

# Documentation – SET Video Review v1.0

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# 1 Introduction

## 1.1 Features

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- Instant replay of up to 4 video sources in Full HD. Simultaneously!
- Support for DirectShow cameras, capture devices (USB, PCIe, TB) and IP cameras
- Extremely performant and synchronized frame-by-frame analysis
- High quality recordings through JPEG based video capture technology
- Flexible archiving, importing and exporting functionalities
- Control via mouse, keyboard or special input devices like the Contour Design ShuttleXpress or ShuttlePRO.
- Highly efficient and user friendly interface
- Integrated into the SET software framework
- Support for 4-in-1 video sources by auto-zooming in fullscreen mode
- Storage type independent

### Maximize the quality of match-winning decisions or motion analysis

.. in any kind of sport! With a frame-by-frame analyzing system like SET Video Review, no important moments will be missed any more. Providing simultaneous recording of up to 4 video sources, combined with synchronized playback offers incredible possibilities when

reviewing all kinds of situations in fast- or slow motion.

### Professional instant replay by efficiency and integration

A simple but powerful user interface is essential to guarantee a gapless and stable instant replay system. SET Video Review was designed and built from scratch following those principles – and considering the full integration into the world of Sportdata Event Technology, this makes SET Video Review to a unique but affordable solution.

### Wide application field by flexibility

No matter if you prefer to use professional video equipment or low cost consumer cams: SET Video Review handles different input sources like DirectShow cameras, capture devices or IP cameras – even in a combined setup! Additionally, all recordings are independent from your storage type – meaning that even shared network recordings are no problem.

### Optimized user experience with specialized controllers

To complete the provided methods of user interaction – aiming to satisfy requirements of the real enthusiasts out there – SET Video Review supports professional hardware controllers like the Contour Design ShuttleXpress or ShuttlePRO. Of course, controlling via mouse and/or keyboard also enables to use the complete set of features by default.



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## 1.2 Supported Platforms

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- Microsoft Windows 7, 8.x, 10 – 32 bit
- Microsoft Windows 7, 8.x, 10 – 64 bit

Right now SET Video Review is available for *Microsoft Windows*. Versions supporting *MacOS* and *Linux* are under development.

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## 1.3 System Requirements

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## System requirements

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|                              |   |  |
|------------------------------|---|--|
|                              | 2 X HD<br>(720/50P)                           | 4 X FULL HD (1080/30P) OR<br>1 X 4K UHD (3840/30P) |
| <b>OPERATING<br/>SYSTEM</b>  | Microsoft Windows 7, 8.x or 10                | Microsoft Windows 7, 8.x<br>or 10                  |
| <b>MAIN MEMORY<br/>(RAM)</b> | 8 GB  | 8 GB   |
| <b>CPU</b>                   | Dual-Core, 3 GHz                              | Quad-Core, 3.5 GHz                                 |
| <b>STORAGE TYPE</b>          | HDD (SATA 3), SSD, Network share<br>(GbE), .. | SSD (NVMe preferred)                               |
| <b>STORAGE USAGE</b>         | ~375 MB per recorded minute                   | ~800 MB per recorded<br>minute                     |

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## 2 Installation

### 2.1 Download

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SET Video Review can be downloaded from here:

<http://set.sportdata.org/wp/index.php/category/downloads/>

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## 2.2 Installer

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After downloading, please run the executable installer file. The installation process needs admin rights exclusively to write into the *ProgramFiles* directory – so you can safely confirm the appearing *User Account Control <UAC>* dialog.



If *Windows SmartScreen* shows an alert, just continue with execution as follows:



# Der Computer wurde durch Windows geschützt

Von Windows SmartScreen wurde der Start einer unbekannten App verhindert. Die Ausführung dieser App stellt unter Umständen ein Risiko für den PC dar.

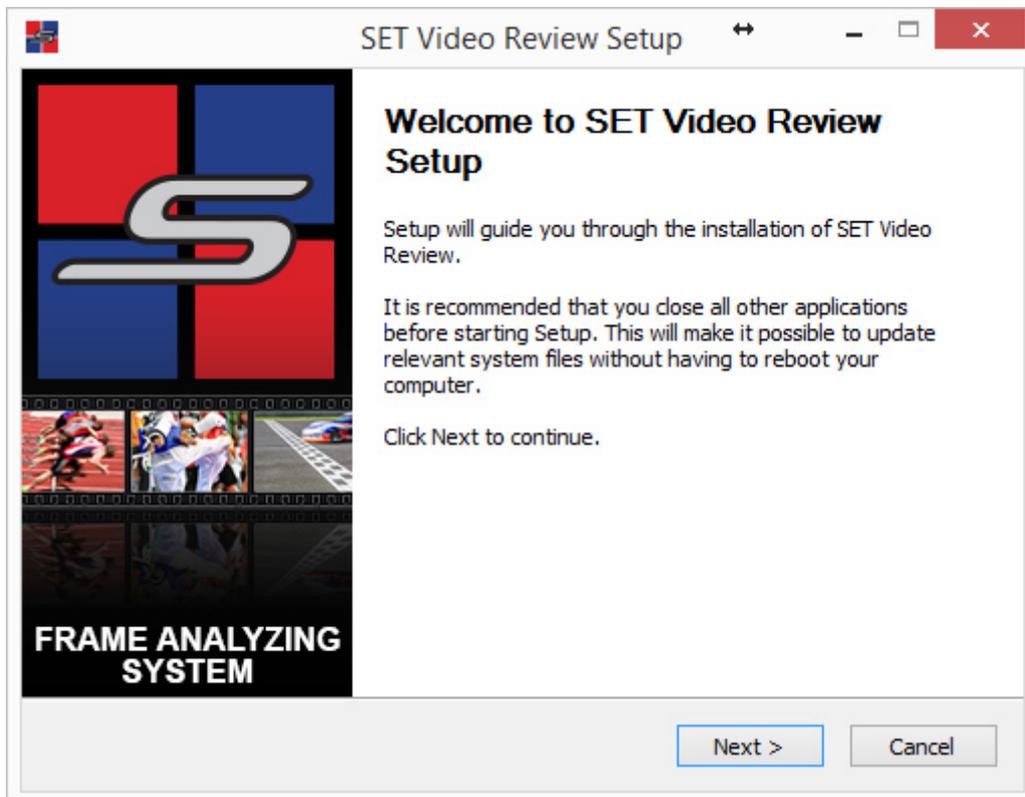
App: SETVideoReview\_1.0.0\_win\_x86.exe  
Herausgeber: Unbekannter Herausgeber

Click here

Trotzdem ausführen

Nicht ausführen

Then just follow the installation instructions, which will guide you through the complete installation process.



Please observe, that you will be asked to select an installation folder twice:

- The first one is for the Software itself (usually: "C:\ProgramFiles\SET Video Review")
- and the second one for the recordings, exports and archives to be stored. (usually: "C:\ProgramData\SET Video Review")

It is not recommended to store the recordings in the *ProgramFiles* Directory – so please use the preselected *ProgramData* directory, or select something like your personal video directory for example. It is advisable to choose fast storage types like SSDs, but generally you can select any storage type you prefer (see System Requirements).

## 2.3 License

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To activate SET Video Review you have to obtain a license via the sportdata online shop:

<http://set.sportdata.org/wp/index.php/product-category/set-software/single-products/video-review/>

You can choose between a 3-year, 1-year or event based license. For all license types the software can be installed and used on as many computers as you want. When the license period has expired, SET Video Review will run in DEMO mode again. The DEMO mode has no functional limitations, but recordings can be no longer than 15 seconds.

You will receive a license file after purchasing one of the licenses mentioned above. This file is needed to activate SET Video Review and unlock the recording-time limitation. Therefore, open SET Video Review and start the *License Manager* via the top menu bar. Follow the instructions of the *License Manager* and select the received license file when requested. If the selected license file is valid, the *License Manager* confirms the successful activation and SET Video Review is ready to be used without any limitations.

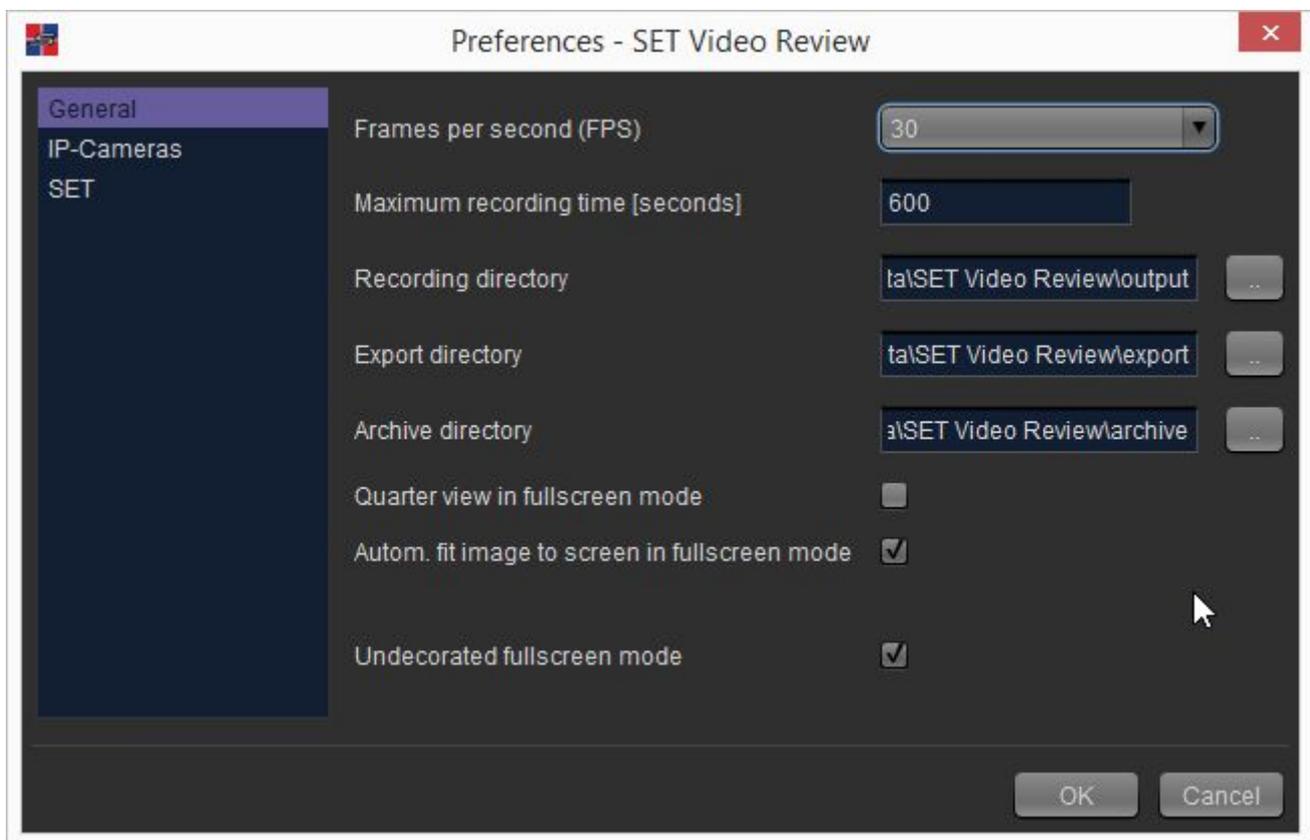


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## 3 Preferences

### 3.1 General

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## Frames per second (FPS)

Determines the preferred number of recorded images per second for all video sources.

*Please note that a camera might not support your configured FPS. In this case, the recording will not succeed - indicated by a red bordered recording panel and an error message at the panel's bottom.*

## Maximum recording time [seconds]

After the maximum recording time, SET Video Review stops the recording to avoid wasting disk space.

## Recording directory

Path to the directory storing the recordings as JPEG files in an accurately defined folder structure.

## Export directory

Path to the directory storing MP4 exports. You will be prompted before each export though, using the configured export directory as a starting point.

## Archive directory

Path to the directory storing recording archives. You will be prompted before each archiving process though, using the configured archive directory as a starting point.

## Quarter view in fullscreen mode

This option is useful for hardware setups merging four video sources to one single input signal: Opening the fullscreen mode while reviewing automatically zooms to the quarter where the corresponding double-click occurred.

## Autom. fit image to screen in fullscreen mode

When opening the fullscreen mode while reviewing, the zoom factor is automatically adjusted to maximize the image size of the recording without cropping it.

## Undecorated fullscreen mode

Hides the window borders to maximize the available viewport of the review fullscreen mode.

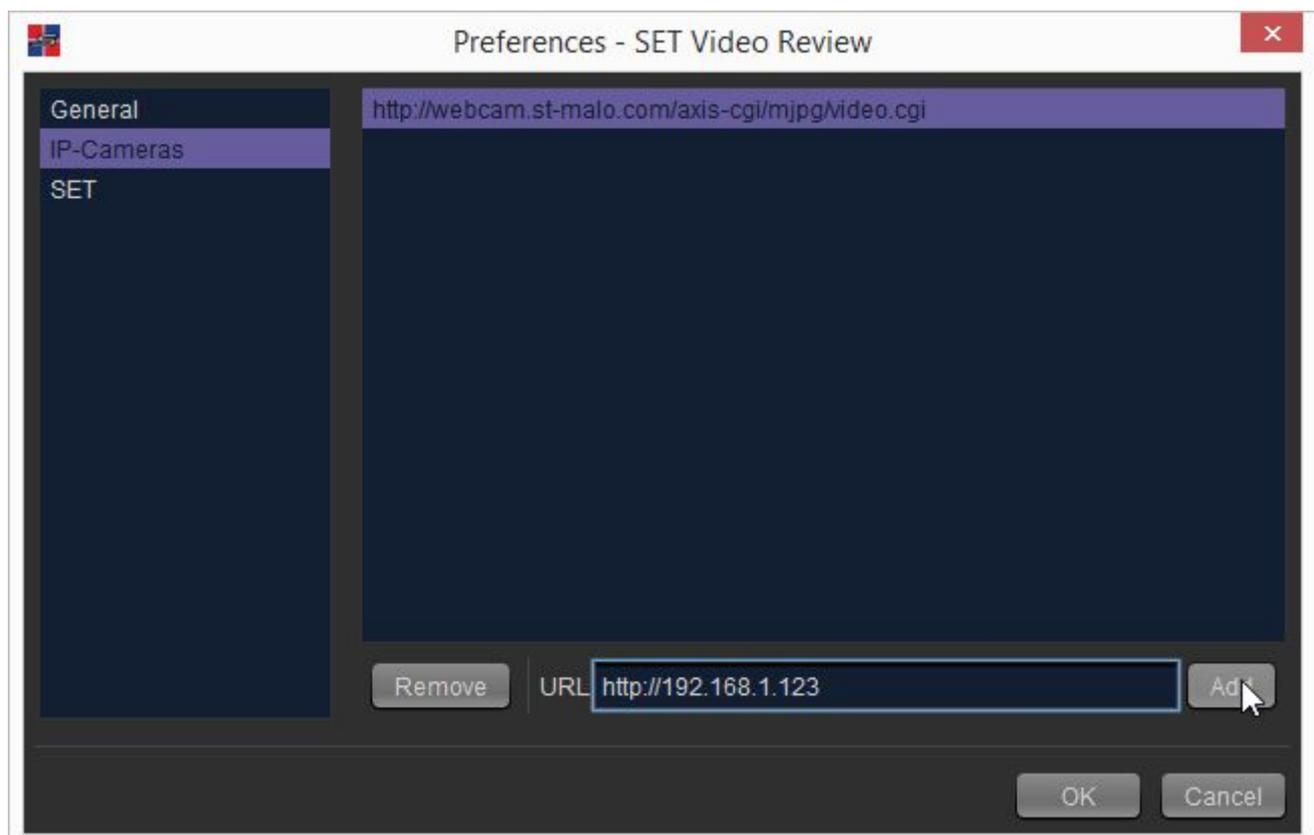
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## 3.2 IP Cameras

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SET Video Review supports wired (LAN) or wireless (WLAN) IP cameras using various protocol types and codecs. IP cams must be added manually via *Edit - Preferences* by providing the camera URLs in the *IP-Camera* section.

Adding new cams is done by entering a URL in the *URL text field* at the bottom and clicking the *Add* button. If the URL is valid, it is listed in the area above. After closing the *Preferences* window, the newly configured IP cams will be added to the *Cam* dropdown lists.



To remove a cam, select the appropriate cam in the list and click *Remove*.

## Parameterization

Configuring IP cams by using parameters is possible by adding so called *GET parameters* directly to the URL.

*The support and correct use of those parameters depends on the camera type and model. So please read the camera's manual or ask the manufacturer how to configure the camera by using GET parameters.*

Examples (unspecific):

**Configured resolution:** <http://my.webcam.com/mjpg/video.mjpg?resolution=1280x720>

**With credentials:** <https://admin:password@192.168.1.123/cgi-bin/video.cgi>

Examples (specific):

**RTSP, public AXIS webcam:** <rtsp://96.10.1.168:554/axis-media/media.amp?videocodec=h264>

**HTTP, public AXIS webcam:** <http://96.10.1.168/mjpg/video.mjpg>

## Supported protocols & codecs

SET Video Review makes use of the powerful *FFmpeg* project, and thus profits from its numerous supported protocols and codecs.

To mention only a few important ones:

**Protocols:** HTTP, RTSP, ...

**Codecs:** MJPEG, H.264, ...

For more information see:

<https://www.ffmpeg.org/ffmpeg-protocols.html>

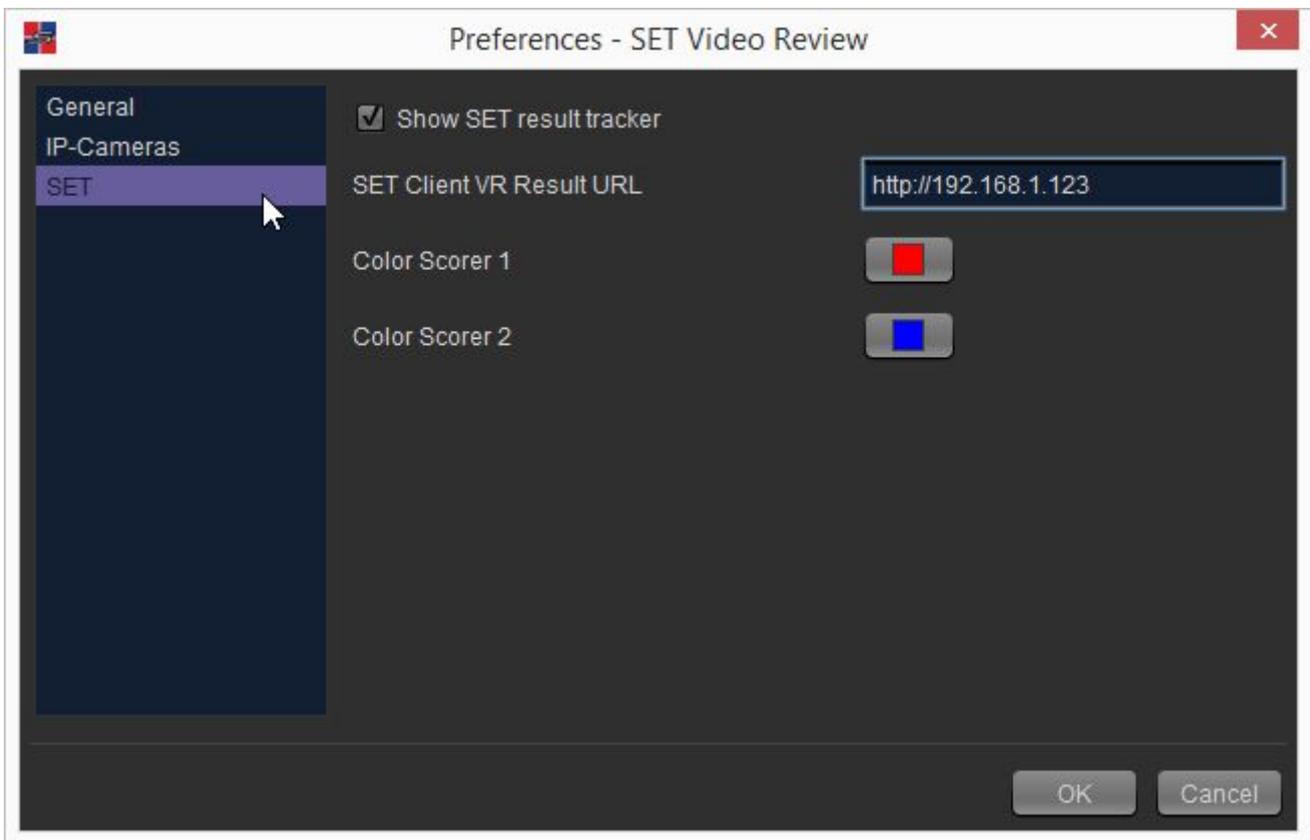
<https://www.ffmpeg.org/ffmpeg-codecs.html>

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## 3.3 SET

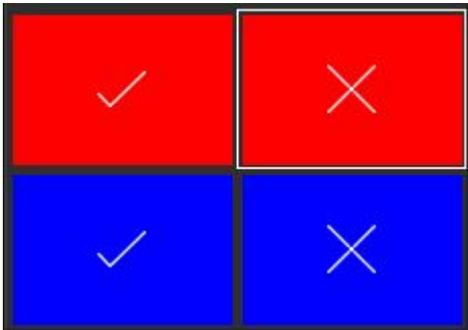
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SET Video Review is fully integrated into the *SET Software Framework*. Thus, if you're using it for instant replay, it is possible to directly track results via a connected *SET Point Panel*. The Point Panel then can use its built-in visualization to view the result on any kind and number of display units, while besides storing all the information in the central SET database automatically. See how the Point Panel looks like in the *Use - SET* section.



## Show SET result tracker

Shows/hides the result tracker buttons in the bottom-left corner of the main window.



## SET Client VR Result URL

Defines the SET client (running a Point Panel) to receive the result information sent by SET Video Review.

## Color Scorer 1

Defines the color of the two top buttons viewed in the main window.

Use the color-chooser button of the *Preferences* window's *SET* section to select a color and click *OK*.



## Color Scorer 2

Defines the color of the two bottom buttons (Scorer 2).

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## 4 Use

### 4.1 User Interface

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#### Overview

The following screenshot defines the main user interface components of SET Video Review. Each component is described more detailed in the subsequent chapters.



## Menu Bar

### File

 *Import* – Copies recordings from a different location into the current *Recording Directory*. Only complete recordings can be imported, not the single camera subdirectories. So always select the parent directory with a 13-digit number (which is a timestamp) as its name (For example: “1488874114825”). Multiple selections are supported too.

 *Close* – Prompts to shut down SET Video Review.

### Edit

 *Refresh* – Reloads the *Recordings List* and the cameras.

 *Preferences* – Opens the *Preferences* window.

### Help

 *Content* – Not implemented yet.

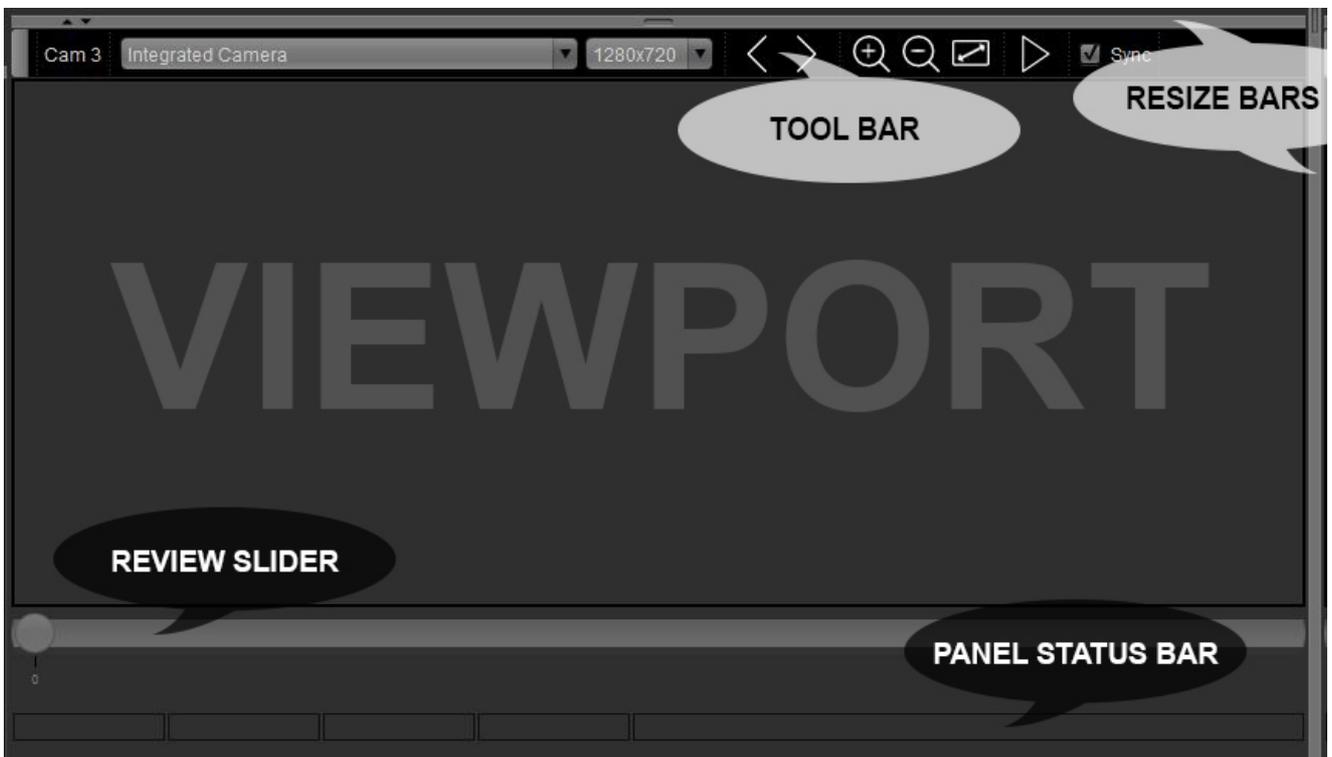
 *About* – Information about SET Video Review.

## License Manager

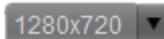
 *License Manager* – Starts the *SET Video Review License Manager*.

## Viewer Panel

The four *Viewer Panels* are used for *Preview*, *Recording* and *Review*. The following screenshot shows one *Viewer Panel* and defines its components.



## Tool Bar

| UI component  | Description  | Usage                             |
|---|--|-----------------------------------|
|  | The complete <i>Toolbar</i> can be undocked to enlarge the viewport                              | <i>Preview, Recording, Review</i> |
|  | <i>Camera Picker</i> to select the desired device  | <i>Preview, Recording</i>         |
|  | <i>Resolution Picker</i> to select the desired camera resolution                                 | <i>Preview, Recording</i>         |
|  | <i>Backward/Forward Buttons</i> for frame-by-frame analysis                                      | <i>Review</i>                     |
|  | <i>Zoom Buttons</i> to zoom-in, zoom-out and fit to the viewport size                            | <i>Review</i>                     |
|  | <i>Play/Pause Button</i> for controlling video playback  | <i>Review</i>                     |
|  | <i>Sync Checkbox</i> en-/disables the <i>Review</i> synchronization between <i>Camera Panels</i> | <i>Review</i>                     |

## Resize Bar

The *Resize Bars* can be used to resize the four *Viewer Panels* or to selectively hide them. For resizing just put the mouse cursor over the desired *Resize Bar* and drag it into the preferred direction. Obviously, the horizontal *Resize Bar* is for adjusting the *Viewer Panel's*

height and the vertical *Resize Bar* for adjusting the *Viewer Panel's* width. Hiding can be done/undone by clicking on the small arrows  inside the *Resize Bars*.

## Review Slider

The *Review Slider* is controlling images shown in the viewport of the corresponding *Viewer Panel*. It represents the position in the recorded video and enables *Reviews* in slow- or fast-motion by dragging it back and forth. The labels under the *Review Slider* show the incremental numbers of the recorded images.

## Panel Status Bar

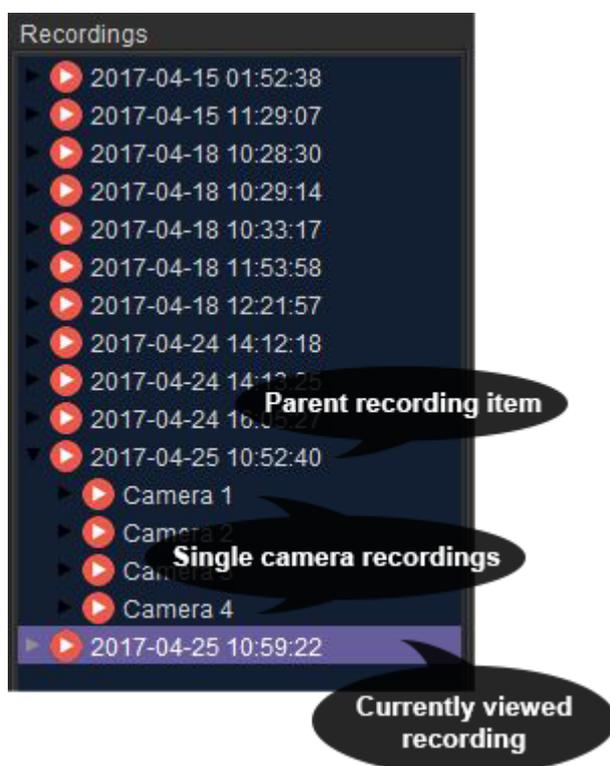
Useful information concerning a current task are displayed in the *Panel Status Bar* of each active *Viewer Panel*. For more details see the *Preview, Recording* and *Review* sections.

## Viewer Window

The *Viewer Window* basically has the same controls than the *Viewer Panels*, except the two pickers and the *Sync Checkbox*. The *Viewer Window* appears when double-clicking into the viewport of a *Viewer Panel* and is usually used in (borderless) fullscreen mode.

## Recordings List

All recordings stored in the configured *Recording Directory* are listed in the *Recordings List* on the left. As recognizable in the picture below, every parent item consists of up to four camera recordings, which are made visible by expanding the parent item. The parent item is named with the date and time of the recording being started.



A right-click on a **parent recording item** (or multiple selected items) shows a popup menu with the following entries:

 *Delete (DEL key)* - Deletes the complete recording(s) (all containing camera recordings).

 *Archive* - Moves the complete recording(s) (all containing camera recordings) to a desired location. Later importing via *File - Import* is possible.

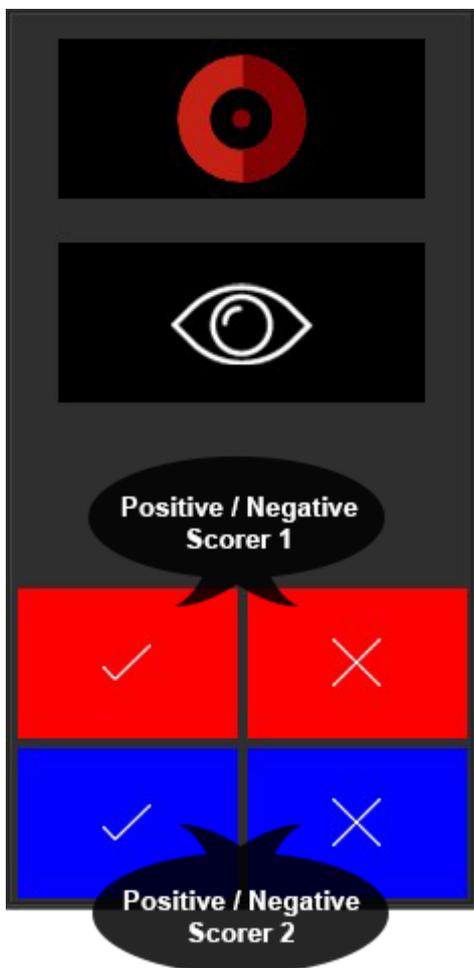
A right-click on a **single camera recording** shows a popup menu with the following entries:

 *Delete (DEL key)* - Deletes a single (or multiple) camera recording(s).

 *Export* - Generates an MP4 file of the selected camera recording, stored to the desired location. Multi-selection is not supported yet.

## Control Panel

The Control Panel consists of the start/stop *Recording Button*   and *Preview Button*  , as well as the four *SET Result Tracker* buttons to submit review decisions. See more detailed instructions on how to use them in the *Use* sections.



## Main Status Bar

The *Main Status Bar* shows global information like the current usage mode (*Review*, *Recording*, etc.), configured FPS, exporting status, etc.





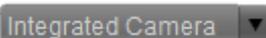
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## 4.2 Preview

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The first step before getting productive should be ensuring that everything is set up correctly. Therefore, SET Video Review provides the *Preview* mode. It connects to the selected camera and shows the live video stream without recording it to your storage device. So, if the *Preview* works without any problems, most likely the *Recording* also will succeed. But please note, that the *Preview* mode is not supposed to estimate the system performance (due to not reading/writing any data to storage).

### Step by step

1. Select the desired device from the *Camera Picker* 
2. Select the desired resolution from the *Resolution Picker*  (except for IP cams)
3. Click the Preview button  in the Control Panel to start the Preview
4. If the connection succeeds the *Viewer Panel* becomes green bordered and you should see the live video.
5. To stop the *Preview*, click the same button again. 

If problems occur, see the *Troubleshooting*.

### Viewer Status Bar



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## 4.3 Record

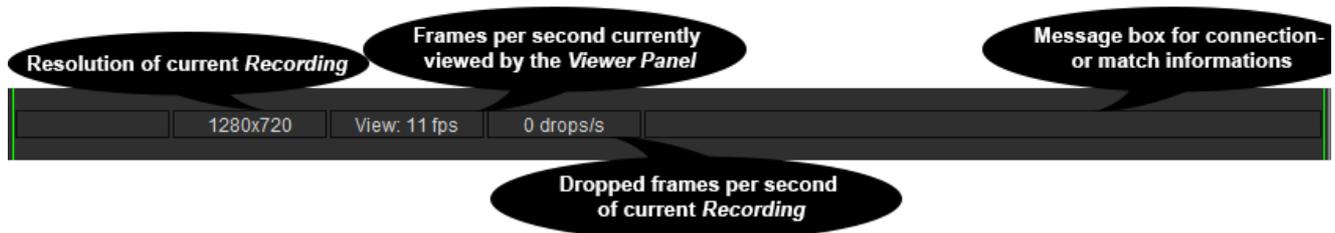
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If the *Preview* works, SET Video Review is basically ready to start recording – providing that the *Recording directory* is set correctly, of course.

### Step by step

- Perform the *Preview* step, if not already done.
- Click the *Record Button*  (or *SPACE* key) to start recording.
- Click the same button again  (or *SPACE* key) to stop recording.

## Viewer Status Bar



Attention: A high number of dropped frames per second indicate an overloaded system. See *Troubleshooting*.

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## 4.4 Review

After the *Recording* process, SET Video Review immediately starts the *Review* mode. The *Viewer Panel(s)* automatically show(s) the current recording and sets the *Review Slider* position to:

$NumberOfImages - configuredFPS * 7$

So now the *Review* process can be started by the user. Basically, three different workflows are common to be used – exclusively or in combination:

### Working with the fullscreen *Viewer Window*

One method of operating is by using the fullscreen *Viewer Window*. It can be configured via the *Preferences* to be viewed completely borderless and/or automatically resizing the current recording to fit into the *Viewer Window's* viewport.

Usually (e.g. when doing (time) critical video reviews on sport events) the responsible reviewer decides upon the best view, which then is made fullscreen by double-clicking into the viewport of the chosen *Viewer Panel*. After a decision is made (or whatever is required), the *Recording* can be started directly via the *SPACE* key. Alternatively, the *Viewer Window* can be closed by doubleclicking into the viewport or pressing the *ESC* key – followed by clicking the *Record Button*  to start *Recording*.

### Working on the single *Viewer Panels*

Directly using the single *Viewer Panels* enables multi-angle reviews or analyzations. The *Sync Checkbox*  additionally allows to synchronize the *Viewer Panels*. So for example altering the *Review Slider* position, viewing important moments frame-by-frame or starting a playback – everything (except zooming) will be applied to all synced *Viewer Panels* simultaneously.

## Working with four-in-one video material

If specific hardware setups deliver four-in-one video material, the appropriate *Preferences* option “*Quarter view in fullscreen mode*” should be selected. With this option enabled, opening the fullscreen *Viewer Window* automatically zooms to the quarter where the corresponding double-click occurred.

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## 4.5 SET

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SET Video Review is fully integrated into the *SET Software Framework*. Thus, if you’re using it for instant replay, it is possible to directly track results via a connected *SET Point Panel*. The Point Panel then can use its built-in visualization to view the result on any kind and number of display units, while besides storing all the information in the central SET database automatically.

Requirements: “*Show SET result tracker*” checkbox is selected and a valid “*SET Client VR Result URL*” is set in the *Preferences*

### **SET Point Panel integration**

*This section shows how the result tracking feature of SET Video Review is integrated in SET Point Panel. So, the following screenshots come from SET Point Panel – not from SET Video Review itself!*

*Exemplary sport: WKF Karate*

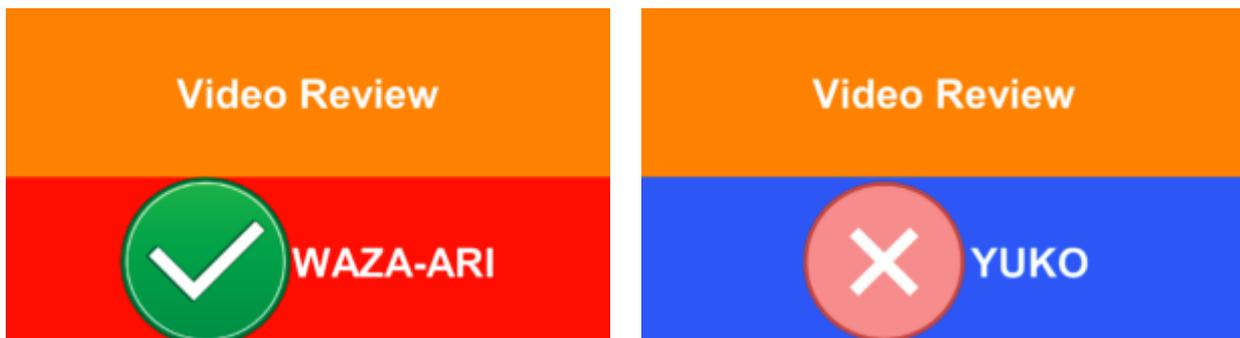
### **Point Panel VR-Status Icon**

The VR icon in *SET Point Panel* shows if the red/blue coach is allowed to do a protest.



## Point Panel VR Action View

If a video review is requested, the screens show the VR View, including the kind of score requested – as well as the result (Accepted/Denied) submitted by *SET Video Review*.



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## 4.6 Troubleshooting

### Preview

Preferred camera resolution is not listed in the *Resolution Picker*

- The selected device does not support the resolution, so a different one must be chosen.

## Connection failed

- The *Viewer Panel* becomes red bordered and will probably show an error message in the *Viewer Status Bar*. Common reasons and possible solutions are:
  - Device(s) powered off → Check power status and switch off/on if necessary.
  - Cable/Wireless connection problem → Unplug/plug cables or switch WLAN off/on if necessary.
  - Wrong FPS configuration → Check the camera's FPS support and change the *Preferences*.
  - Device is currently used in another application (e.g. Skype) → Close all not needed applications.

## Viewer Panel shows black image instead of live video

- Capture devices sometimes send black still images when not receiving any input signal → Check the HDMI/SDI/.. cables delivering the source video signal.

## Record

*Recording* performance is low (e.g. indicated by high number of dropped or duplicated frames)

- System performance too low → Check the *System Requirements*. Choose lower resolution and/or lower FPS and/or decrease number of cameras.
- Another task slows down your computer in the background → Close all not needed applications and watch out for CPU intensive tasks e.g. with the help of the *Windows Task Manager*.
  - If tasks named 'ffmpeg.exe' are running while SET Video Review is NOT RECORDING and NO EXPORT was made, please 1) close SET Video Review and 2) close the ffmpeg.exe task(s).
- *Recording* performance is low although *Preview* is working well → This can happen because the *Preview* is NOT an indicator for a sufficient system performance! (due to not reading/writing any data from/to the storage device)

## Connection failed

- ... see '*Connection failed*' in the *Preview Troubleshooting* above.

## Viewer Panel shows black image instead of live video

- Capture devices sometimes send black still images when not receiving any input signal → Check the HDMI/SDI/.. cables delivering the source video signal.



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