

FS Recorder for FSX Version 2.1

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Introduction

FS Recorder is an add-on module for Microsoft Flight Simulator, which can record flights, save them to files and play them back similar to the FS instant replay and flight video recorder, but with a lot more features. It is currently available for FS2004 and FSX. **This version is only compatible with FSX!**

FS Recorder does NOT record video files (like e. g. .avi), it records flight data (aircraft position, speed, etc.). Therefore the recordings can only be played inside FS, and it is also not possible to convert the recorded files into video files.

FS Recorder also includes additional camera features based on the FS2004 view modes *Virtual Cockpit*, *Tower* and *Spot Plane*. FS Recorder cameras include features like multiple cameras of each type, manual and automatic panning, automatic zoom, etc. For details see the [Camera Features](#) chapter.

If you have problems installing or using FS Recorder, refer to the [Support](#) chapter at the end of this document. To suggest improvements or discuss about FS Recorder visit the forums at www.fs-recorder.net.

Version 2 Release Notes

Make sure that FS Recorder 1.x is uninstalled before using FS Recorder 2! Having both versions installed may result in problems. If you used the automatic installer for version 1.x, the version 2 installer will automatically uninstall the old version.

The .frc file format was completely redesigned for FS Recorder 2 for smaller file size and better extensibility. It is not compatible with the format used by FS Recorder 1.x. To play back recordings made with version 1.x the files have to be converted to the new format. When you select a version 1.x .frc file for playback in version 2, you will be asked if you want to convert the file to the new format (a backup of the old version will be saved if you accept the conversion).

It is currently not possible to load VC/Tower/Spot camera files saved with FS Recorder 1.x, as the file format has changed. A tool for converting the version 1.x files to the new format might become available soon.

Version 2.1 Release Notes

In case you want to downgrade from version 2.1 to version 2.0, uninstall version 2.1 first and then make sure to install at least version 2.01 to avoid problems!

Installation

Automatic installation (recommended)

First extract all files in the zip archive to a directory of your choice! Then start the included Windows Installer file *Setup.msi* and follow the instructions. FSX has to be installed on your system, otherwise installation will fail.

The module, documentation and tools will be installed into the directory you select in the installation wizard. The installer will automatically add the required Launch.Addon entry to your FSX dll.xml file (only for the current user!).

Manual installation

If you have installed FS Recorder 1.x for FSX on your system, remove it before installing FS Recorder 2!

Create a directory and extract the file *FSRecorder_FSX.dll* into it. Then open the file *dll.xml*, which is located in *Documents and Settings\[USER]\Application Data\Microsoft\FSX* and add the following entry before `</SimBase.Document>`:

```
<Launch.Addon>
  <Name>FS Recorder</Name>
  <Disabled>False</Disabled>
  <ManualLoad>False</ManualLoad>
  <Path>[PATH] \FSRecorder_FSX.dll</Path>
</Launch.Addon>
```

where you have to replace [PATH] with the path, where *FSRecorder_FSX.dll* is located.

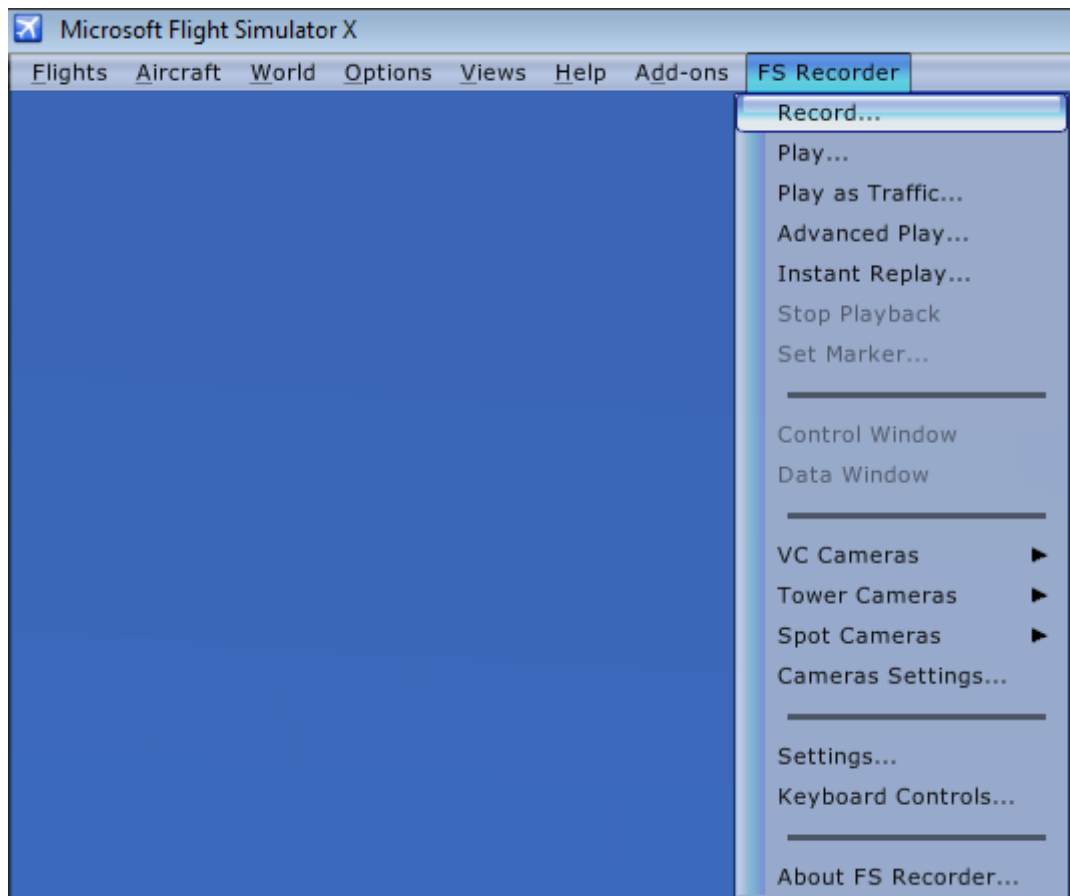
Uninstalling

If you used the automatic installer for installation, select the *Uninstall* shortcut under *Start > Programs > FS Recorder for FSX*. Or you open the Windows control panel and select *Software*, find *FS Recorder for FSX* in the list and select *Remove*.

If you did a manual installation, remove the entry, which you added to the *dll.xml* file. You may then also delete the directory where you installed the DLL.

Using FS Recorder

If the installation was successful, you will find a new menu entry *FS Recorder* in your FS main menu bar:



The features of FS Recorder are used by the items in this menu, customizable keyboard shortcuts and the playback control window.

Recorded Files

When you record a flight with FS Recorder, the data is saved in a binary format with the file extension *.frc*. A *.frc* file can contain multiple tracks, where each track belongs to one aircraft. FS Recorder uses the first track for the user aircraft and, if AI traffic is recorded, an additional track for every AI aircraft. Every track contains a time-code for synchronization of the individual tracks.

With the included FS Recorder Converter tool it is possible to convert *.frc*-files to text files and vice versa. For details see the FS Recorder Converter manual.

Recording a Flight

To start recording select *Record* from the *FS Recorder* menu or press the key combination assigned to *Record* in the [Keyboard Controls](#) dialog.

If the option *Show Recording Settings* is enabled in the [Settings](#) dialog, the [Recording Settings](#) dialog will be shown and you can select the recording interval, recorded data and some other options.

If *Enter Filename before Recording* is selected in the [Settings](#) dialog, you will have to enter a filename for the recording now.

Recording starts now and is indicated by a red display with the recorded time in the lower right corner if the *Recording* option is checked under *Display* in the [Settings](#) dialog.

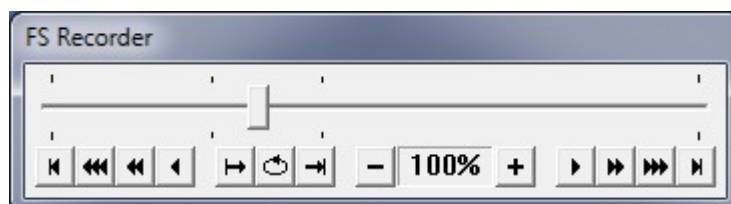
To stop recording select *Stop Recording* from the *FS Recorder* menu or press the key assigned to *Stop Recording/Playback* in the [Keyboard Controls](#) dialog (default: ESC). When recording is stopped and *Enter Filename after Recording* is selected in the [Settings](#) dialog, you have to enter a filename for the recording now. If you press the *Cancel* button in the save file dialog, you will be asked if you want to continue recording. Choosing *No* discards all recorded data, *Yes* continues recording until you select *Stop Recording* again.

If *Automatic Filename (no Dialogs)* is selected in the [Settings](#) dialog, the recording will automatically be saved in the *Flight Simulator Files* folder (where FS stores your saved flights). The file will be named *FSRecorder_* followed by the current system date and time.

Playing back a recorded Flight

To play back a flight recorded with FS Recorder select *Play* from the *FS Recorder* menu or press the key combination assigned to *Play* in the [Keyboard Controls](#) dialog. A standard file selection dialog opens where you select the recording you want to play and press the *Open* button to start playback. If the *Playback* option is checked under *Display* in the [Settings](#) dialog, a green playback display appears in lower right corner showing the elapsed and total playback time.

If the *Show Playback Control Window* option is enabled in the [Settings](#) dialog (disabled by default), the playback control window will automatically be shown:



This window can be shown/hidden any time using the *Control Window* item in the *FS Recorder* menu or the keyboard shortcut assigned to *Toggle Playback Control Window* in the [Keyboard Controls](#) dialog. You can move this window to any position you like, FS Recorder will remember that position when it's shown the next time.









The playback control window may cause a drop of frame rate on your system if FS is running in full-screen mode (possibly also in windowed mode). If you experience bad frame rates during playback, try to turn off the playback control window.

Slider

The slider shows the current playback position. The loop start and end points are shown as ticks if they are set. The slider can be moved by clicking or dragging it with the mouse to search within the recording.

Step/Search Buttons

You can step or search forward or backward through the recording using the following buttons or keys:




Button	Default key	Function
	Home	Previous chapter
	Page Up	Step/search backwards 3
	Up Arrow	Step/search backwards 2
	Left Arrow	Step/search backwards 1
	Right Arrow	Step/search forward 1
	Down Arrow	Step/search forward 2
	Page Down	Step/search forward 3
	End	Next chapter

The three step/search modes and speeds can be set in the [Settings](#) dialog.

Using the previous/next chapter buttons/keys you can jump to the previous/next chapter point, or to the beginning/end of the recorded flight if there is no chapter point before/after the current playback position. For information about chapter points see the [Markers](#) section.

Loop Playback


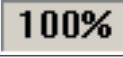

You can loop the playback of a part of the recording using the following buttons or keys:

Button	Default key	Function
	Numeric /	Set loop start point
	Delete	Toggle loop on/off
	Numeric *	Set loop end point and start loop

Turning on looping without setting start and end points before will loop the full recording. The start and end points of the loop are shown as ticks on the slider.

Changing Playback Speed

You can change the playback speed using the following buttons or keys:

Button	Default key	Function
	Numeric -	Decrease speed
	Insert	Reset speed to 100%
	Numeric +	Increase speed

The available playback speeds can be configured in the settings dialog.

Stopping Playback

To stop playback select *Stop Playback* from the *FS Recorder* menu or press the key assigned to *Stop Recording/Playback* in the [Keyboard Controls](#) dialog (default: ESC). The last second of the recording will always be played before playback stops. At the end of the recording playback will automatically stop, and FS will pause if *Pause after Playback* is turned on in the [Settings](#) dialog.

If you want to stop playback without jumping to the end of the recording to continue the flight manually from the current position, press the key assigned to *Stop playback at current Position* in the [Keyboard Controls](#) dialog (default: Shift+ESC). **As not all data is recorded by FS Recorder this does not always work as expected and can result in a (plane) crash if the aircraft is not set up correctly at the moment where you abort playback!**

Play as Traffic

The *Play as Traffic* feature allows you to play back one or multiple flights you recorded with FS Recorder as (AI) traffic. To use it select *Play as Traffic* from the *FS Recorder* menu and choose a recorded flight in the file selection dialog (it is possible to select more than one file here, for details see [Playback of multiple Recordings](#)).

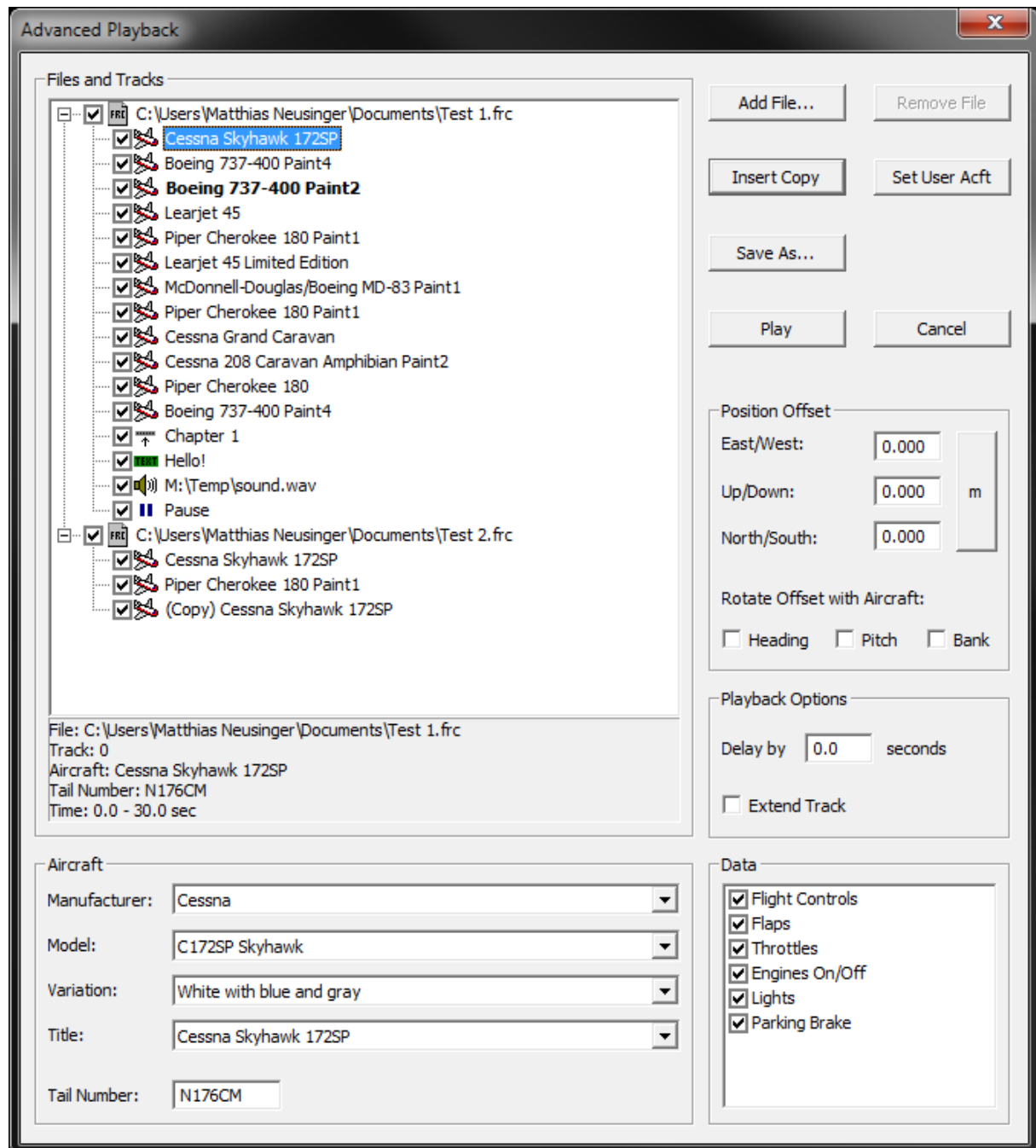
AI aircraft will be created and follow the recorded flight path(s). The aircraft type(s) will be the same as used for recording the flight. If no aircraft with that title is installed (because you uninstalled it or the recording was made on another system), the respective track cannot be played. In that case you should use the [Advanced Play](#) feature to change the aircraft used for playback.

If the *Playback* option is checked under *Display* in the [Settings](#) dialog, a blue playback display appears in the lower right corner, together with the elapsed and total playback time.

During traffic playback you can continue flying with your aircraft, and you can even record a new flight (see [Combined use of Recording and Playback](#)).

Advanced Playback

Selecting *Advanced Play* from the *FS Recorder* menu or pressing the keyboard shortcut assigned in the [Keyboard Controls](#) dialog opens the advanced playback dialog:



Here you can customize playback in many ways: You can select multiple files for playback (also from different directories), enable/disable individual tracks, change aircraft models, select a track for the user aircraft, adjust delays, etc.

Files, Tracks and Markers

The tree-view control displays all files you have added for playback, and for each file all the tracks and markers it contains. Every file, track and marker has a check-box by which it can

be enabled/disabled for playback. If a track is selected to be played back with the user aircraft, it is displayed in bold font, all other enabled tracks are played back as AI traffic.

Below the tree-view additional information about the currently selected file/track/marker is displayed.

If a track is selected, then after the track number “*(Original User Recording)*” is displayed if the track was recorded with FS Recorder 2.x, with the user aircraft, and if no modifications were made to the recorded data. This might be useful for virtual airlines using FS Recorder for check-rides to verify that the recorded data was not modified afterward (e. g. using the FRC Converter). The recorded user aircraft data is protected by a hash code, so if any modification is made to the data, “*(Original User Recording)*” will not be displayed.

Add File

Use this button to add one or multiple files for playback. The selected files are displayed with their respective tracks in the tree-view.

Remove file

Clicking this button removes the currently selected file from the list.

Insert Copy

Inserts a copy of the currently selected track. Usually inserting a copy only makes sense if you use a delay or position offset for it (see below).

Set User Aircraft

This button selects the currently selected track for playback with the user aircraft. The user aircraft track is displayed in the tree-view in bold font. Pressing this button while the current user aircraft track is selected in the tree-view clears the user aircraft track selection.

Save As

With this button you can save the current selection of tracks with all options into a new .frc file. You can use this feature to combine several recorded files into a single one, or to make certain modifications to recorded files (change aircraft, remove tracks, etc.).

Play

Pressing the play button starts playback of all currently selected tracks with the options you have set.

Position Offset

These options allow to shift the aircraft position for the selected track. The options under *Rotate Offset with Aircraft* determine if the offset vector is rotated with the aircraft in 3D space, i.e. if the aircraft is shifted along the world coordinate axes or aircraft axes.

Delay

You can delay the playback of a track/file by a number of seconds (only positive values are allowed) using this option. This can be used to adjust the synchronization of independently recorded tracks, or together with the *Insert Copy* feature to play multiple copies of the same flight with different delays.

Extend Track

Without selecting this option, if multiple tracks with different durations are played back together, the respective aircraft is only displayed while track data is available. If you enable the *Extend Track* option, the aircraft will be displayed for the full playback time (at it's initial/final position before/after the track begins/ends).

Aircraft

For every track the aircraft model and tail number used for playback can be changed here.

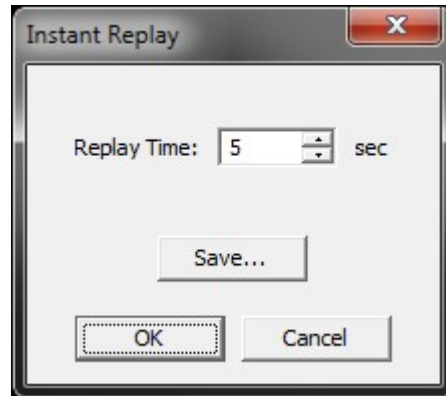
Data

Here a list of recorded data is displayed for the currently selected track. Using the checkboxes you can select, which of the recorded variables should be used for playback.

If you open the advanced playback dialog while playback is running, it will display the currently playing files and tracks with their current options. You can then make changes and press the *Play* button to continue playback at the current position.

Instant Replay

If instant replay is enabled in the [Settings](#) dialog, you can always replay the last time of your flight, even if you didn't start recording before. To replay a certain time of your flight select *Instant Replay* from the *FS Recorder* menu. The following dialog opens:



Enter the number of seconds you want to replay and press the *OK* button to start replay. If the *Playback* option is turned on under *Display* in the [Settings](#) dialog, a green replay display appears in the lower right corner showing the number of seconds remaining. During replay the same features as described in [Playing back a recorded Flight](#) are available.

Using the *Save* button in the replay dialog you can save the entered number of seconds to a .frc file for later playback.

The maximum available replay time depends on the maximum temp file size set in the [Settings](#) dialog and on the replay settings. Note: When going back to the maximum available replay time and replay of AI traffic is enabled, some AI aircraft might be missing during the first minutes of replay (as the data might already be overwritten).

All replay data is cleared when you load a flight, change the user aircraft, record a flight, play back a saved recording, or change settings in the settings dialog.

Combined use of Recording and Playback

While you are playing back one or multiple recordings as (AI) traffic using the *Play as Traffic* feature, it is possible to record a new flight. You can first start recording and then start traffic playback using the *Play as Traffic* or *Advanced Play* features; or you can first start traffic playback and then start recording.

If you stop recording before traffic playback ends, playback will continue. If playback ends before you stop recording, recording will continue until you stop it. During recording + traffic playback no playback controls are available.

This feature is especially useful for creating formation flights:

- First you record a flight A.
- Then you play back flight A as traffic, fly along with it, and at the same time record it as flight B.
- Then play back flights A and B together while recording flight C, etc.
- Finally, to play the complete formation, play back all the recorded files together, or combine them into a single .frc file using the *Advanced Play* feature.

Note: If you select the *Record Playing Traffic* option in the *Recording Settings*, the currently playing tracks will be recorded again into the new recording. However, this is **not** recommended for recording formations as it will give less accurate results (as data is first recorded, then interpolated for played back, then recorded again, etc.). Instead it is recommended to leave this option disabled and record each flight to a separate file, and finally play all files together or merge them into a single file using the [Advanced Play](#) feature.

Playback of multiple Recordings

When you use the *Play as Traffic* or *Advanced Play* features, you can select multiple files for simultaneous playback (in the file selection dialog hold *Shift* or *Ctrl* to select multiple files). This will result in all selected flights being played back simultaneously. This is useful if you recorded a flight while playing back another one as traffic, see [Combined use of Recording and Playback](#). It is also possible to select Play as Traffic again while playback is already running and add additional files for simultaneous playback.

About Synchronization

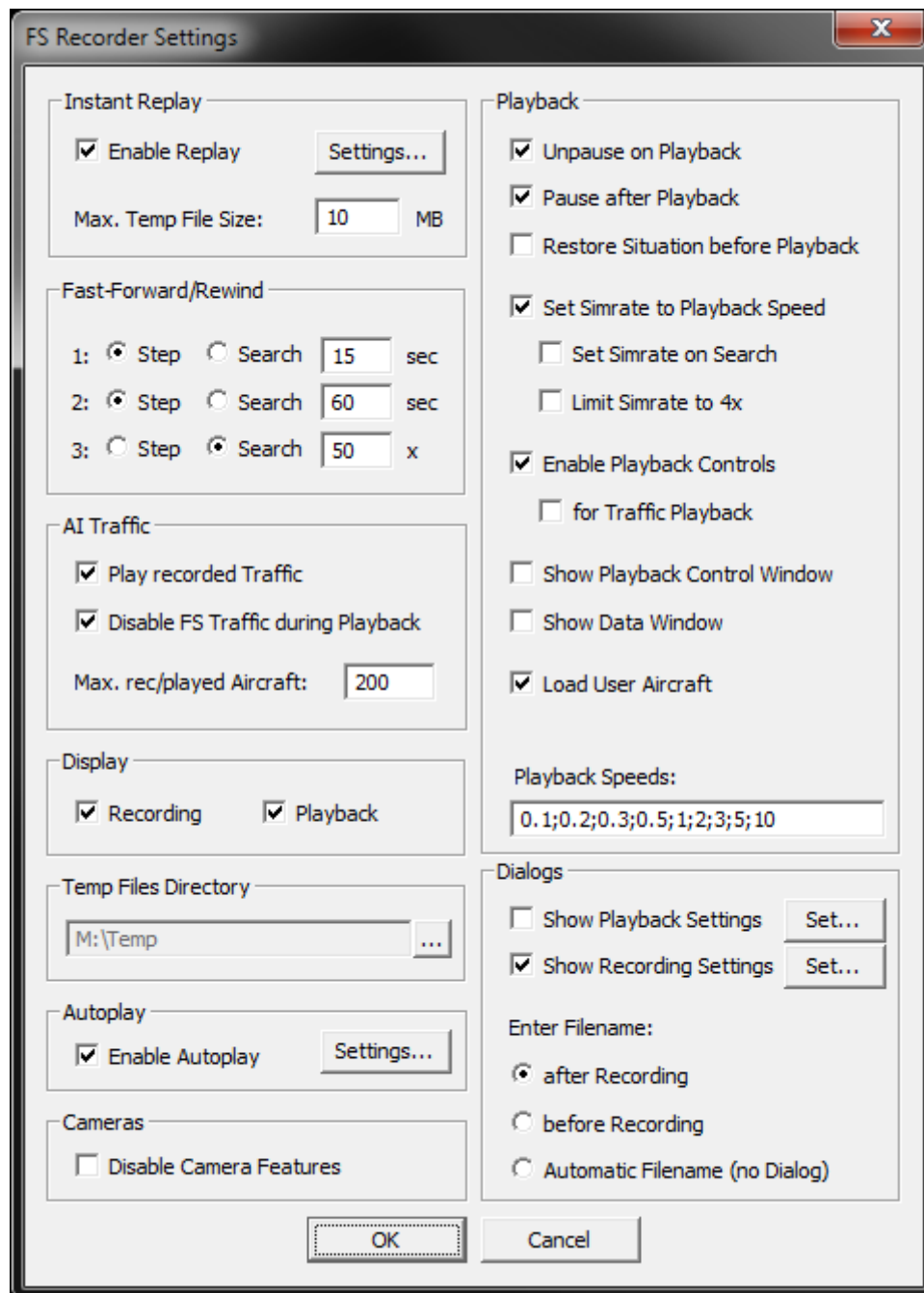
Each recorded track contains a time-code. If you record a flight while no playback is running, the time-code will start at zero. If you play back multiple such recordings together, they will all start at the same time.

However, if you record a flight while traffic playback is running, the playback time-code will be used for the recorded track(s). That way it is possible to play back both flights together afterward without losing synchronization.

Here is an example for better understanding: You record a flight A. Afterward you record another flight B independent of A. Then you start playback of flight A as traffic, and after ten seconds start recording of flight C. This will result in time-codes of A and B starting at zero, while the time-code of C starts at ten seconds. If you play back all three flights together as traffic, playback of A and B will start immediately, while C will start ten seconds later.

Settings

To access the settings dialog select *Settings* from the *FS Recorder* menu:



The following options can be set in that dialog:

Instant Replay - Enable replay

This option has to be checked if you want to use the instant replay feature. If it is checked, FS Recorder will always record replay data, except while recording or playback is running.

Instant Replay – Settings

Pressing the *Settings* button shows a dialog in which you can define replay settings (recording intervals, recorded data, recording of AI traffic, etc.). This dialog is identical to the [Recording Settings](#) dialog, except that some options are not available.

Instant Replay – Max. Temp File Size

Recorded replay data is written to temporary files in the selected *Temp Files Directory* (see below). This setting defines the maximum amount of space occupied by the replay temp files. When the size of the temp files reaches this limit, the oldest replay data is overwritten. The maximum available replay time depends on this limit and on the replay settings (and on the density of AI traffic, if replay of AI traffic is enabled).

Fast-Forward/Rewind - Step/Search 1/2/3

Here you can configure the modes and step sizes/speeds for the different step/search buttons/keys described under [Playing back a recorded Flight](#). If you select the *Step* mode, the playback position will step by the entered number of seconds each time you press the appropriate button/key, while in the *Search* mode playback speed will be increased by the entered factor while you keep the button/key pressed.

AI Traffic – Play Recorded Traffic

If this option is enabled, all recorded tracks are played back by the *Play* and *Play as Traffic* features, otherwise only the first track (the user aircraft track) is played. This setting has no influence on the *Advanced Play* feature.

AI Traffic - Disable FS Traffic during Playback

If this option is enabled, the FS generated AI traffic will be turned off during playback.

AI Traffic – Max. rec/played Aircraft

This setting limits the number of simultaneously recorded/played back AI aircraft. A value of zero means no limit.

Display - Recording

If this option is checked, *RECORDING* is displayed in the lower right corner during recording, together with the number of recorded seconds.

Display - Playback

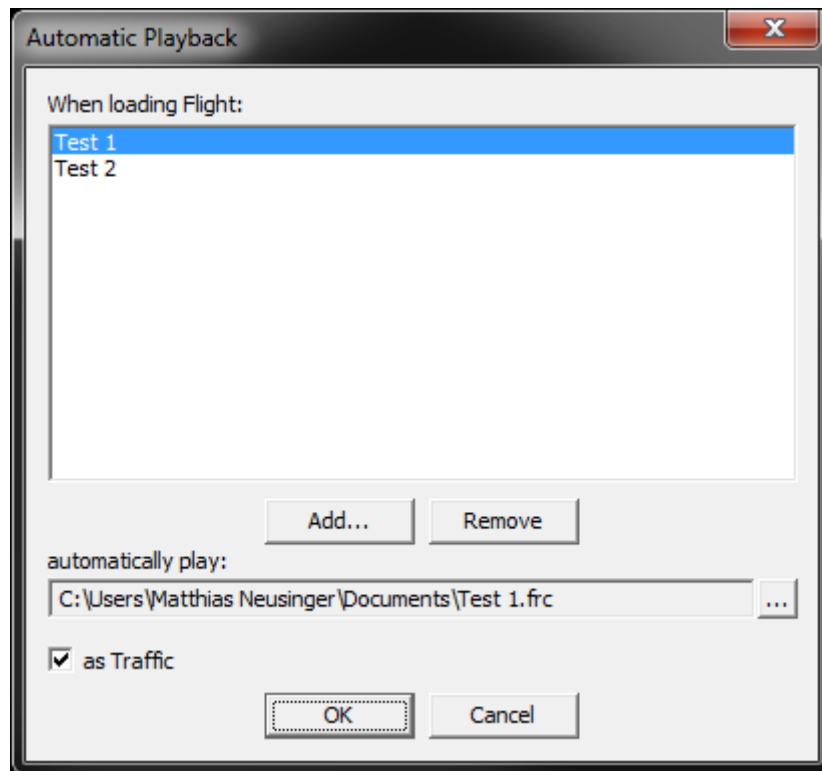
If this option is checked, *PLAYBACK*, *TRAFFIC PLAYBACK* or *REPLAY* will be displayed during playback/replay in the lower right corner, together with the playback time.

Temp Files Directory

FS Recorder creates temporary files during recording and if instant replay is enabled. Here you can define the directory where those files are created. By default this is set to the directory where the DLL module is located. **Make sure the directory is writable and there is enough space left on the drive!**

Autoplay

The autoplay feature allows you to automatically start playback of a flight recorded with FS Recorder when a certain saved flight situation (.FLT file) is loaded. The *Enable Autoplay* check-box allows to completely en/disable autoplay. The settings button opens the following dialog to configure flights for autoplay:



Use the *Add* and *Remove* buttons to select the flight (.FLT) files for which autoplay should be triggered.

With the browse button (...) you can change the recording (.frc file) to play for the currently selected flight. To play the recording as AI traffic enable the *as Traffic* option.

Cameras – Disable Camera Features

Checking this option disables the [Camera Features](#) of FS Recorder. Changing this setting requires a restart of FS to take effect.

Playback – Unpause on Playback

If this option is enabled, FS Recorder will automatically unpause FS when playback is started.

Playback - Pause after Playback

If this option is enabled, FS Recorder will automatically pause FS when playback ends.

Playback - Restore Situation before Playback

If this option is enabled, FS Recorder will save the flight situation before playback starts, and restore it after playback ends.

Playback - Set Simrate to Playback Speed

If this option is enabled, FS Recorder sets the simulation rate to the same factor as the playback speed. When you change the playback speed, this option has the advantage that flaps, gear, AI traffic, etc. will move with the correct speed.

Playback - Set Simrate on Search

If enabled, the simulation rate will also be increased during searching.

Playback - Limit Simrate to 4x

If the simulation rate is set to more than 4x, FS generated AI traffic disappears (not the traffic played back by FS Recorder). To prevent frequent disappearing and reloading of FS AI traffic (if it is enabled during playback) when searching or changing playback speed and *Set Simrate with Playback Speed* is enabled, this option limits the adjustment of the simulation rate to a maximum of 4x.

Playback - Enable Playback Controls

This option enables/disables all playback controls (searching, speed changes, loop, etc.), including those in the playback control window.

Playback - Enable Playback Controls for Traffic Playback

This option enables/disables all playback controls (searching, speed changes, loop, etc.) during playback as traffic.

Playback - Show Playback Control Window

If this option is enabled, the [Playback Control Window](#) will be shown automatically when playback is started.

Playback - Show Data Window

If this option is enabled, the [Data Window](#) will be shown automatically when playback is started.

The playback control and data windows may cause a drop of frame rate on your system if FS is running in full-screen mode (possibly also in windowed mode). If you experience bad frame rates during playback, try to turn off both windows.

Playback – Load User Aircraft

If this option is enabled, FS Recorder will automatically load the correct user aircraft when playback is started.

Playback – Playback Speeds

Here you can define the selectable playback speed factors. Enter a sequence of values in ascending order separated by semicolons. Valid values are in the range from 0.03 to 100, negative numbers are allowed for reverse playback, the value 1 has to be in the sequence.

Dialogs – Show Playback Settings

If this option is enabled, FS Recorder will always show the [Playback Settings](#) dialog when playback is started. Use the *Set* button to open the playback settings dialog now.

Dialogs – Show Recording Settings

If this option is enabled, FS Recorder will always show the [Recording Settings](#) dialog when recording is started. Use the *Set* button to open the recording settings dialog now.

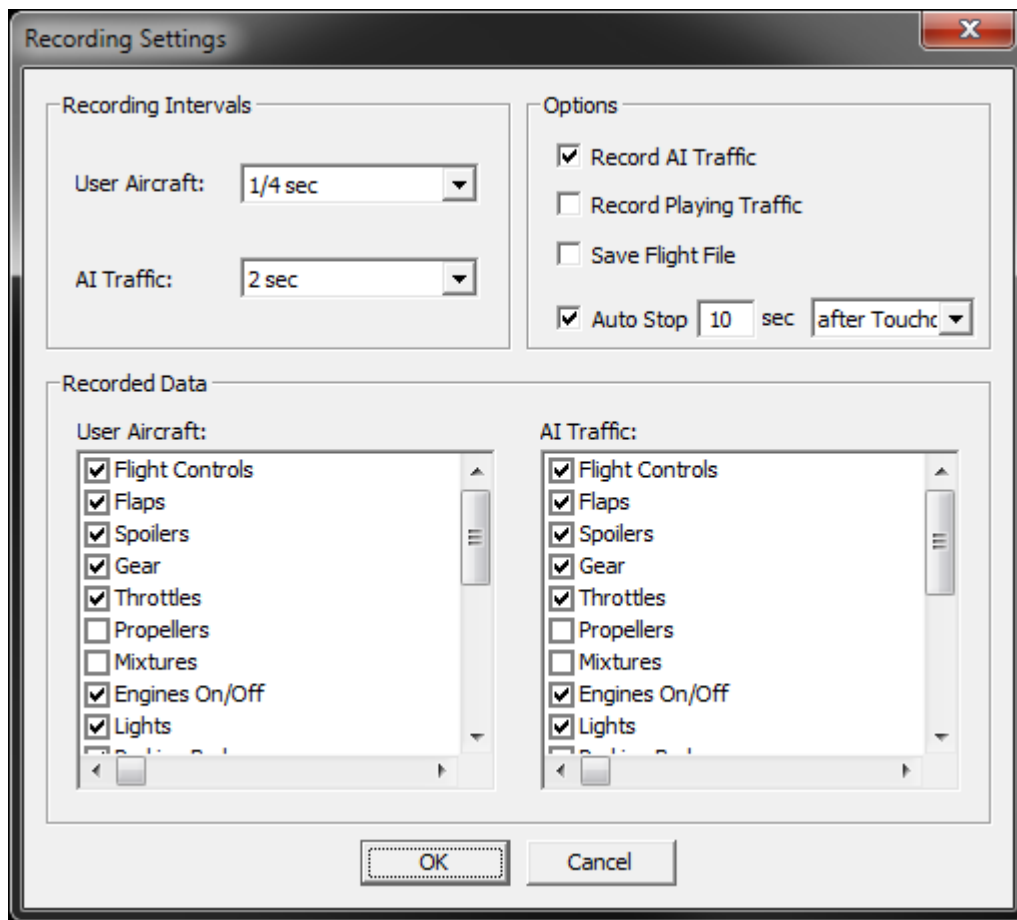
Dialogs – Enter Filename

Here you can select, if you want to enter the filename for the recorded flight before or after recording, or if an automatic filename should be used.

All settings are saved to the file *FSRecorder.ini* in the installation folder of FS Recorder. It is not recommended to edit this file! If you delete the file, FS Recorder will use default settings and create a new file when you change the settings.

Recording Settings

In the recording settings dialog you define parameters for the recording of flights:



Recording Intervals

Here you select the intervals in which data is recorded for the user aircraft and AI traffic. The shorter the interval the more accurate playback will be, but the larger the recorded file will become. **Note: Recording dense AI traffic with short intervals may result in very large files!**

Options – Record AI Traffic

Enable this option if you want to record FS generated AI traffic and multi-player traffic.

Options – Record Playing Traffic

If you record a flight while playback as traffic is running and this option is enabled, the played back traffic is also recorded (using the AI traffic recording interval). Otherwise the played back traffic is not recorded.

Options – Save Flight File

If this option is enabled, the flight situation is saved when recording starts (as .FLT flight file, like with normal FS flight saving). The saved flight gets the same name as the recorded flight and is stored in the same directory.

Options – Auto Stop

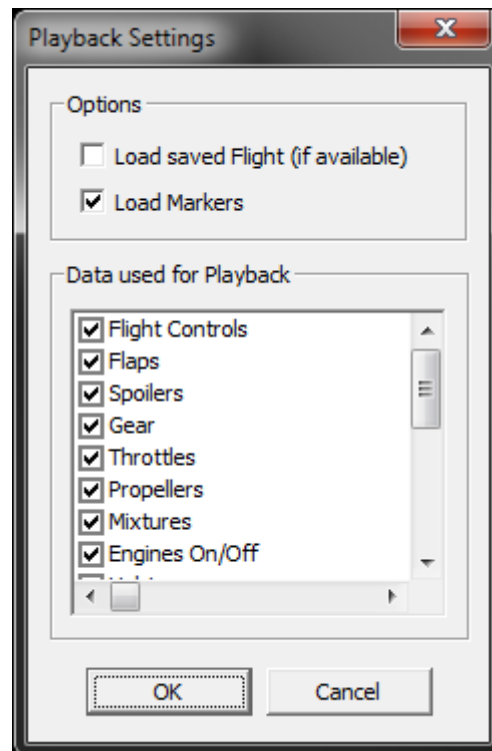
This option allows to automatically stop recording a defined time after recording was started, after touchdown, or after engine shutdown.

Recorded Data

Here you can select what aircraft data should be recorded for the user aircraft and AI traffic. For details about the options see the [Recorded Data](#) section.

Playback Settings

In the playback settings dialog you define options for the playback of recorded flights:



Options – Load saved Flight (if available)

If this option is enabled and a flight situation file (.FLT file) with the same name as the recorded flight (.frc file) you select for playback is available in the same directory, it will be loaded before playback starts. See also the *Save Flight File* option under [Recording Settings](#). This option is not available for playback as traffic.

Options – Load Markers

Enable this option to load and activate all markers saved with the flight(s) you select for playback. For details about markers see the [Markers](#) section.

Data used for Playback

Here you can define which recorded aircraft data should be used for playback. For details about the options see the [Recorded Data](#) section.

Changing the User Aircraft Track

During playback (not playback as traffic) you can change the track for the user aircraft using the keyboard shortcuts assigned to *Previous/Next User Aircraft Track* in the [Keyboard Controls](#) dialog.

Alternatively you can open the [Advanced Playback](#) dialog and select a different track for the user aircraft there.

Markers

Markers can be set both during recording and playback to mark certain positions of a flight. Every marker can be used as chapter point to which you can jump during playback, and to trigger an action when it is reached during playback.

Setting Markers

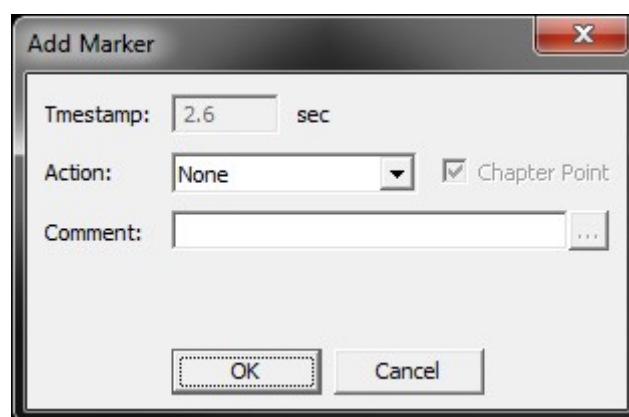
During recording or playback of a flight you can set a marker by selecting *Set Marker* from the *FS Recorder* menu, or by using the keyboard shortcut assigned to *Set Marker* in the [Keyboard Controls](#) dialog. The *Add Marker* dialog will appear in which you can configure the marker (see below).

If you set markers during recording of a flight, they are automatically added to the recorded .frc file.

When setting markers during playback of one or more flights, you can either discard or save the added markers after playback. If you select to save the new markers, they will be saved to a new .frc file which will only contain the makers (no flight data), and therefore get the extension *.markers.frc*. You can later use this file to play it back together with the other flight(s) for which you have set the markers, or use the [Advanced Playback](#) dialog to combine it with that flight(s) into a single .frc file.

Marker Options

When you set a marker, the following dialog appears in which you can configure the marker:



Every marker can trigger one of three actions when it's position is reached during playback: Display of a text message, playback of a sound (wave file), and pausing FS.

If you select no action, the marker simply becomes a chapter point to which you can jump during playback. You can enter a comment of your choice to describe the marker.

If you select *Play Sound* as action, you have to select a wave file (.wav) which will be played back by FS Recorder when the marker's timestamp is reached on playback. Additionally you can select if the wave file should be played only when an inside (cockpit) or outside view is active, or always.

Selecting *Display Text* as action will show a text message on top of the FS window (similar to the FS ATIS display) when the marker is reached during playback. You have to enter the text to display and the number of seconds for which the message should be shown. Optionally you can select to scroll the text across the screen. Leaving the text field empty or setting the display time to zero will clear any currently displayed message.

If you select *Pause* as action, FS will be paused when the marker is reached on playback. You can optionally enter a comment to describe the marker.

Playback with Markers

The *Load Markers* option in the [Playback Settings](#) determines if saved markers are loaded for playback. When using [Advanced Playback](#) you can en/disable every marker individually. To jump to a marker set as chapter point see [Playing back a recorded Flight](#).

Recorded Data

The following aircraft data is always recorded and set during playback by FS Recorder:

- Aircraft latitude, longitude and altitude
- Aircraft pitch, bank and heading
- Aircraft X, Y, and Z velocities
- Aircraft on ground flag

In the [Recording Settings](#) dialog and [Playback Settings](#) dialog you can define which of the following aircraft data should be recorded and set during playback:

- Flight Controls: Elevators, ailerons, rudder
- Flaps: Flaps handle
- Spoilers: Spoilers handle
- Gear: Landing gear lever
- Throttles: Throttle levers
- Propellers: Propeller levers
- Mixtures: Mixture levers
- Engines On/Off
- Lights: Aircraft lights
- Parking Brake
- Smoke System
- NAV Radios: Nav1/2 frequency and OBS, ADF frequency
- COM Radios: Com1/2 frequency, transponder
- Airspeeds: IAS, TAS, Mach
- Concorde Nose Visor
- Main Exit: Aircraft main exit
- Tailhook
- Wing Fold

The following data can optionally be recorded, but will not be set during playback. It is however displayed in the [Data Window](#):

- Ambient Wind
- Autopilot On/Off: Autopilot master switch

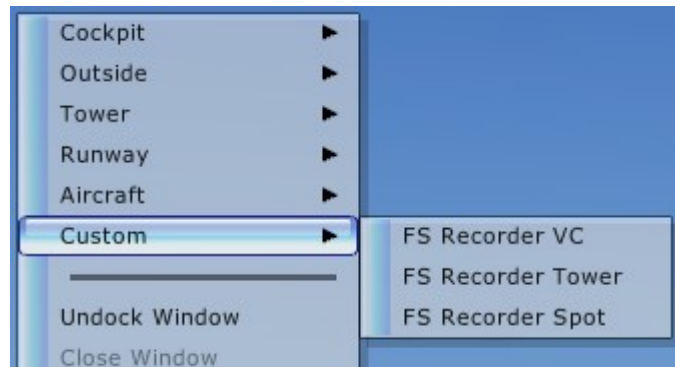
Data Window

During playback the data window can be turned on/off by selecting the *Data Window* item in the *FS Recorder* menu, or by the keyboard shortcut assigned to *Toggle Data Window* in the [Keyboard Controls](#) dialog. The data window displays most of the recorded and some derived variables for the user aircraft during playback and can be useful for flight analysis.

Camera Features

FS Recorder includes additional camera features which give you more freedom for watching your recorded flights. The camera features are based on the FS2004 view modes *Virtual cockpit (VC)*, *Tower* and *Spot Plane*.

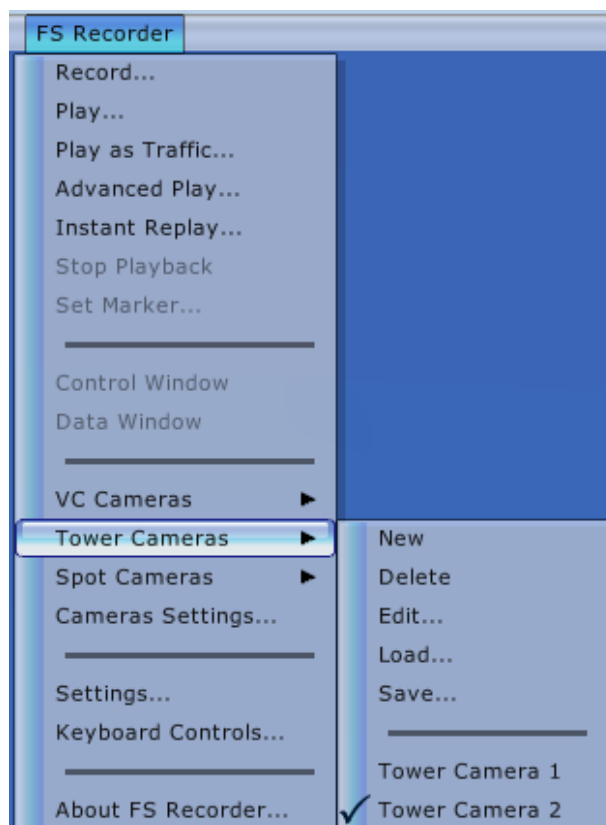
In FSX these three FS Recorder camera types are realized using three custom FSX cameras:



You have to switch to one of these custom cameras to use FS Recorder cameras. When using FS Recorder for the first time, there is one camera of each type, initialized with default values. You should modify the default cameras to reasonable settings before using them.

Managing Cameras

Creating, deleting, switching, loading and saving cameras is done in the same way for VC, tower and spot cameras. Therefore this is described for all three view modes in a common chapter.



Creating new Cameras

To use the FS Recorder camera features, you first have to create a new camera for the respective view mode. To do this select *VC/Tower/Spot Cameras>New* from the *FS Recorder* menu, or change to the respective view mode and press the key combination assigned to *New Camera* in the [Keyboard Controls](#) dialog (default: Ctrl+V). This will create and select a copy of the currently active camera.

Deleting Cameras

To delete the currently active camera select *VC/Tower/Spot Cameras>Delete* from the *FS Recorder* menu, or change to the respective view mode and press the key combination assigned to *Delete Camera* in the [Keyboard Controls](#) dialog (default: Shift+Ctrl+V). For each view mode there has to be at least one camera, therefore the last camera of a view mode cannot be deleted.

Switching between Cameras

To select a different camera select it from the list in the *VC/Tower/Spot Cameras* sub-menu. The first entry in the list is always “FS Default VC View”, “FS Default Tower View” or “FS Default Spot View” respectively, which selects the default FS view for the respective view mode.

You can also use the key combinations assigned to *Next Camera* and *Previous Camera* in the [Keyboard Controls](#) dialog (default: V and Shift+V) to cycle through all cameras of the respective view mode.

When changing to a different camera, it's title will be shown on top of the window for three seconds if the *Display Title/Aircraft on Change* option is enabled in the [Camera Settings](#) dialog.

Changing the Target Aircraft

To select a different target aircraft for the current camera use the key combinations assigned to *Watch previous/next Aircraft* in the [Keyboard Controls](#) dialog (default: Ctrl+W and Shift+Ctrl+W).

Loading Cameras

To load a set of saved VC/tower/spot cameras from a file select *VC/Tower/Spot Cameras>Load* from the *FS Recorder* menu and choose a file in the file selection dialog. **All current cameras of the respective view mode will be deleted!**

Saving Cameras

To save the current set of VC/tower/spot cameras to a file select *VC/Tower/Spot Cameras>Save* from the *FS Recorder* menu and enter a filename in the file selection dialog.

Manual and automatic Panning

Some camera types (e.g. tower cameras) allow you to switch between manual and automatic panning. In manual panning mode you can control the view direction by using the standard FS panning controls. In automatic panning mode the camera always tracks the target aircraft.

To switch between manual and automatic panning edit the camera settings or use the keyboard shortcut assigned to *Auto/Manual Panning* in the [Keyboard Controls](#) dialog.

Mouse Panning and Zoom

With FS Recorder cameras you can use the mouse to change the view direction and zoom factor. You do that by holding down the key assigned to *Mouse Camera Control* in the [Keyboard Controls](#) dialog (by default the space bar) and at the same time moving the mouse to pan around or turning the mouse wheel to zoom in/out.

VC Cameras

Editing VC Cameras

To edit the properties of the current VC camera select *VC Cameras>Edit* from the *FS Recorder* menu to open the following dialog:

The 'Edit VC Camera' dialog box contains the following settings:

- Title:** VC Camera 1
- Position:**
 - Left/Right: -0.258
 - Up/Down: 0.637
 - Front/Back: -0.105
 - Unit: m
- Panning:**
 - Panning Speed: 30.0
 - Unit: /s
- Zoom:**
 - Zoom Factor: 1.000
 - Unit: x
 - Min/max. Zoom: 0.250 to 256.0
 - Unit: x
 - ☒ Smooth Zoom: 1.00
 - Unit: s

Title

The title entered in this field identifies the camera in the *VC Cameras* sub-menu and will be displayed for three seconds when switching to this camera.

Position

The position of the viewpoint relative to the aircraft reference point. The units can be switched between meters and feet using the button to the right.

Panning

Here you can enter the panning speed in degrees per second.

Zoom – Zoom Factor

The current zoom factor of the camera.

Zoom – Min/max. Zoom

The minimum and maximum zoom factors allowed for the camera.

Zoom - Smooth Zoom

With this option you can enable smoothing of zoom changes. The value you enter here is the number of seconds it takes for the zoom factor to change by a factor of two.

View Controls

The following FS controls and FS Recorder key shortcuts can be used to adjust the active VC camera (FS controls are assigned in the FS controls assignment dialog, FS Recorder shortcuts in the [Keyboard Controls](#) dialog):

FS Control	Function
Move eyepoint up/down/left/right/forward/back	Adjust camera position
Look forward/forward right/right/back right/back/back left/left/forward left/up/down/forward up/forward right up/right up/back right up/back up/back left up/left up/forward left up/up	Set view direction
Pan up/up right/right/down right/down/down left/left/up left/tilt left/tilt right/pan	Pan view direction (deactivates automatic panning)
Eyepoint reset	Reset camera position to pilot position
Pan reset	Reset view direction

FS Recorder Shortcut	Function
Watch previous/next aircraft (default: Ctrl+W/Shift+Ctrl+W)	Watch the previous/next aircraft (activates automatic panning)

Tower Cameras

Editing Tower Cameras

To edit the properties of the current tower camera select *Tower Cameras>Edit* from the *FS Recorder* menu to open the following dialog:

Edit Tower Camera

Title:

Position

Latitude:

Longitude:

Altitude:

Max. Dist.:

Panning

☐ Manual Panning

Panning Speed:

☒ Automatic Panning

Focus Point X:

Focus Point Y:

Focus Point Z:

Zoom

Zoom Factor:

Min/max. Zoom:

☐ Smooth Zoom:

Title

The title entered in this field identifies the camera in the *Tower Cameras* menu and will be displayed for three seconds when switching to this camera.

Position – Latitude/Longitude

Here you can change the position of the tower camera by entering the latitude and longitude. With the button to the right you can switch the format between degrees, degrees/minutes and degrees/minutes/seconds.

Position – Altitude

The altitude of the tower camera. With the button to the right you can switch units between feet and meters. You can enter a value of zero to set it to the minimum height above the ground.

Position – Max. Dist.

The maximum distance the camera can be away from the watched aircraft. If the watched aircraft is more than this distance away from the camera position, the camera starts to follow the aircraft. If no target aircraft is selected, this value has no effect. With the button to the right you can switch units between kilometers, nautical miles and statute miles.

Position – Set to FS Tower

Pressing this button sets the camera position to the nearest FS tower position.

Position – Set to Aircraft

Pressing this button sets the camera position to the current user aircraft position.

Panning – Manual Panning

The manual panning mode allows the user to control the view direction of the camera using the standard FS panning controls.

Panning – Panning Speed

Here you enter the panning speed for manual panning in degrees per second.

Panning – Automatic Panning

In automatic panning mode the camera is always directed toward the target aircraft (like in the default FS tower view).

Panning – Focus Point X/Y/Z:

Here you can change the point of the aircraft to which the camera is directed in automatic panning mode. The setting is relative to the aircraft reference point.

Zoom – Zoom Factor

The current zoom factor of the camera.

Zoom – Min/max. Zoom

The minimum and maximum zoom factors allowed for the camera.

Zoom – Smooth Zoom

With this option you can enable smoothing of zoom changes. The value you enter here is the number of seconds it takes for the zoom factor to change by a factor of two.

View Controls

The following FS controls and FS Recorder key shortcuts can be used to adjust the active tower camera (FS controls are assigned in the FS controls assignment dialog, FS Recorder shortcuts in the [Keyboard Controls](#) dialog):

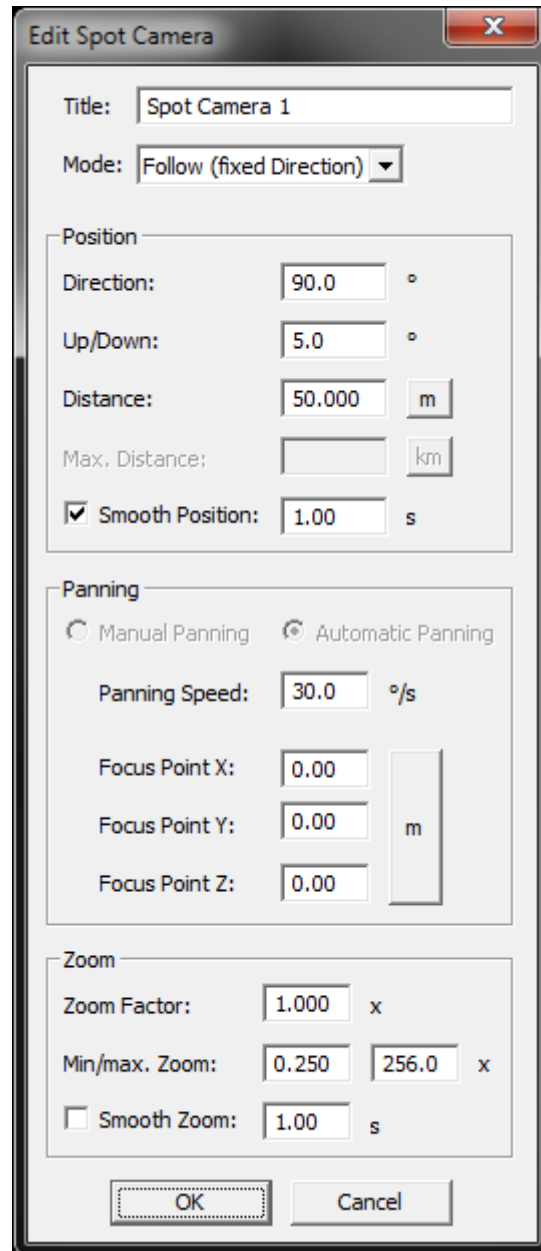
FS control	Function
Move eyepoint up/down/left/right/forward/back	Move camera/focus point by step size 1
Look forward/forward right/right/back right/back/back left/left/forward left/up/down	Move camera by step size 2
Look forward up/forward right up/right up/back right up/back up/back left up/left up/forward left up	Move camera by step size 3
Pan up/up right/right/down right/down/down left/left/up left/tilt left/tilt right/pan	Pan view direction (manual panning)/move focus point (automatic panning, if enabled)
Eyepoint reset	Set camera to nearest FS tower position
Pan reset	Set automatic panning to user aircraft

FS Recorder Shortcut	Function
Autozoom (default: Ctrl+Z)	Turn autozoom on/off
Auto/manual Panning	Switch between automatic and manual panning
Mouse Camera Control	Zoom in/out, pan view direction (manual panning)/move focus point (automatic panning, if enabled)
Watch previous/next aircraft (default: Ctrl+W/Shift+Ctrl+W)	Watch the previous/next aircraft (activates automatic panning)

Spot Cameras

Editing Spot Cameras

To edit the properties of the current spot camera select *Spot Cameras>Edit* from the *FS Recorder* menu to open the following dialog:



The dialog box is titled "Edit Spot Camera" and contains the following fields and controls:

- Title:** A text field containing "Spot Camera 1".
- Mode:** A dropdown menu showing "Follow (fixed Direction)".
- Position:**
 - Direction:** A text field with "90.0" and a degree symbol.
 - Up/Down:** A text field with "5.0" and a degree symbol.
 - Distance:** A text field with "50.000" and a unit selector set to "m".
 - Max. Distance:** A text field with a unit selector set to "km".
 - Smooth Position:** A checked checkbox followed by a text field with "1.00" and a unit selector set to "s".
- Panning:**
 - Radio buttons for "Manual Panning" and "Automatic Panning" (selected).
 - Panning Speed:** A text field with "30.0" and a unit selector set to "°/s".
 - Focus Point X:** A text field with "0.00".
 - Focus Point Y:** A text field with "0.00".
 - Focus Point Z:** A text field with "0.00".
 - A unit selector set to "m" is shared by the Focus Point X, Y, and Z fields.
- Zoom:**
 - Zoom Factor:** A text field with "1.000" and a unit selector set to "x".
 - Min/max. Zoom:** Two text fields with "0.250" and "256.0" and a unit selector set to "x".
 - Smooth Zoom:** An unchecked checkbox followed by a text field with "1.00" and a unit selector set to "s".
- Buttons:** "OK" and "Cancel" buttons at the bottom.

Title

The title entered in this field identifies the camera in the *Spot Cameras* sub-menu and will be displayed for three seconds when switching to this camera.

Mode

There are five modes for spot cameras: *Fixed to Aircraft*, *Follow (fixed Direction)*, *Follow (fixed Heading)*, *Fly By* and *Free*.

In the *Fixed to Aircraft* mode the camera is fixed to the aircraft and will move and turn with aircraft position, pitch, bank and heading. View direction is controlled by the user, position offset is set along aircraft axes. This mode can be used e.g. for wing views.

In the two *Follow* modes the camera follows the aircraft in the defined distance and direction and is always directed toward the aircraft focus point. Direction is set relative to the aircraft in the *fixed Direction* mode (i. e. the camera turns with aircraft heading), and relative to world axes in *fixed Heading* mode. Position offset is set as direction, up/down angle and distance.

In the *Fly By* mode the camera is positioned at a certain distance and direction in front of the aircraft; it keeps its position until the aircraft has passed the camera and the set distance is exceeded, at which point the camera is repositioned, etc. The camera is always directed toward the aircraft focus point. Initial position is set as direction, up/down angle and distance.

In the *Free* mode the user can control camera speed and direction, similarly as the aircraft is controlled in the FS slew mode.

Position

In the *Fixed to Aircraft* mode you enter the camera position relative to the aircraft center along the aircraft axes (front/back, up/down, left/right). With the button to the right you can change units between meters and feet.

In the *Follow* and *Fly By* modes you set the camera position relative to the aircraft by direction, up/down angle and distance. Direction is set in degrees; in *fixed Direction* and *Fly By* modes 0° corresponds to in front of the aircraft; in *fixed Heading* mode 0° corresponds to North. Up/down is set in degrees. Distance units can be switched between meters and feet. In *Fly By* mode direction is limited to $\pm 80^\circ$, as the camera has to be positioned in front of the aircraft.

Position – Max. Distance

This setting is only available in the *Free* mode. It defines the maximum distance the camera can be away from the watched aircraft. If no aircraft is watched, this setting has no effect. With the button to the right you can switch units between kilometers, nautical miles and statute miles.

Position – Smooth Position

With this option you can enable smoothing of camera position changes. This setting is not available in the *Fixed to Aircraft* and *Fly By* modes. The value you enter here is a time constant, valid values range from 0.1 to 10 seconds.

Panning – Manual/Automatic Panning

This setting is only available in the *Free* mode. In manual panning mode you can set the view direction using the panning controls, while in automatic panning mode the camera is always directed toward the aircraft.

Panning – Panning Speed

Here you enter the panning speed for manual panning in degrees per second.

Panning – Focus Point X/Y/Z:

Here you can change the point of the aircraft to which the camera is directed in the *Follow* and *Fly By* modes. The setting is relative to the aircraft reference point.

Zoom – Zoom Factor

The current zoom factor of the camera.

Zoom – Min/max. Zoom

The minimum and maximum zoom factors allowed for the camera.

Zoom – Smooth Zoom

With this option you can enable smoothing of zoom changes. The value you enter here is the number of seconds it takes for the zoom factor to change by a factor of two.

View Controls

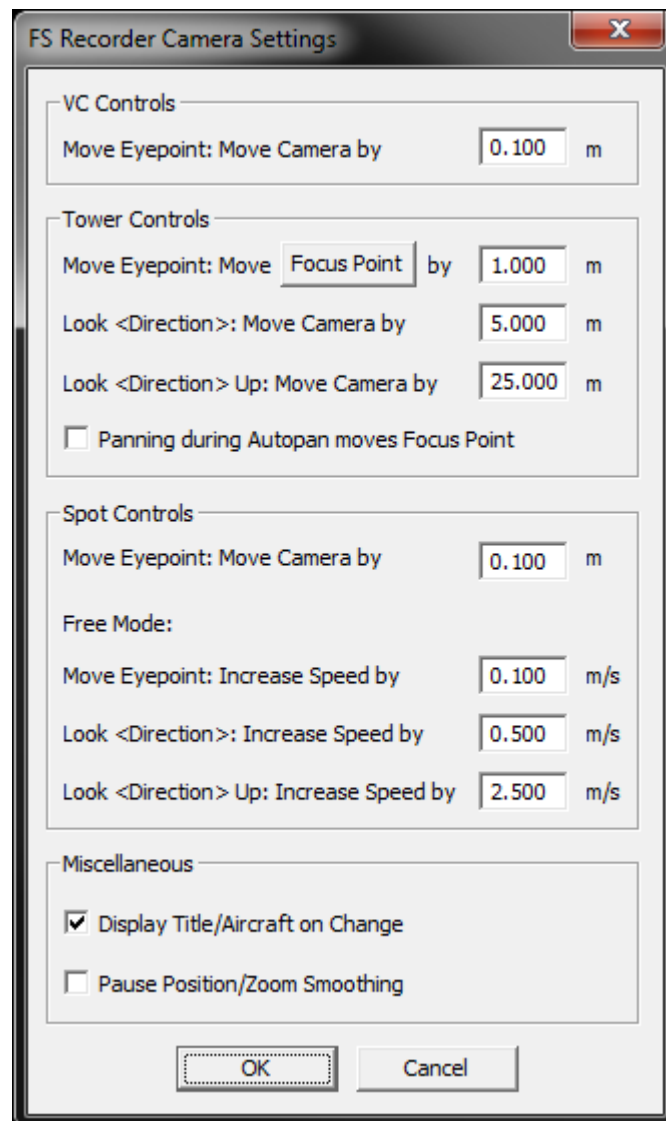
The following FS controls and FS Recorder key shortcuts can be used to adjust the active spot camera (FS controls are assigned in the FS controls assignment dialog, FS Recorder shortcuts in the [Keyboard Controls](#) dialog):

FS Control	Function		
Camera Mode	Fixed to Aircraft	Follow, Fly By	Free
Move eyepoint up/down/left/right/forward/ back	Adjust camera position	Move focus point	Change camera speed by step size 1
Look forward/forward right/right/back right/back/back left/left/forward left/up/down	Set view direction	Set camera direction	Change camera speed by step size 2
Look forward up/forward right up/right up/back right up/back up/back left up/left up/forward left up	Set view direction	Set camera direction	Change camera speed by step size 3
Pan up/up right/right/down right/down/down left/left/up left/tilt left/tilt right/pan	Pan view direction	Adjust camera direction	Pan direction
Eyepoint reset	Reset position	Reset focus point	Reset camera behind aircraft

FS Recorder Shortcut	Function
Autozoom (default: Ctrl+Z)	Turn autozoom on/off (Fly By/Free mode)
Auto/manual Panning	Switch between automatic and manual panning (Free mode)
Mouse Camera Control	Zoom in/out, pan view direction
Watch previous/next aircraft (default: Ctrl+W/Shift+Ctrl+W)	Watch the previous/next aircraft

Camera Settings

To open the Camera Settings dialog select *Camera Settings* from the *FS Recorder* menu:



VC Controls – Move Eyepoint

Here you can change the step size by which VC camera position is moved when using the *Move Eyepoint* controls.

Tower Controls – Move Eyepoint

Here you can change the step size by which the tower camera position/focus point is moved when using the *Move Eyepoint* controls. The button allows you to select if the *Move Eyepoint* controls change the camera position or the focus point position.

Tower Controls – Look <Direction>

Here you can change the step size by which the tower camera position is moved when using the *Look forward/left/back/...* controls.

Tower Controls – Look <Direction> Up

Here you can change the step size by which the tower camera position is moved when using the *Look forward up/left up/back up/...* controls.

Tower Controls – Panning during Autopan moves Focus Point

If this option is enabled you can use the panning controls to move the focus point in automatic panning mode. Note that it depends on the viewing direction along which of the three aircraft axes the focus point is moved.

Spot Controls – Move Eyepoint

Here you can change the step size by which the focus point for spot cameras is moved when using the *Move Eyepoint* controls.

Spot Controls – Free Mode

Here you can change the step size by which the speed of free cameras is changed when using the *Move Eyepoint*, *Look forward/left/back/...* and *Look forward up/left up/back up/...* controls.

Miscellaneous – Display Title/Aircraft on Change

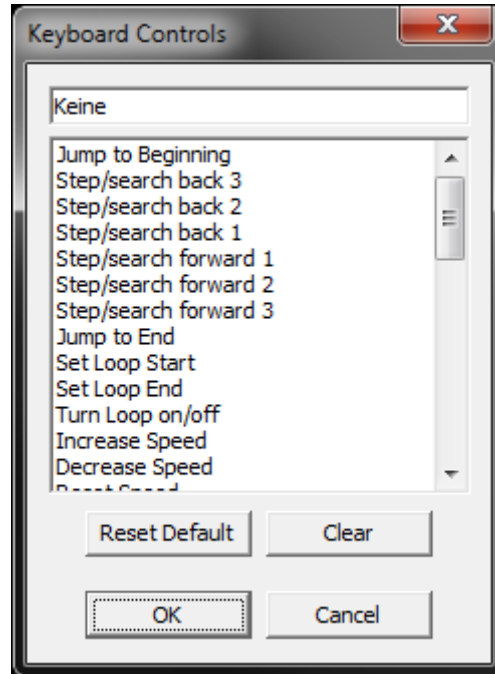
If this option is enabled, the title of the camera will be shown on top of the window for three seconds, when switching to a different camera, and the aircraft title and registration are shown when changing the watched aircraft.

Miscellaneous – Pause Position/Zoom Smoothing

If this option is enabled, the smoothed position/zoom transition (for cameras having it enabled) is paused, if FS is paused.

Keyboard Controls

To customize the keyboard shortcuts to control FS Recorder select *Keyboard Controls* from the *FS Recorder* menu. The following dialog will appear:



If you select a command from the list, the currently assigned key combination will be shown in the hotkey field above. To change it just press the key combination you want to assign (the focus has to be on the hotkey field!)

By pressing the *Reset to Default* button you can reset the default key combination for the selected command.

Known problems and limitations

- The playback control window can cause a drop in frame rate, at least when running FS in full-screen mode. Try to turn off the playback control window if you experience bad frame rates during playback.
- For certain add-on aircraft using custom programmed systems recording/playback of certain variables may not work correctly.
- The *Play as Traffic* feature does not work with helicopters and certain add-on aircraft, because FS does not support them as AI traffic.
- If during playback the smoke system is used on multiple instances of the same aircraft (same model and variation), the smoke will stay on forever on some of these aircraft. This is a problem of FS and the only workaround is to use a different variation for each aircraft.

Support

If you have problems installing or using FS Recorder, please follow the steps below to get support:

- First check the [Frequently Asked Questions](#) on the FS Recorder website and this manual for a solution to your problem.
- Search the [FS Recorder forums](#) for a solution, a lot of problems were already discussed there.
- If you did not find a solution, post your problem in the [support forum](#). Include as much information as possible, esp. your FS version and FS Recorder version! If you don't want to register a forum account or your account was not yet activated, you can still make a guest posting (which has to be approved as well, but I get immediate email notification about it).
- **Only contact me by email if you have a good reason not to use the support forum!** Posting in the forum helps other users having the same problem, and it saves me the time to answer the same question again. Also you might get help by other users if I cannot help you.

Do not ask me for support if you don't own an original copy of FSX! I will not help fixing problems with FS Recorder caused by pirated copies of FS!

Contact

To get support please do not use email, but follow the instructions above!

If you want to contact me directly for other reasons, send an email to contact@fs-recorder.net or use the [contact form](#) on the FS Recorder website.

Donations

If you would like to support the development of FS Recorder, you can make a donation via PayPal directly using [this link](#), or go to the PayPal website and use donations@fs-recorder.net as recipient's email.

I hope you enjoy my product.

Matthias Neusinger