

ViewTracker Manual



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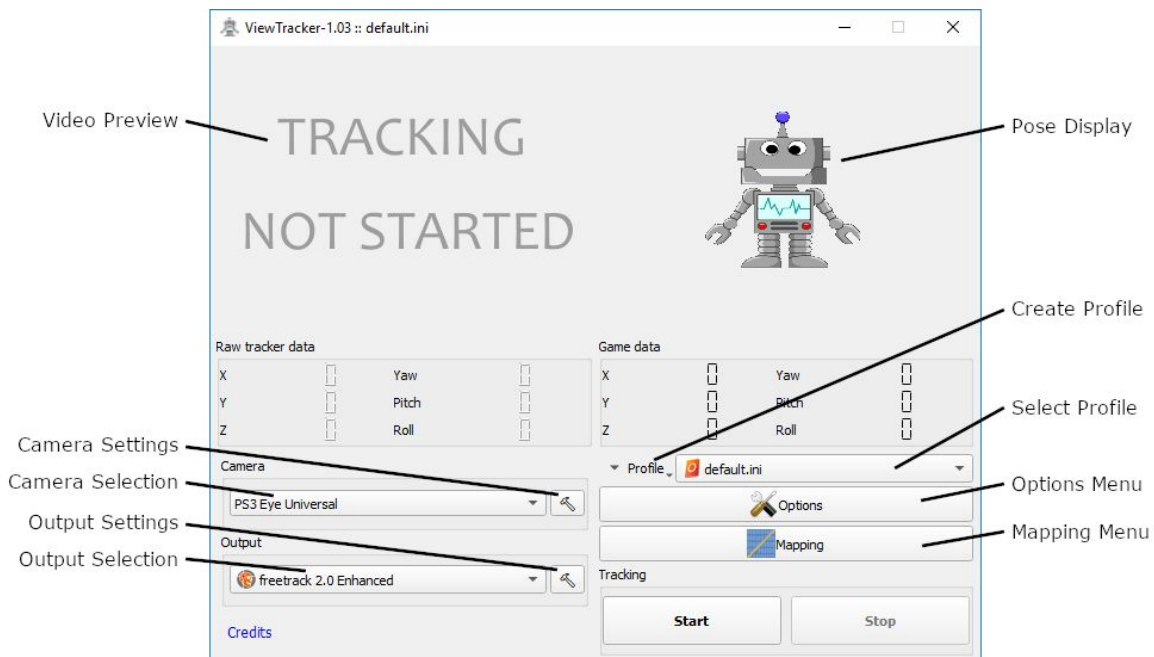
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Introduction

ViewTracker is a head tracking application for games that doesn't require any hardware other than a webcam. It allows you to use your head to control the in-game camera.

The tracking algorithm has been developed from the ground up to provide responsive tracking similar to what you would get with a hardware-based tracker. ViewTracker borrows heavily from the [opentrack project](#) for the user interface and output plugins. The developer of ViewTracker is grateful to the opentrack project for allowing these components to be used in commercial projects.

Main Window Diagram



Quick Start

To get started with ViewTracker, first make sure a supported webcam is connected and any necessary drivers are installed. Launch the app, press the start button, and you should see a green box around your face in the camera preview on the left. The robot graphic on the right should mirror your head movements.

Information describing the position of your head can be sent to one of several different outputs depending on which game you're playing. Most supported games use the FreeTrack 2.0 Enhanced output. This output is compatible with the Track-IR protocol, so any game that supports Track-IR should also work with this output.

While ViewTracker is running in the background, launch any game supported by the currently selected output and you should be able to use your head to control the camera. Some games have options that need to be set in order to enable head tracking. See the [Game Configuration Guide](#) for information on how to setup several of the games supported by ViewTracker.

Tracking might be slightly less smooth during the first 1-2 minutes while ViewTracker is adjusting to the shape of your face. You can improve the range of tracking by centering the view when your face is in the middle of the video preview and looking exactly straight-on (by default you can center the view by pressing ctrl-shift-c).

Supported CPUs

ViewTracker requires a 64-bit CPU with the AVX instruction set. This includes all Intel and AMD CPUs released after 2011. The first CPU architecture to support AVX was Intel's "Sandy Bridge" which was released in the first quarter of 2011.

Supported Webcams

ViewTracker will work with almost any webcam, but some work better than others. In general, more recent and expensive cameras tend to work better. The main exception to

this is the PlayStation 3 Eye which is currently less than \$10 on Amazon and works very well with ViewTracker (although it requires installing a free driver — see the PlayStation 3 Eye section below).

Any webcam that supports the DirectShow API can in theory be used with ViewTracker. Just about every webcam in existence meets this requirement. In order to work well, it should support running at 640x480 resolution at 30 frames per second. Webcams vary a lot in terms of latency and the amount of image noise they produce. For more information about specific webcam models, see the [Camera Selection Guide](#).

PlayStation 3 Eye

The PlayStation 3 Eye requires installation of a driver in order to work with Windows. [A universal 32/64 bit driver](#) that works works with ViewTracker is available on Github. Unfortunately, the 3rd party driver provided by Code Laboratories doesn't work with 64-bit applications and therefore can't be used with ViewTracker. The universal driver can be installed alongside of the Code Laboratories driver if desired.

Camera Setup

Once you have a camera selected, there are a few guidelines for setting it up that may improve tracking quality. ViewTracker is designed to work under a variety of different conditions, but taking a few minutes to make sure your camera and environment is properly set up can make a big difference.

Lighting

In general, the more light that's shining on the front of your face the better. Even lighting that doesn't cast large shadows is best. Backlighting can make it more difficult for your camera to get a good view of your face. Use the video preview as a guide — if you have a clear view of your face then the tracking algorithm will have a clear view as well.

If your environment doesn't have a lot of light, it's best to use a more recent webcam that can deliver good image quality in low-light. Using a lower [frame rate](#) allows your camera to

use a longer exposure time which allows it to gather more light. Finally, a higher value for the [smoothing setting](#) can compensate for inaccurate tracking caused by camera noise.

Camera Positioning

The camera should be positioned as close to directly in front of your face as possible. You want the camera to see your face straight-on when the view is centered in-game. Also make sure the camera isn't too far above or below your head. The best place to mount the camera is usually above your monitor.

Settings

Profiles

All settings are stored in a profile which is saved on your hard drive in Documents\viewtracker-1.0. You can create multiple profiles if for example you want to use different settings for different games. To create a profile, click Profile on the main screen then select either "Create new empty config" or "Create new copied config". See the [Game Detection](#) section for instructions on how to automatically choose a profile when a game is started.

Camera Settings

Resolution

This option controls the resolution of the video used by ViewTracker. The default option of 640x480 is usually sufficient. Higher resolutions require more system resources, and if your face occupies a region larger than 125x125 pixels it will be scaled down internally. A higher resolution might be required if you're positioned far away from the camera.

Frame Rate (FPS)

This determines how many frames per second (FPS) that the camera is requested to send. Higher frame rates result in more responsive tracking, but require more light to provide a noise free image (see the [lighting section](#)). Some cameras will automatically reduce their

frame rate in low light even when a higher value is requested. The actual tracking frame rate will depend on how quickly your CPU is able to process frames. Higher frame rates use more system resources and may require more CPU cores to prevent frames from being dropped.

Outputs

FreeTrack Enhanced 2.0

This output is compatible with the Track-IR protocol, so any game that with Track-IR should also work with this output. Most supported games should work without changing anything, but some games have an option that needs to be set to enable Track-IR. This output has a couple of options, both of which usually don't need to be changed.

Select Interface

The FreeTrack output actually supports two similar protocols, and in rare cases games seem to get confused when both are available. This option allows you to enable one protocol at a time.

Repair NPClient location

This option allows you to manually specify which DLL you want games to use for setting position data in shared memory. This is generally used only for testing or troubleshooting purposes.

Mouse Emulation

This output allows you to use your head movements to control the mouse. It has some options that control how head movement is mapped to mouse movement.

Map mouse X/Y to

This determines what type of movement controls the mouse. The default values of Yaw and Pitch mean that the mouse will respond to the rotation of your head.

Sensitivity

This adjusts the speed of your mouse. Note that this setting only applies to the mouse output; to adjust sensitivity for all outputs see the [mapping menu](#).

Joystick Emulation (vjoystick)

This output creates a virtual joystick device that is controlled by your head movements. It requires installing the [vjoystick driver](#). Once you have installed the driver, you can use the vJoy Monitor application to see how your head movements are mapped to the virtual joystick's axis. In your game's controller configuration select the vJoy device and map the axis to the desired in-game actions.

FlightGear

[FlightGear](#) is an open source flight simulator. FlightGear has its own format for head tracking data but it requires some extra configuration in order to work. See [this page](#) for details.

Prepar3D SimConnect

This output works with Prepar3D 4.0 via the SimConnect protocol. The SimConnect library that ViewTracker uses for this output is provided by Lockheed Martin and unfortunately isn't compatible with Microsoft FSX. Older versions of the SimConnect library provided by Microsoft are 32-bit only and can't be used by ViewTracker which is a 64-bit application.

UDP Over Network

This output sends head tracking data in a simple format over UDP. Each UDP packet is simply 6 double precision floating point numbers. The first 3 are the X,Y,Z coordinates of the head and the last 3 are the orientation as Tait-Bryan angles.

Options Menu

Shortcuts

Shortcuts can be assigned to perform several tracking actions. Shortcuts can either be key combinations or joystick buttons. To assign a shortcut, press the bind button corresponding to the action you want to bind, then press the key combination or joystick button you want to use. Note that joystick buttons can also be modified by control, shift or alt. Each action can have two bindings. To delete a binding, press the bind button then close the window that pops up.

Beneath the shortcuts are several general options:

Center at startup

Select this option to use the first head position detected by ViewTracker as the center position.

Show face box in preview

Draw a green box around your face in the camera preview when enabled.

Show FPS in preview

Displays the number of frames per second processed by ViewTracker in the camera preview. The higher the FPS, the more responsive tracking will be. Usually this will correspond to the FPS selected in the camera settings, but could be different if the camera decides to use a frame rate other than the one that was requested or ViewTracker is unable to process frames fast enough.

Never translate the application interface

Choose this option to disable the non-english translations that are available for many UI options.

Number of CPU cores used

Use this option to control the number of CPU cores used by the tracking algorithm. Using more CPU cores allows ViewTracker to obtain a higher frame rate, but it can reduce the resources available for demanding games. The default setting of auto depends on the FPS selected under camera settings: it uses two cores for less than 45 FPS and four cores for greater than 45 FPS.

Minimize to tray

When this option is selected, ViewTracker will minimize to the system tray (the set of icons on the bottom right of your desktop). Pressing the minimize or close button will cause ViewTracker disappear and continue running in the background. You can restore ViewTracker by pressing the robot icon in your system tray. Right clicking on the tray icon provides several options, including one to completely exit. You can also exit ViewTracker by pressing ctrl-q.

Filter

Smoothing

Use this option to control the “smoothness” of tracking. Roughly speaking this determines how much movement per frame is suppressed. Values range from 0-90%. 100% isn't allowed as that would result in no movement at all.

Deadzone

Even when your head is perfectly still, ViewTracker will still detect small movements. This is undesirable because when playing a game you want the view to be completely still when your head isn't moving. To achieve this, small movements are ignored while your head is still. Deadzone controls how much movement will be ignored before the view starts moving.

Output

Output remap

This section allows you to choose how movement axes are mapped to the axes of the camera in game. In general it shouldn't be necessary to change these options, but if for some reason camera movements are mixed up or backwards this can be one way to fix it. These settings can also be used to disable movement for certain axes.

Custom center pose

By default, ViewTracker reports the "center" as 0 degrees for every angle and 0 for every spatial position. The center is defined as the position of your head when the center shortcut is pressed or when tracking begins if [center at startup](#) is selected. The custom center pose option causes ViewTracker to send the given position to the game when your head is centered. This is useful if the default view in the game isn't optimal and the game doesn't provide any way to adjust it.

CSV Data Logging

Enable this option if you would like to create a log file containing the estimated position of your head over time.

Relative Translation

Relative translation

This option determines how rotation and translation are combined. Normally, translation is always relative to your webcam. That is, even if your head is rotated, if you move your head towards the webcam your in-game view will move forward . If relative translation is enabled, translation is relative to the direction your head is pointing. So if your head is rotated, moving your head in the direction it's pointing will cause the in-game camera to move in the direction that it's pointing.

Neck displacement

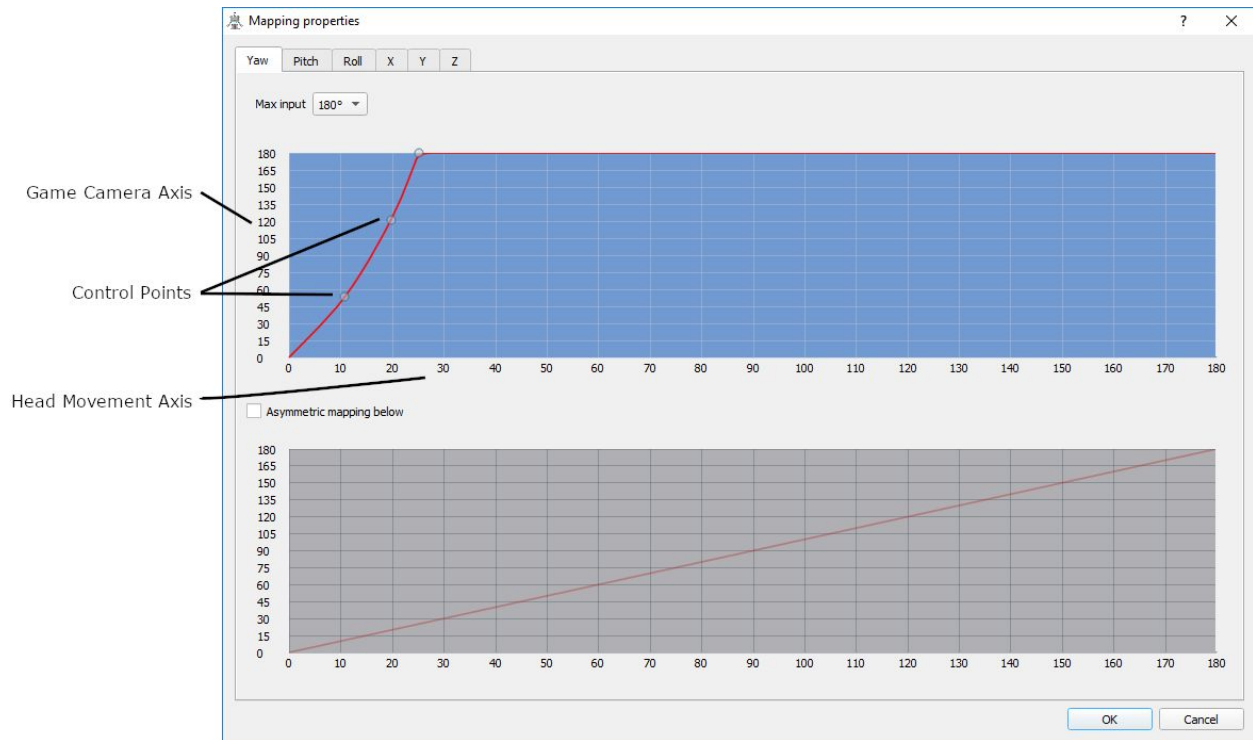
This is an advanced option that normally shouldn't need to be changed. This relates to the point that is used as the center of rotation. ViewTracker automatically determines the center of rotation to minimize the amount of translation that occurs when your head is turned. Adjusting this option might help if you find that large translations occur when you rotate your head.

Game Detection

This tab allows you to automatically load a given profile and start tracking when ViewTracker detects that a game has been launched. Note that this isn't required for tracking to work. Tracking can always be started manually even if the game isn't on this list.

Select the check box at the top to enable game detection. To add a game to the list, press the "+" button at the bottom of the window. Use the file browser to select the executable that's used to launch the game. Use the profile column to select which profile is used for this game. ViewTracker will start tracking with the given profile whenever it detects that the executable is running.

Mapping Menu



The mapping menu allows you to control how much the in-game camera moves for a given amount of head movement. The horizontal axis on the graphs represents the amount of head movement, and the vertical axis represents the movement of the camera. Drag the control points to adjust the curve. Left click anywhere on the curve to create a new control point. Right click to delete a control point. If you open the mapping window while tracking is active, the point on the curve corresponding to your current head position will be displayed.

If the asymmetric mapping checkbox is selected, the top curve will be used for half of the positions and the bottom curve will be used for the other half. In the yaw tab for example, the top graph will be used for angles that are left of center, and the bottom graph for angles right of center.

Troubleshooting

[ViewTracker crashes on startup with error code 0xc0000142](#)

Please make sure you have a [supported CPU](#)

[Head tracking doesn't work with Elite Dangerous](#)

There are a lot of reports that head tracking in Elite Dangerous sometimes doesn't work. Some things that might help are moving the location of ViewTracker to the same drive that Elite Dangerous is installed on or changing the "Select interface" option in the FreeTrack output settings to "Use Track-IR, hide FreeTrack". Note that these tips are specific to Elite Dangerous and probably won't help with other games.

Additional Resources

- [Game Configuration Guide](#)
- [Camera Selection Guide](#)
- [Universal PS3 Eye Driver](#)