the ranges are used for the following:

- Small – most appropriate for walk-mode or very close-up camera positioning
- Medium – most suited for placing cameras in the cockpit
- Large – most suited for placing external cameras that are relatively close to the plane
- Very Large – most suited to placing free cameras around an airport or scenery

The Pan and Movement Speed Factors determine the multiplier or divisor for the fast and slow movement commands. Slow commands will divide the speed range value by the factor and fast commands will multiply the speed range value by the factor. Normal speed commands use the pan and movement speeds directly with no modification.

Using the settings in the figure above let's assume your range is currently set to Medium. A slow command would result in a .333 degree movement ($1 / \text{Pan Speed Factor } 3$). A normal pan command would result in a 1 degree movement, and a fast pan command would result in a 3 degree movement ($1 * \text{Pan Speed Factor } 3$).

Enable Pan Speed Toggle allows you to map a joy stick button to increment the pan speed from slow to normal, and to fast. This is useful if you have one hat switch that is mapped to either the slow, normal, or fast X-Plane panning commands. When you toggle the pan speed, X-Camera will pan at the current pan speed regardless of which X-Plane pan speed command is mapped to the hat switch.

If Enable Pan Speed Toggle is disabled X-Camera will pan at the speed indicated by the mapped X-Plane command.

Remember to Save Settings when you are done making changes.

Head Track Range

When you are using a head tracking device like TrackIR the offsets generated by your head movements are applied to the camera position. The head track range defaults to a 1x multiplier. This works good for internal cockpit cameras but if you were to enable head tracking on an external camera a 1x multiplier might not be enough for you to see any changes when you lean left, right, forward, or back.

The head track range allows you to set an offset multiplier for each of the four movement increment settings, small, medium, large, and very large allowing you to have greater head movement for external cameras that could be set to a large or very large movement increment.

Auto Show Mini-Control Panel

The mini-control panel can be set to auto open if the mouse is placed in the lower 5 pixels of the screen or X-Plane window. Uncheck this option to disable that feature.

Open Mini-Control Panel on Start

You can set the mini-control panel to open the first time X-Camera is started. After that you can use a mapped command to toggle it open and closed. If this is used in conjunction with the Auto Show Mini-control panel the panel will be opened and initially pinned open. You can use the checkbox in the upper left corner of the Mini-control panel to unpin the panel if needed.

Enable Transparent Mini Control Panel

Prior to X-Camera 2.2 the mini control panel could only be displayed with a solid background. With this option enabled the mini control panel will be rendered with a translucent background similar to the main control panel.

Enable Solid Control Panel

This option will present the control panel with a solid background. The default setting is a translucent control panel background.

Hide Favorites in Mini Control Panel

By default X-Camera will create a fourth row of buttons in the mini control panel any time you have cameras with view IDs assigned to them. This allows you to select any of your favorite cameras using the buttons in this fourth row. Turning this option on will suppress the creation of this fourth row regardless of view ID assignments.

Show Target Information

When a target following camera is selected information about the target such as target name, bearing, and distance will be displayed at the bottom of this screen. Refer to the target section of this manual for more details on targets and target following cameras.

Pause When Aiming Target

It can be difficult to aim a free target using mouse look while the sim is operating and the plane is moving. This will optionally pause the simulation when you are aiming a free target. The pause will be toggled as soon as you release the middle mouse button.

Lock Keyboard Control

Due to some recent changes in X-Plane a conflict arose around the X-Plane `general_up` and `general_down` commands with regard to using these to respond to ATC. X-Camera has these commands mapped to camera move up and down and was intercepting the commands when the ATC window was

open. Setting this option allows you to lock out keyboard control for camera movement when the X-Camera control panel is not open. When this option is set you will not be able to move the camera with the keyboard if the control panel is not open but the commands will go to the ATC window restoring the ATC response functionality.

Mouse Smoothing

Mouse Smoothing Factor determines how many mouse coordinates are averaged to smooth mouse look and mouse move operations.

Mouse Speed Factor

The mouse speed factor affects how much camera yaw and pitch will occur based on the amount of mouse travel. By default X-Camera will assume that a full width screen traversal of the mouse will result in 360 degrees of camera yaw. If that is too much you can set the mouse speed factor to .5 and now a full screen of mouse travel will be 180 degrees.

Mouse Move Factor

When using Mouse Move Mode the camera is moved based on the current camera's selected Movement Speed in Meters value (Small, Medium, Large, Very Large) and the number of pixels you moved the mouse. This factor can be adjusted to increase or decrease the distance moved per pixel of mouse movement.

Head Track Smoothing

You can apply a head track smoothing factor to TrackIR camera inputs. A value between 4 and 10 may reduce the visual effects of stuttering when panning your head rapidly with a head tracking device. Smoothing factors high then 10 will start to add lag to head tracking that may not be acceptable.

View Axis Smoothing

A view axis smoothing factor between 4 and 10 will help to smooth camera movement when using a joystick for camera movement.

Enable Force FOV

If you enable this dialog you will see additional controls displayed on the control panel. With these controls you can enable each camera to have a specific horizontal field of view (FOV). This is accomplished using the FOV slider on the left hand side of the control panel and the FOV enable checkbox. When the checkbox is enabled you can set the FOV from 15° to 170° for each camera using the slider and the slider arrow buttons. When the FOV checkbox is disabled the camera will use the FOV setting in X-Plane's rendering options at the time X-Camera was enabled.

If you have this setting enabled you will not be able to change your horizontal field of view in the X-Plane rendering options while X-Camera is enabled. Disable X-Camera using the X-Camera plugin menu

option to adjust your default X-Plane horizontal field of view. You also can not reliably run an X-Plane 11 Multi-Monitor configuration as each monitor may require a different FOV.

Camera Smoothing Window

If you use the camera option “Smooth Camera Joins” this setting parameter can have impact on how many frames are involved in the smoothing. The default is 60 frames meaning that X-Camera will start smoothing using a three point Bezier curve 30 frames ahead of and past the camera join points.

The smooth window must be larger than 60. Note that increasing this value assumes that you have a sufficient number of frames in your camera transitions to allow for the window.

Always Show Advanced Camera Options

If you always tend to use the more advanced camera options you can set this to have the control panel always open up showing all camera options.

Middle Mouse Behavior

Older versions of X-Camera were not able to use the right mouse button for a mouse look operation. Now that right click mouse look is supported we can use the middle mouse for other operations on the Windows operating system.

- None – X-Camera will not react to a middle mouse click
- Mouse Look – X-Camera will do a mouse look using both the right click and a middle mouse click
- Toggle Zoom Lock – This will toggle the 3D cockpit zoom lock option on an off

Disable Voice Messages

This option disables the text to speech audio that occurs by default when you add cameras and categories.

Update Community Files on Start

By default X-Camera will refresh your community file cache when X-Plane starts. This operation runs in the back ground and should not materially affect the load time of the simulator. However, if you don't typically import your cameras from community file you might want to disable this option to save unnecessary processing time.

Use Small Font for Both Control Panels

X-Camera uses an 18 point font by default for its UI. You can enable this option to use a 14 point font for the control panel and mini-control panel.

Reverse Circle View Mouse Y Axis

With this option checked pushing the mouse forward with a right mouse click in the circle view will cause the height of the camera to decrease. This makes the mouse behavior on a circle camera more closely match the X-Plane 11 circle view.

Smooth Transition Style

You can select either a slow-fast-slow or fast-slow smooth transition style.

Warn About Duplicate View IDs

By default X-Camera will warn you if you reuse the same view ID on multiple cameras when you save the camera file. Some users like to take advantage of the feature that if you use the same view ID on a set of cameras you can cycle through those cameras every time you activate the `select_view_ID_n` command.

If you tend to use duplicate view IDs regularly you may wish to disable the warning using this setting.

Remember Last Saved Control Panel Position

When this option is disabled X-Camera will always create the Control panel horizontally centered on the main X-Plane monitor after each X-Plane start. You can enable this option and then while the control panel is open and positioned to its desired place on the screen use the settings dialog Save Settings button which will save the control panel position and state (floating or OS level pop out).

When X-Plane starts it will position the control panel to the last saved position when it is first opened.

Circle View Wheel Zoom

If disabled the mouse wheel will move a circle view camera forward and backward, similar to using the `.` and `,` keys on the keyboard. This mode allows a circle camera to be moved back away from the aircraft infinitely.

If enabled the mouse wheel will zoom the camera in and out from its current distance from the aircraft.

Controlling Camera with Lua Scripts

Overview

There are two ways to control camera input with a FlyWithLua script. The first method allows you to directly change a camera's coordinates and orientation. The camera you want to change must be assigned a view ID. Any direct manipulation of the data is actually reflected in the control panel when you view the camera. These changes would also be saved to the camera file when a save all cameras operation is performed.

This direct camera manipulation is useful when you want to initialize a camera on aircraft load. The example Lua script for the direct manipulation approach initializes a free camera associated with the plane to a point just behind and slightly above you plane's loaded position.

A second approach to camera control is the offset method. In this approach the camera's actual coordinates are not directly changed but any offsets you supply are blended with the camera's current position. This approach is very useful when you want to apply special effects to a camera regardless of its position. The Wingman script is a very good example of such a special affect.

The offset method can be applied to any camera and is not restricted to just camera's with view ID's. A script ID is used to allow a script to know when a camera has been selected that would like offset input from a script.

Direct Control Method

X-Camera defines 7 dataref arrays which can be used in the direct control method along with FlyWithLua to programmatically control cameras. The array index is the view_id number of the camera you wish to control. View ID's range from 1 – 65. Index 0 is not used and all values at index 0 are always zero.

Dataref	Description
SRS/X-Camera/integration/camera_status	An integer array that represents the current status of the camera (see below)
SRS/X-Camera/integration/camera_x	X Coordinate for the camera
SRS/X-Camera/integration/camera_y	Y Coordinate for the camera
SRS/X-Camera/integration/camera_z	Z Coordinate for the camera
SRS/X-Camera/integration/camera_pitch	Camera pitch in degrees -90 to 90 typically
SRS/X-Camera/integration/camera_heading	Camera heading 0 – 360 degrees
SRS/X-Camera/integration/camera_roll	Camera roll -90 to 90 typically

The Camera Status dataref can be used to determine if the camera with that view_id exists. It can also give you other useful information about the camera. The status is an integer but each bit position indicates a different camera status.

- CAMERA_STATUS_PRESENT = 1,
- CAMERA_STATUS_SELECTED = 2,
- CAMERA_STATUS_AIRPORT_CAMERA = 4,
- CAMERA_STATUS_CONTROL_PANEL_OPEN = 8
- CAMERA_STATUS_TRANSITION_IN_PROGRESS = 16

Non free cameras that are always attached to the plane and use an aircraft aligned coordinate system. Values are in meters. 0,0,0 is the aircraft's center of gravity. -X is to the left of the plane, +X is to the right. -Z is forward of the plane, +Z is behind. +Y is above the plane, -Y is below the plane. A heading of zero degrees aims the camera at the plane's nose and 180 aims it toward the tail.

Free cameras are not attached to the plane. X,Y,Z is the local OpenGL coordinate system. -X is west , +X is east. -Z is true north, +Z is true south. +Y increases elevation, -Y decreases elevation.

Direct Method Sample Script

There is a sample Lua script in the Sample Lua Scripts folder, test-x-camera.lua. If you place this script in the FlyWithLua scripts folder it will run when a new plane is loaded or when the plane is placed to a new position. It assumes you have free camera defined with its view ID set to 7.

When it runs it will update that free camera so that it is roughly 20 meters behind your aircraft and above it. Please review the comments in the Lua script for a better understanding of how it works.

Note: Make sure you use local Lua variables so that multiple scripts do not adversely affect one another.

Offset Method

With the offset method there are eight datarefs that are of interest.

Dataref	Description
SRS/X-Camera/integration/overall_status	Integer dataref with each bit signifying the status of the currently active camera
SRS/X-Camera/integration/effect_script_id	An integer that shows the value of the script ID for the current active camera. The script ID but be greater than 0 for X-Camera to apply any of the below offsets to the selected camera.
SRS/X-Camera/integration/effect_script_x_offset	The left / right offset in meters. – is to the left + is to the right
SRS/X-Camera/integration/effect_script_y_offset	The up / down offset in meters. – is down + is up
SRS/X-Camera/integration/effect_script_z_offset	Forward / back offset in meters. – is forward + is back
SRS/X-Camera/integration/effect_script_heading_offset	Yaw offset in degrees. – is left + is right
SRS/X-Camera/integration/effect_script_pitch_offset	Pitch offset in degrees. – is down + is up
SRS/X-Camera/integration/effect_script_roll_offset	Roll offset in degrees. – is left + is right

Script ID Usage

The script ID usage is an important concept. The script ID serves two purposes. First X-Camera needs to know if it should apply any offsets to the current active camera. If the script id on that camera is 0 or less no offsets will be applied. Any value over zero will cause X-Camera to apply the offsets.

The other purpose of the script ID is to inform all Lua scripts who are monitoring the script ID dataref what script ID value is set for the active camera. The Lua script can then decide if it should modify the offsets datarefs to apply its special affect. Supporting any script ID value above 0 allows multiple Lua scripts to be installed each of which can uniquely be identified by the script ID comparison logic in the script. This way scripts know when a camera is looking from input from them vs another script.

Note: two scripts should not be both applying offsets data simultaneously. The last one will win.

Overall Camera Status

Lua scripts may wish to monitor the overall status dataref to determine the scripts behavior. The overall status dataref uses bit positions to indicate the various state of X-Camera operation.

- GLOBAL_STATUS_ENABLED = 1,
- GLOBAL_STATUS_HEAD_TRACK_ENABLED = 2,
- GLOBAL_STATUS_AIRPORT_CAMERA = 4,
- GLOBAL_STATUS_CONTROL_PANEL_OPEN = 8,
- GLOBAL_STATUS_TRANSITION_IN_PROGRESS = 16,
- GLOBAL_STATUS_SCRIPT_INPUT_ENABLED = 32

Example Offset Method Script

The best offset method script example is the Wingman script which was created by smoothchat on X-Plane.org. Admittedly it is a complex and quite sophisticated script but it is an excellent example of the types of things you can do with this feature.

You can download the script from here:

<https://forums.x-plane.org/index.php?/files/file/50170-wingman-view-flywithlua-script-for-x-camera/>

Directly Selecting a Camera

Lua scripts can select cameras by executing the Select_View_ID_n commands to select a camera with the n view ID. You can also see what camera is selected or force a camera to be selected without using View IDs. This might be useful for a Lua script that drives walk-around animation and you would prefer to not use up View IDs.

The Dataref: "SRS/X-Camera/integration/SelectedCamera" can be used for such a purpose. The dataref is an integer that represents the current camera index. X-Camera supports 20 categories with each category being able to hold 150 cameras. That means that this dataref can have a value between 0 and 2,999 (20 * 150).

The dataref will have a value of -1 if X-Camera is not enabled. If you try to write a value to the dataref that represents a camera index that is not defined in the camera file then no change will take effect.

Dataref Tool

There is a great tool that can be used to play with these datarefs to see how they work. It is called the DataRefTool and you can get from this URL:

<https://datareftool.com/>

One of the best ways to see how a camera will be affected by using the above datarefs is to use the dataref tool to change the values and watch the impact on the camera.

Getting Support

There is an X-Camera FAQ available here: <https://www.stickandrudderstudios.com/x-camera-faq/>

There are also various forums you can join as well as options to report bugs and suggest enhancements. For more information visit:

<https://www.stickandrudderstudios.com/support/>

New Releases and Beta Releases

If you want to be notified of new versions of X-Camera and beta testing programs you can join our newsletter mailing list here:

<https://www.stickandrudderstudios.com/mailling-list/>

Make sure you select the appropriate “Send me information about” check boxes.

We also recommend that you install the Skunkcrafts Stand Alone Updater and follow the X-Camera forum on X-Plane.org. See Updates.

Appendix

External Integrations

Head Tracking

X-Camera has a set of datarefs which can be manipulated by 3rd party head tracking solutions to provide head movement offsets to any X-Camera camera that has the TrackIR option enabled. Note that X-Camera natively supports TrackIR and any head tracking solution that can emulate the TrackIR software interface. These datarefs are useful for those products that do not emulate TrackIR.

The following datarefs are defined by the X-Camera plugin:

Dataref	Type	Comments
SRS/X-Camera/integration/headtracking_present	Int	Set to 1 to indicate that a 3 rd party tracker is going to provide head tracking input
SRS/X-Camera/integration/headtracking_x_offset	Float	X axis offset in meters. + is to the right
SRS/X-Camera/integration/headtracking_y_offset	Float	Y axis offset in meters. + is up
SRS/X-Camera/integration/headtracking_z_offset	Float	Z axis offset in meters. + is back
SRS/X-Camera/integration/headtracking_pitch_offset	Float	Pitch offset in degrees. + is pitch up
SRS/X-Camera/integration/headtracking_heading_offset	Float	Heading offset in degrees
SRS/X-Camera/integration/headtracking_roll_offset	Float	Roll offset in degrees. + is roll to the right

It is important that only one 3rd party plugin use these datarefs at one time. If headtracking_present has a non-zero value in it when you try to attach it would be wise to report a conflict error. You should always clear the headtracking_present dataref when you no longer will be providing input.

Note:

- The TrackIR camera option must be enabled on any camera that you want these inputs applied to on each frame.
- These values are offsets that will be added to the camera position on each frame. They are not absolute camera coordinates.