

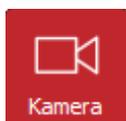
ARES Video

user manual V1.1

ARES Video is a program for laser shooting training which detects and evaluates laser shots via cameras. It is based on the technology of Project ARES, but has been developed specifically for shooting video films.

Before the training can begin, the camera and the weapon must be set up. Then a playlist of video and image files can be created and made available in the game menu.

The two required settings menus as well as the game menu can be activated via the buttons at the top right. At the top left are buttons for saving and loading, for settings and for exiting the program.



In this menu the cameras can be selected and configured. In this window, the camera image can be seen first of all.

In the Display field, it can be selected whether it is to be displayed in color or black and white. The third option "Laser" shows the evaluation of the laser detection. Here the whole image should be black and the places where a light flash was detected should flash red. In addition, two circles are displayed that show the minimum and maximum size that such a light flash must have in order to be evaluated as a laser shot. Normally, these special settings do not have to be made, but the default values can be kept.

Important for the laser detection are the camera settings of brightness and exposure time. However, the two sliders only work if the automatic brightness or exposure control of the camera is deactivated. The Driver Settings button can be used to open the camera-specific driver menu where these functions can be disabled. However, there are cameras that do not provide an option to disable automatic control. These cameras are not suitable for ARES video. Brightness and exposure should be set so that the frame rate, which is displayed in the upper right corner, is as high as possible, even though this may make the image appear very dark.

To set up, the camera must be oriented so that the projected image is captured completely and over as large an area as possible. A color filter that matches the color of the laser used must be mounted in front of the camera. If the camera is aligned, the color filter is mounted and the brightness is set as described above, the automatic calibration is started via the button. Thereby the screen is completely white and black a few times and then the positions of the corners of the screen and the settings for the brightness threshold and the camera delay are determined automatically.

The result is shown in the picture as an example. The position of the corners can be corrected by clicking on the camera image, but this is not recommended because the automatic detection works more accurately than it can be done manually if the brightness settings are correct.



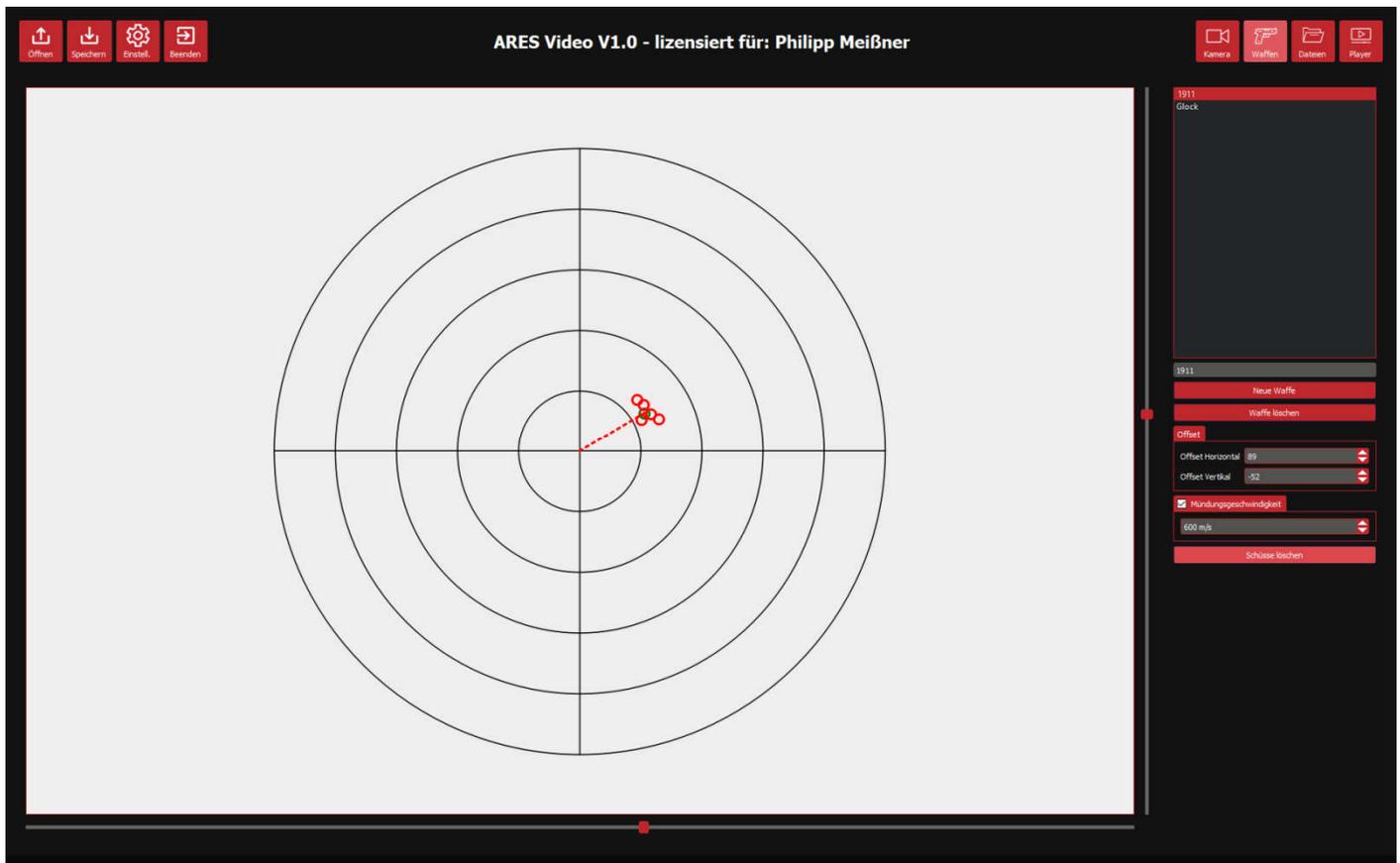
Various weapons can be managed and adjusted in the weapon menu. The offset and the muzzle velocity can be adjusted. The muzzle velocity can be used to create a delay between shot detection and stopping the video when shooting videos. The delay then results from the muzzle velocity and the target distance stored for the video. If this is not desired, the use of the muzzle velocity can be deactivated by unchecking the box.

Setting the offset of a weapon is necessary if for technical reasons it is not possible to adjust the laser so that it is in line with the sighting device, i.e. the weapon shoots slightly off target. In principle, this condition should be avoided and it is always better to adjust the laser or the sight than to set an offset correction.

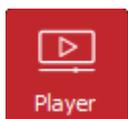
The offset correction should only be used if there is no possibility to adjust the laser of the weapon. Otherwise, it should be disabled by setting both values (X and Y) to 0.

If you are forced to use an offset, the program will help you determine the optimal value. A large target is displayed in the weapon menu for this purpose. When you shoot at this target, the program shows you where the laser was actually detected. From this you can see the deviation between the sight and the laser. If several shots are fired, the program also shows the average value of these. The offset can be set either by using the input fields or by clicking on the corresponding position of the target.

The picture shows an executed offset setting. First some shots were fired at the target (red circles) and then the offset was set to the center of the strike circle. The green circle shows the currently set offset.

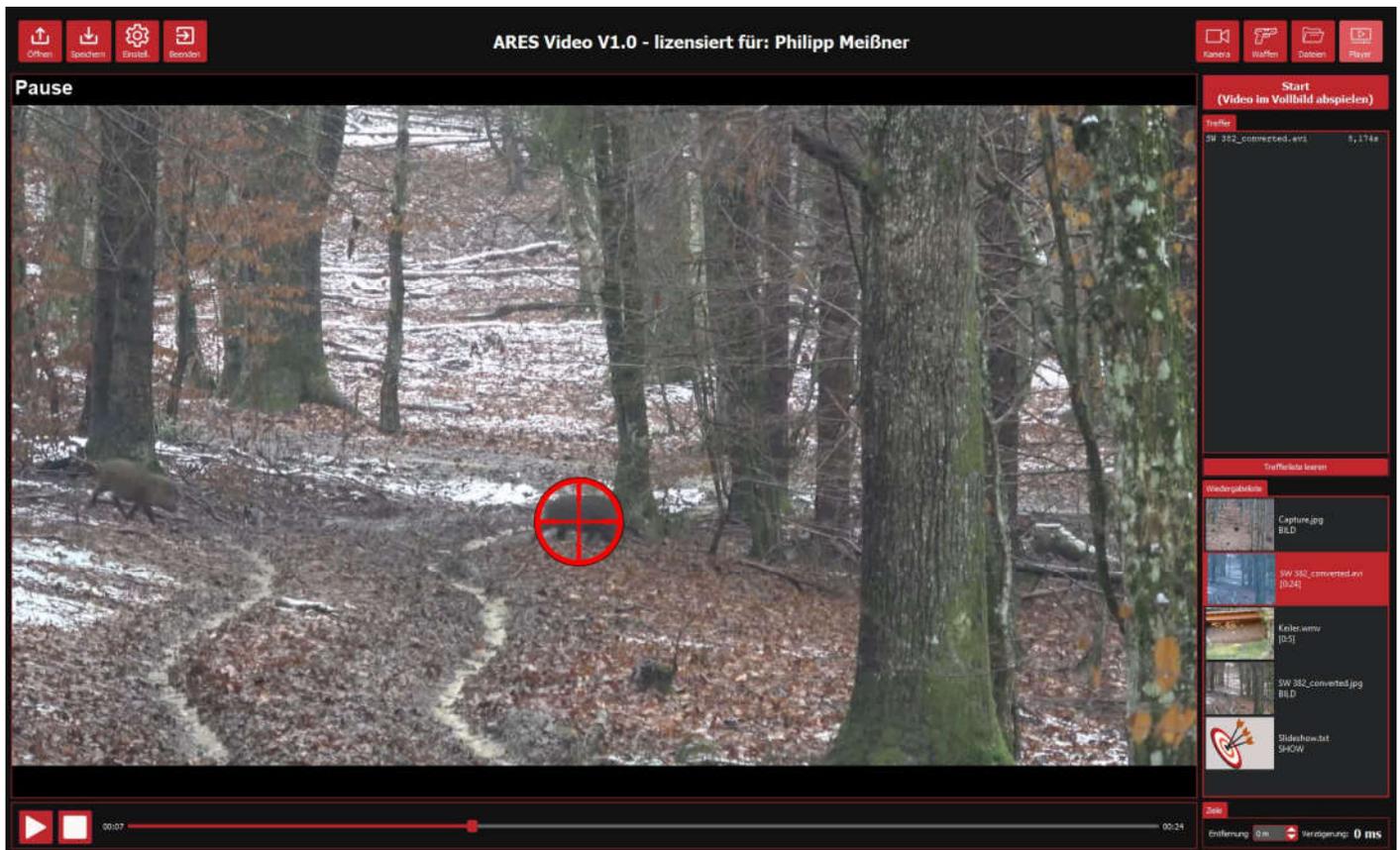


In this menu the playlist can be created. On the left side a folder can be selected and in the middle column all media files in this folder are displayed. The elements can be dragged with the mouse to the playlist in the right column. A double click on a media file opens it immediately in the player.



In this menu the actual simulation takes place. At the bottom right is the playlist with the previously selected media files. A double click on an element of the list opens the file. If it is a video or a slideshow it can be played by clicking the play/pause button. Alternatively to the button, each video/slideshow can also be paused or resumed by pressing the space bar. On the top right is the start button. If it is pressed, a selected video is played in full screen mode. The full screen mode can be left by pressing the escape key. It is also exited automatically at the end of a video unless it is set to automatically play the next video.

With each shot a new hit is created in the hit list. Depending on the setting, the video is paused or simply continued. If a hit is selected in the list, it is displayed and a crosshair shows its position.



Opens a configuration file with the extension ".avd". All settings and the playlist are stored in this file. If a file with the name "ARESVideo.avd" exists in the main program directory, it is automatically opened when the program is started.



Saves all settings in a file. If it is given the name "ARESVideo.avd", it will be loaded automatically at the next program start.



Opens the window for general settings. Here you can set the language, the volume and some other options. The trainer mode can also be started and exited here.

SELECTION OF THE VIDEO FRAMEWORK

ARES Video 1.1 can play videos using two different software frameworks. One is OpenCV and the other is VideoLAN. There is no clear recommendation, each of the two has advantages and disadvantages, which is why the user has been given the option to choose. If there are problems with the playback of a video, changing the video framework may be a solution.

OpenCV is a software library specifically designed for computer vision. Therefore this framework is unfortunately not able to render audio, but image effects like mirroring in ARES Video are only possible with this framework. The ARES main program project uses this framework for playback.

VideoLAN is known mainly by the playback software of the same name. It supports many formats and can also play audio. ARES Video 1.0 used this framework exclusively.

ADVANCED FUNCTIONS

ARES Video can calculate a time delay between the shot and the creation of the hit to simulate the flight time of the projectile. For this, a muzzle velocity must be set for the weapon used and a target distance must be set for the video. The target distance can be set after opening the video in the player at the bottom right, whereupon the calculated delay is displayed. It is also possible to store the target distances for videos in a text file. This must have the name "TargetDistances.txt" and be located in the same folder as the corresponding videos. In the file, each line can contain the name of a video followed by a vertical bar and the distance in meters. The file can be created with any text editor. The following is an example of what the contents of the file might look like.

```
VideoName1.avi | 30m
Jagtvideo Wildschwein.mp4 | 25m
Deer.wmv | 50m
```

In addition to simulating bullet flight time, ARES Video can also compensate for camera delay. This comes from the fact that an image filmed by a camera usually reaches the computer with some delay. Therefore the program registers the shot only with a certain delay. The program automatically determines how long this delay is during the calibration process. This time is subtracted from the simulated bullet flight time. If the bullet flight time is smaller than the camera delay, the program tries to implement a negative delay. This means that the hit point in the video is set to a position before the actual shot detection. This requires a rewinding of the video which may be associated with a certain inaccuracy depending on the video format. Therefore, it may be necessary to readjust camera delay itself or disable its use altogether by unchecking it in the camera menu.

All delay parameters play a role only when playing video files. Images and slideshows are not affected.

TRAINER MODE

The trainer mode can be activated in the settings menu in the licensed version, provided that a second monitor is available on the system. If this is the case, the selected media file is always displayed in full screen on the main monitor (projector). On the second monitor the view with the playback and hit list as well as a reduced view of the main monitor can be seen. Here, videos can be selected and played or hits can be displayed or the necessary menus can be seen on the main screen.

SLIDESHOWS

The licensed version is able to play slideshows that can be created with a simple text editor. To do this, a text file must be created, into which a sequence of commands can then be written. The file must then be renamed so that it has the extension ".dia". The file is processed line by line and each line can contain one of the following commands.

command	function	example
OPEN %File Name%	Opens an image file. The file must be in the same folder as the slideshow. Only the following formats are supported (jpg, png, bmp)	OPEN Target.jpg
WAIT %Time%	Waits the specified time in seconds until the next line is processed.	WAIT 3,1s
RANDOMWAIT % Time %	Waits for a random period of time that is at most equal to the specified time.	RANDOMWAIT 4s
PAUSE	The slideshow pauses and resumes only when the play button is clicked or the space bar is pressed.	PAUSE
RAND %Lines%	From the next lines only one randomly selected one will be executed. For example, a random image from a selection can be opened.	RAND 3 OPEN Target1.jpg OPEN Target2.jpg OPEN Target3.jpg

CUSTOM CROSSHAIRS

In the licensed version, an individual crosshair can be used instead of the standard crosshair for hit display if required. To do this, simply copy a PNG image file with the name "Crosshair.png" into the program directory. If such a file is available, it will be used as crosshair. The actual hit point is the center of the image file.