# Eocortex
# Face Mask Detector
## User Guide

eocortex.com

# Table of content

# About the module

The **Face Mask Detector** module is designed to detect people not wearing medical face masks in the frame. When such persons are detected, the module highlights them in the frame with a square in real time and enters the event in the event log.

For correct operation of the module it is imperative to properly place and set up the camera, to install the **Eocortex Neural Networks** software package, and to enable and adjust the software motion detector and the module itself.

# Requirements and recommendations

## Detection

The module is capable of detecting up to ten people not wearing face masks in the frame at the same time (if allowed by the computing capacity).

The module does not recognize (identify) faces, it cannot tell one person from the other or compare a person's face with the faces from a database; it only finds people without face masks in the frame.

When an infringement event (no mask) is detected, the module briefly highlights the person's face with a red square in the client application and creates a corresponding event in the event log. The repeated detection of the infringement by the same person will become possible only after the disappearance of this person from the frame for three seconds minimum (e.g. when the person leaves the frame or covers his/her face completely).

## Hardware and software

The module is intended to work as a part of the 64-bit distribution package of **Eocortex** only.

The algorithm of the module is based on the neural network detectors. Consequently, it is recommended to use video cards (GPUs) for better performance.

The nVidia GPU with the computing power index of at least 5.0 is required for the module's operation.
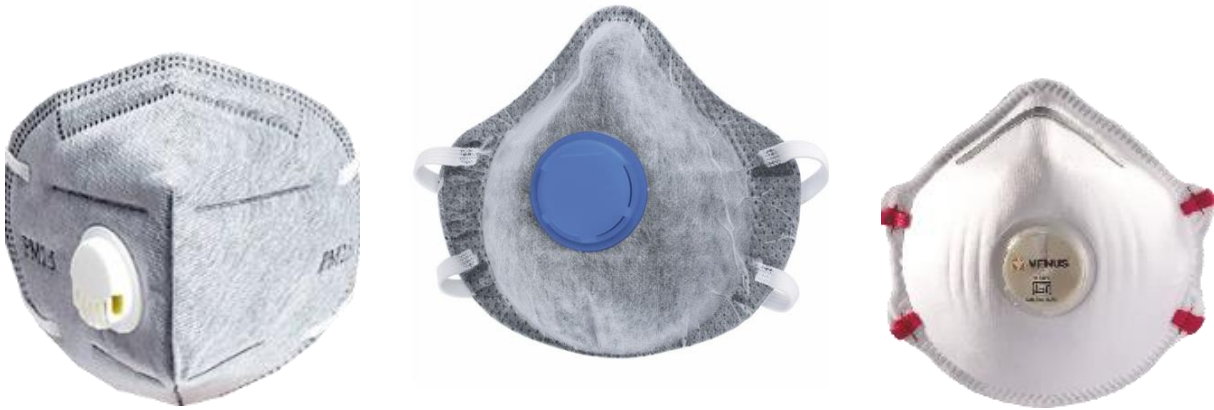
## Module settings

Setting too small minimum face size may lead to false positives due to low image quality.

The shape of the detection area can be arbitrary.

## Masks

The examples of supported face masks:

The supported colors are as follows: white, black, yellow, different tones of green.

The face covered by a hand or a scarf will trigger the detector unless the area of a nose is covered.

## Video Stream

Optimum resolution for the module's operation: HD or FullHD.

Framerate: 10 fps or more.

No mirrored (horizontally flipped) stream.

## Illumination and image quality

Illumination of faces in the frame must be uniform and constant.

If the camera is installed opposite a bright source of light (sun behind the entrance door, etc.), it is required to adjust the exposure or brightness in such a way that the face in the frame is light. The overexposed background is acceptable.

The image quality must be medium or better. Significant compression artefacts are not acceptable.

No blurring of moving people's faces is allowed.

The image must be in color.

## Scene and camera position

The faces must be fully seen in the frame.

There must be no mirror surfaces giving reflections in the frame (glass, mirrors, etc.).

Strong lateral illumination (e.g. sunlight from the window) resulting in the overexposure of one part of the face is not acceptable.

The camera may be placed above the face level, directly facing the people to be recognized. In such a case, the camera elevation angle must not exceed 35°.

The distance between the pupils of a face to be recognized must be at least 30 pixels.

The camera must directly face the people to be recognized. The camera angle between the face direction and the lens axis must not exceed 30°.

## Examples of non-compliance with the requirements

Covering (overlapping):



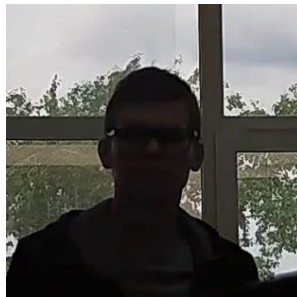✓                                          X

Face illumination:



✓                    X                    X

Blurring of face in motion:



✓                            X

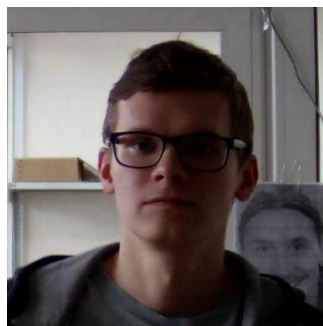Unacceptable distance between pupils:



30 pixels          15 pixels

✓                 X

Video stream quality:



✓                 X

Camera tilt:



35°         50°         70°

✓         ⚠         X

Lateral light source:



✓                X

Reflecting surfaces:



✓                    X

Horizontal turn of camera from face plane:



0°          15°          30°          45°          60°          90°

✓           ✓           ✓           ⚠           X           X

Black and white image (night mode):



✓                    X

# Recommended camera settings

Quality: highest.

Bitrate: maximum possible.

Profile: maximum possible.

I-frame interval (GOV): 50.

Stream anti-aliasing: off.

Exposure and brightness: ensuring that the face is clearly seen (if the camera faces the light source, the overexposed background is acceptable).

Shutter speed: must not be too low (more than 1/50), because in such a case the blurring of moving objects will occur).

# Module installation

Before using the module, it is required to install the **Eocortex Neural Networks** software package.

In the process of installation of **Eocortex Neural Networks** it is required to select the **Face Mask Detector** component.
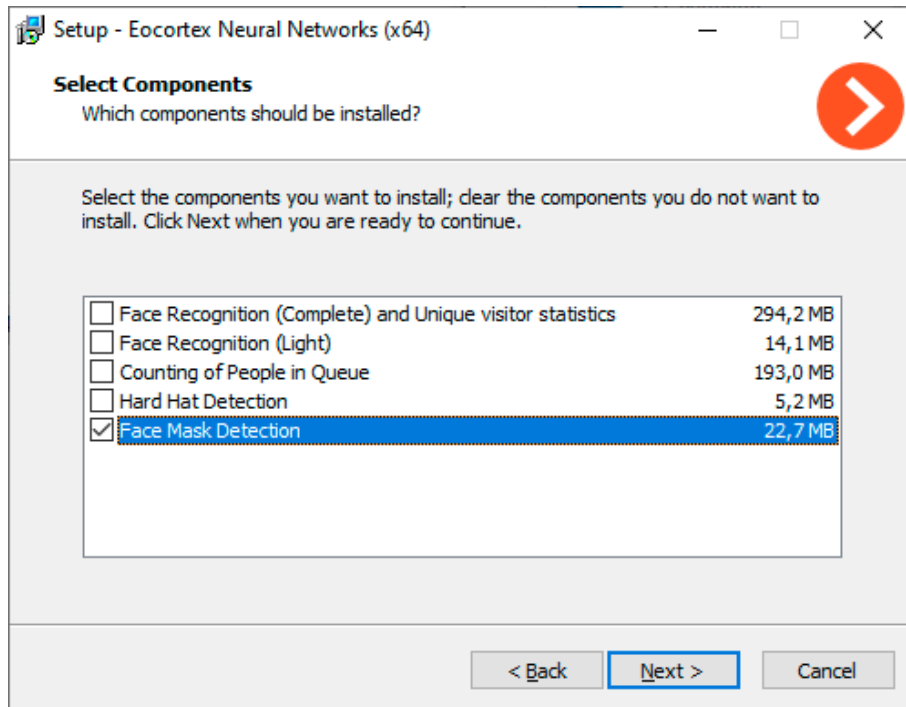


It is recommended to use video cards (GPUs) for the optimum operation of the module.
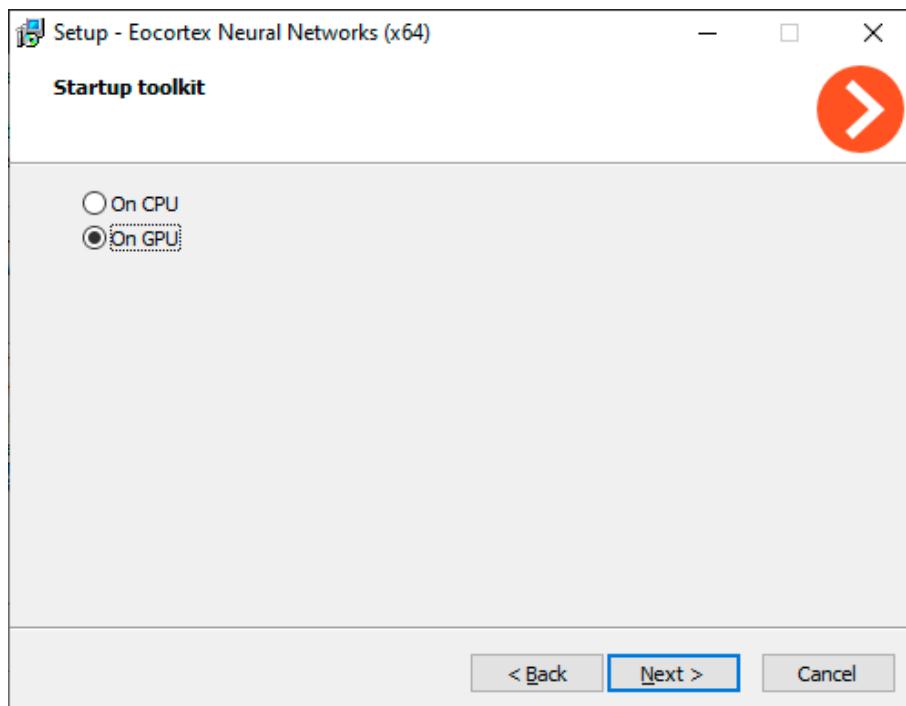
# Module setup

Before using the module, it is required to install the **Eocortex Neural Networks** software package.

To use the module, it is required to enable and set up the software motion detector, then enable and set up the module itself.

To do that, it is required to launch the **Eocortex Configurator**, go to the ⌖ **Cameras** tab, select a camera in the list located on the left side of the page, and set up the motion detector on the **Motion detector** tab on the right side of the page.

After that, it is required to switch to the **Analytics** tab and enable the module using the ⬤✓ toggle.

The ⊟ button opens the module setup window.

In the opened window, it is required to make the appropriate settings in the corresponding tabs.

**Face size**: the minimum and maximum sizes of the faces of the people to be monitored.
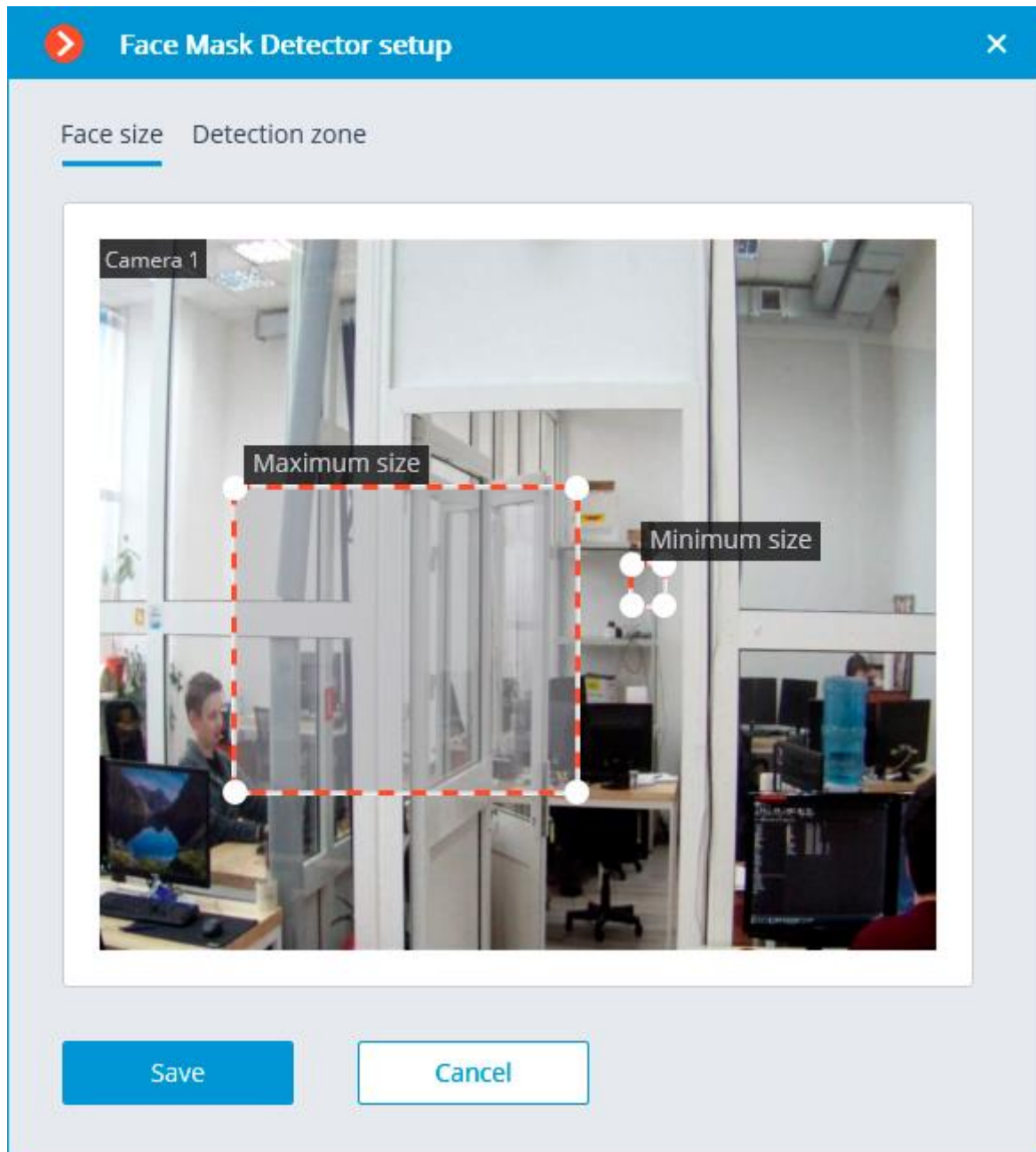


**Detection zone** is the zone of the frame filled with the semitransparent blue fill in the settings window. The mouse is used for modifying the zone: left mouse button serves for filling the zone, and the right one is used for clearing it. With the help of the **Fill** and **Clear** buttons you can fill or clear the whole area of the frame. The corresponding slider is used to modify the **Brush size**.
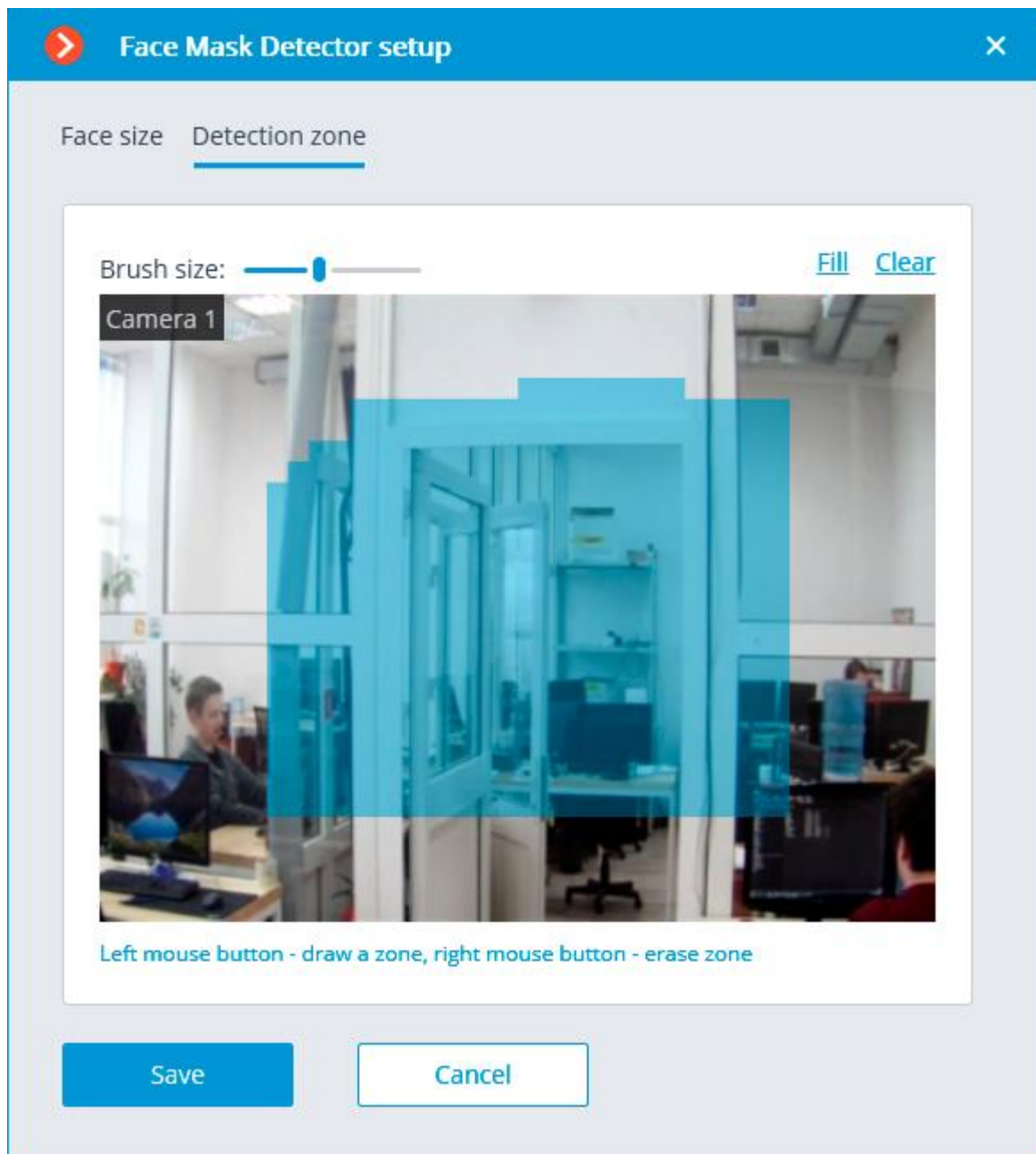
The use of the module will start only after the settings are applied.

# Operation of the module in Eocortex Client application

The **Face Mask Detector** module is designed to detect people not wearing medical face masks in the frame. When such persons are detected, the module highlights them in the frame with a square in real time and enters the event in the event log.

This module will only work on the cameras on which it has been enabled by the video surveillance system administrator.
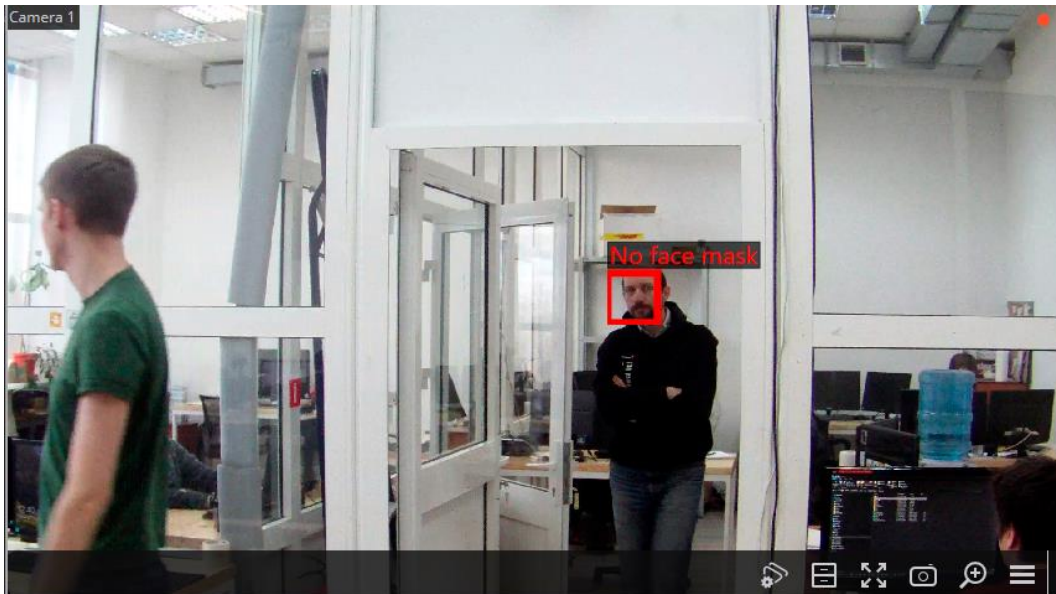


To display the frame around people not wearing face masks, select **Show frames of infractors** subitem in **Face Mask Detector** item of the cell's context menu.
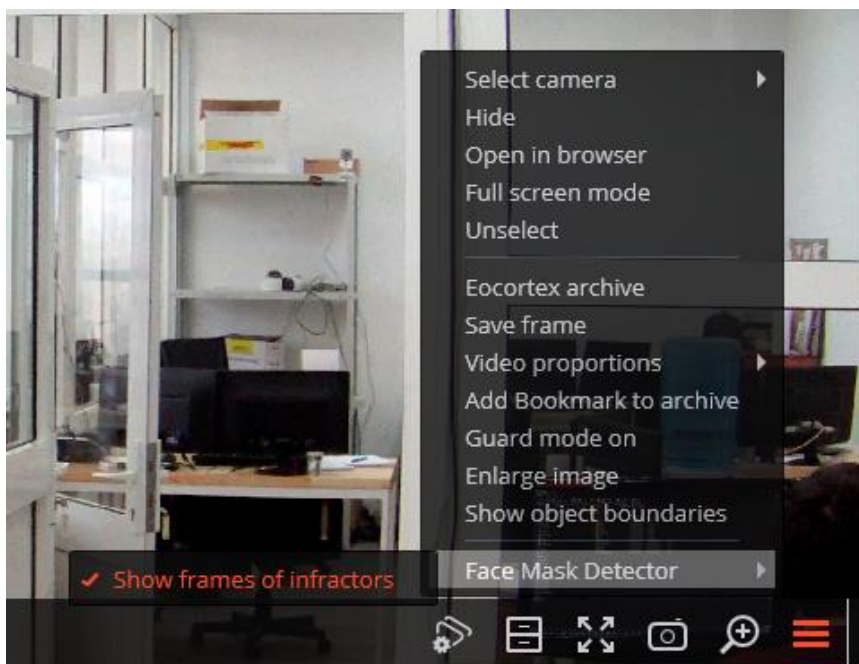


All the module events are recorded in the **Events log**.