FireCatcher

V4.03.05

USER- & INSTALLATION MANUAL

Copyright Notice

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Definition of symbols

Hazard statements

Danger:	Indicates a hazardous situation which, if not avoided, *will* result in serious injury or death.
Warning:	Indicates a hazardous situation which, if not avoided, *could* result in serious injury or death.
Caution:	Indicates a hazardous situation which, if not avoided, *might* result in moderate or minor injury.
Notice:	Indicates a situation which, if not avoided, might result in property damage or in an undesirable result or state.

Others

Information:	Indicates a shortcut or any other useful indication.
Attention:	Indicates an element which requires extra attention, not necessarily a hazard

Disclaimer

Danger:

The end user should be aware that fire safety is subject to strict standards and regulations.

FireCatcher can never replace a mandatory fire detector. For such function, Araani refers to its certified solutions (SmokeCatcher Certified, FlameCatcher Certified, FireCatcher Camera).

Fire indications by FireCatcher should only be raised after human verification.

Safety information

Attention:

Please read this document carefully before installing, using, or interacting with the FireCatcher software or products running this software.

This document must be kept for future reference.

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Contact and support

Should you require any technical assistance, please contact your Araani reseller. If your questions cannot be answered immediately, your reseller will forward your queries through the appropriate channels to ensure a rapid response.

If you are a reseller, please contact your direct contact person, or contact our support staff via support@araani.com.

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Introduction

About this manual

This manual describes the installation and usage of Araani's FireCatcher software.

Please read this document carefully before installing, using, or interacting with the FireCatcher software or products running this software.

The manual expects the reader to have some basic knowledge about video surveillance and the use of cameras.

Please refer to the camera documentation for any information that is related to the use, installation, or restrictions of the camera on which this software is or will be installed.

Information: Illustrations of Axis camera interface throughout this manual are taken from the new web interface. Your camera interface may have a slightly different layout or may be using the legacy interface. Still, all indicated functions will be valid; the interface does not affect the functionality.

Product description

Overview

FireCatcher is an intelligent video fire detection solution, that will trigger an alarm if it recognizes smoke or flames.

FireCatcher is an edge-based video analytics software that runs on an Axis® camera.

FireCatcher analyses the image real-time for any indication of smoke or flames. When detected, it generates an alarm that can be:

- Processed as an input to the fire alarm control panel to generate audible and/or visual alarms.
- Overlaid on the streaming video as a text label as well as a dynamic zone border, highlighting the location of the alarm in the field of view.
- Sent to a Video Management System (VMS) for display on operator interfaces and further processing.

Built-in tamper detection, image quality control and activity monitoring contribute to a fail-safe and reliable detection.

FireCatcher is typically used in situations where traditional fire detection fails because of too slow detection or too many unwanted alarms.

How to install FireCatcher

System requirements

CAMERA REQUIREMENTS

The FireCatcher software is intended for and extensively tested on the Axis® P1375(-E) and Q1615 MkIII(-E) camera models. These cameras have a high-performance video processing chipset that is designed to support smart video processing applications. These cameras provide high resolution (1920 x 1080) and have a high light sensitivity that allows to operate in harsh environments. Use the latest long-term support firmware that is qualified by Araani for use with FireCatcher.

These cameras have following characteristics:

- **Recommended models:** Axis® P1375(-E) or Q1615 MkIII(-E).
- **Chipset**: ARTPEC-6, ARTPEC-7 or ARTPEC-8. (*)
- **Firmware**: Latest qualified Axis® LTS (= long-term support) firmware.
  Firmware can be downloaded at https://www.axis.com/support/firmware.
  Refer to your camera manual on how to install firmware on the device or follow the steps under Camera firmware.
- **Resolution**: 1920 x 1080 or higher.
- **Aspect ratio**: 16:9 or 4:3 or 10: 6 or rotated version of these. (**)

Notice: Check the FireCatcher release notes to verify what Axis software versions are compatible with your FireCatcher software version. Using an incompatible or untested version may result in malfunction, errors or detection performance issues.

(*): **Information**: FireCatcher is available in 3 versions: signed_FireCatcher_Vx.xx.xx_artpec6.eap ,signed_FireCatcher_Vx.xx.xx_artpec7.eap and signed_FireCatcher_Vx.xx.xx_artpec8.eap. Verify what ARTPEC chipset your camera has and select the correct FireCatcher software.

(**) **Attention:** After changing the aspect ratio or rotating the image, a restart of the camera and FireCatcher software is required.

AXIS STREAMING LIMITATIONS

In setting up your system, pay attention to the fact that total streaming video capacity of an Axis® camera may be limited. For Araani analytics to work properly, the camera should be capable of delivering an application-specific video stream. In combination with other video streams for recording, visualization, etc., the total computational capacity of the camera could be exceeded which will result in failure of the analytics.

The amount and complexity of video streams that can be delivered simultaneously by an Axis camera is limited by the performance of the processor. The computational load of a stream is expressed in megapixels per second (mps) and is calculated using the following formula:

P_{stream} = horizontal resolution (pixels) x vertical resolution (pixels) x frame rate (fps = frames per second) /1.000.000

The total streaming capacity is obtained by adding the load of all unique streams. Only unique streams are counted for as requesting twice the same video stream (same resolution, frame rate, encoding type, compression, etc.) from a camera does not require separate encoding and as such does not increase the computational requirements.

$P_{CPU} = \Sigma$ unique P_{stream}

Araani fire monitoring analytics requests a video stream that depends on the aspect ratio of the maximum resolution of the camera at 12 frames per second:

Aspect ratio	Analytics stream resolution	P_{Araani}
16:9	1280 x 720 @ 12 fps	11 mps
16:10	1280 x 800 @ 12 fps	12,3 mps
4:3	1280 x 960 @ 12 fps	14,8 mps

This stream should be considered when calculating the total load.

The streaming load is practically independent of the encoding type (H264 versus H265).

The maximum capacity for a camera depends on the type of processor. Currently, three generations of processor are supported by in the Axis offering, named ARTPEC-6, ARTPEC-7 and ARTPEC-8. These are the limits for both processor types:

- ARTPEC-6 maximum total streaming capacity = approximately 310 mps.
- ARTPEC-7 maximum total streaming capacity = approximately 367 mps.
- ARTPEC-8 maximum total streaming capacity = approximately 498 mps.

In case of doubt, contact your supplier to know what processor type is used in your cameras.

As video stream compression is occurring in a dedicated part of the CPU, these limits are practically independent of other processor activities such as image optimization, mirroring or ACAP-based analytics.

For proper functioning of Araani fire detection analytics, make sure the total stream demand - including the required analytics stream - does not exceed this limit and preferably add some margin. If that limit is exceeded, the camera will lower the frame rate on ALL streams and as a result, Araani analytics will no longer work and report a fault.

Example: A 4K CCTV system requires one high resolution stream for visualization and one HD resolution stream for recording. (3840 / 2160 = 16:9 aspect ratio)

Stream role	Resolution	P_{stream}
Visualization	3840 x 2160 @ 25 fps	207,4 mps
Recording	1920 x 1080 @ 25 fps	51,8 mps
Araani analytics	1280 x 720 @ 12 fps	11 mps
Total		**270,2 mps**

The total load in this example is well below the limit of both processor types, so this will work fine. Adding another HD recording stream with different settings for example would exceed the maximum performance of an ARTPEC-6 based camera and analytics will fail to run on such combination.

Notice: For performance reasons:

- Do not exceed streaming limits of the processor!
- Do not use SD card recording with FireCatcher!

Both can lead to malfunction of the detection.

FireCatcher will automatically try to re-establish a video stream connection when it is lost.
FireCatcher will generate FAULT status when the video stream is lost and reconnection fails a number of times.

LENS REQUIREMENTS

Selection of the lens depends on:

- **Field of view** to cover. Most lenses today are multifocal, allowing adaptation at installation time to fit the environment. Online lens calculators can help to select the proper focal range.

- Area of risk.
- Light conditions: day / night / seasons.
- Light stability / light changes.
- Uniformity of illumination.
- Interchangeability of the lens.
- Etc.

Consult with your camera supplier for proper selection of the lens type and specifications.

INSTALLATION GUIDELINES

The sensitivity and performance of the FireCatcher system is impacted partially by the environment it is operating in. Consider these basic guidelines with each installation for optimal performance:

Light:

- For smoke recognition, there should be sufficient light 24/7 in the complete field of view. As a general guideline, fire recognition requires light from 5 lux onwards. However, the minimal required light level is dependent on the exact camera type.

⚠ Notice: Using (built-in) infrared illumination is possible but will disable the flame recognition as for flame recognition a colour image is required.

Contrast:

- Avoid the combination of very dark and extremely bright spots in the field of view. This will stress the dynamic range of the camera and make the image quality unstable, resulting in an overall darker image.
- The ratio between dark and bright is defined as the illumination ratio. The illumination ratio is the ratio between the brightness - usually measured in lux - in the brightest versus the darkest spot in the field of view. For proper functioning of the algorithms, this ratio should never exceed 1000:1.
- There should be sufficient contrast in the field of view. Do not point the camera to white walls or large areas without contrast.

For indoor cameras:

- Do not point the camera to exterior windows or portals.
- Avoid the presence of direct light sources in the field of view. If this cannot be avoided, adjust the detection zone to mask these areas out.
- False triggers: avoid sources of dust, damp, or smoke (e.g., from operating machines) in the field of view during normal operation. These could lead to recurring false detections

For outdoor cameras:

- Avoid east or west orientation, where the sun gets low and potentially may blind the camera.
- Avoid having horizon in the field of view of the camera at all.
- Maximum brightness at any point should never exceed 120.000 lux.
- Avoid direct sunlight or bright reflections of the sun falling straight into the lens.

Notes for outdoor usage:

Outdoor conditions are more susceptible to false alarms. For outdoor applications, try to control and stabilize environmental conditions as much as possible e.g., protecting the scene from varying weather conditions, apply stable lighting conditions, apply or extend a weather shield extension, etc.

To further optimize the detection or to avoid false triggering of alarms e.g., due to very dynamic or badly illuminated zones in the field of view, the detection can be restricted to certain zones in the field of view. These zones can be drawn in the app configuration screen in the browser itself, see section Configuring detection zones.

By default, the detection area is the whole field of view. If detection zones are defined, this will override the default and detection will only occur in the defined zones.

Adjust the sensitivity parameters of FireCatcher if problems persist.

Camera positioning

SITE ASSESSMENT

To maximize protection, it is recommended to perform a site survey before installing cameras with FireCatcher. This allows you to identify risk areas and take those into account when positioning new cameras.

- Define the hot spots:
  What is the type of risk? Can the fire start at any location in the field of view or is there a specific risk related to machinery or a critical part in the scene?
- For smoke detection, estimate the smoke flow:
  Estimate where smoke may flow in case of an incident. Based on this estimation, preferably select a camera position that will visualize the smoke in the fastest and largest way. Focus on where the smoke will flow, rather than the risk area.
  Will smoke ascend to the ceiling or will there be stratification?
  Will smoke be dispersed over the whole area by ventilation or forced air flow?
- System redundancy:
  To guarantee full coverage on very large areas, multiple cameras will be needed. To avoid blind spots, make sure the field of views of the cameras overlap with a minimum of 20%.

CAMERA POSITION / FIELD OF VIEW

Based on the site assessment, preferably select a camera position that maximizes the visualization of potential smoke or flames.

- With default settings, the FireCatcher algorithm will trigger alarm when smoke covers approximately 3 % of the field of view during 5 seconds at the same location in the field of view.
- With default settings, the FireCatcher algorithm will trigger alarm when the flame size exceeds 0,04% of the field of view and the flame is detected for at least 5 seconds at the same location in the field of view.

For a camera with 1920 x 1080 resolution, 3 % is a zone of 249 x 249 pixels and 0,04% is a zone of 28 x 28 pixels.

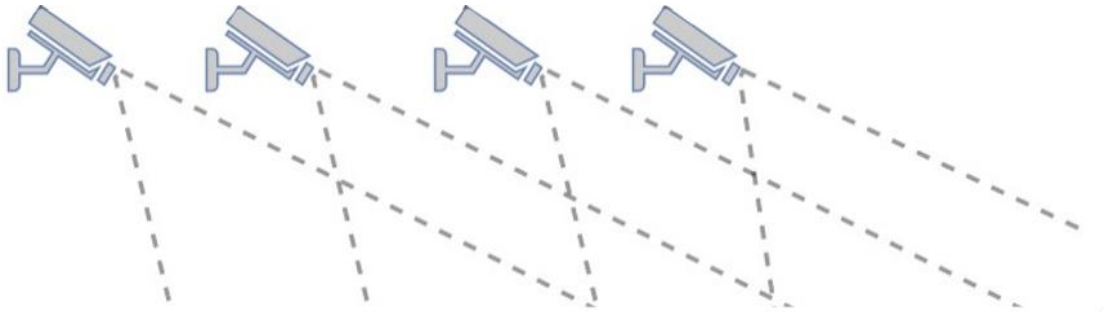
As a result: the smaller the field of view, the higher the sensitivity; and the further away from the camera, the lower the sensitivity.

The minimum required coverage for smoke to be detected depends on the “smoke alarm minimum coverage” setting. The minimum required size for a flame to be detected depends on the “minimum flame size” setting.

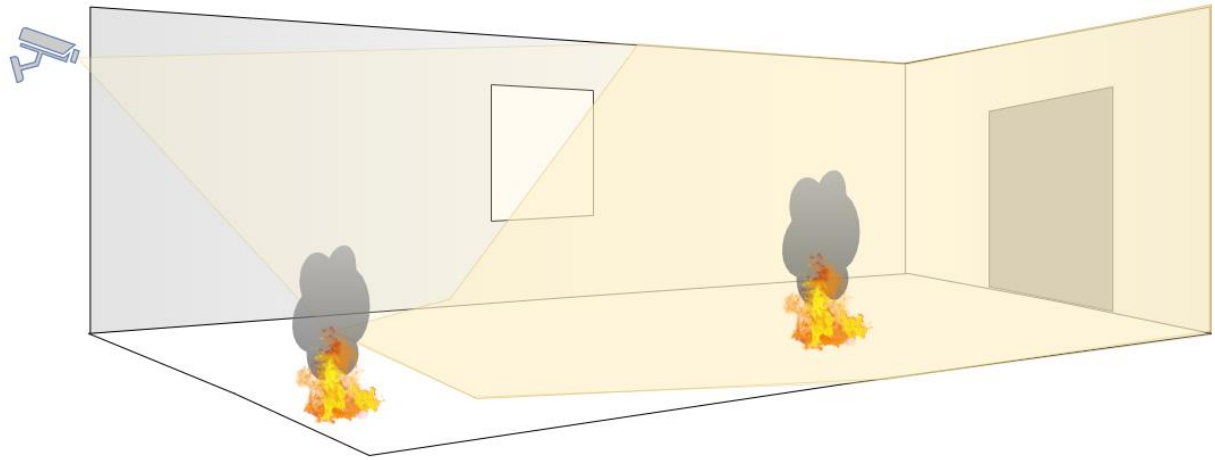
Below is a graphical representation of smoke and flame detection threshold for some common coverage settings on a 1920 x 1080 image, assuming a 1:2 aspect ratio of smoke clouds.

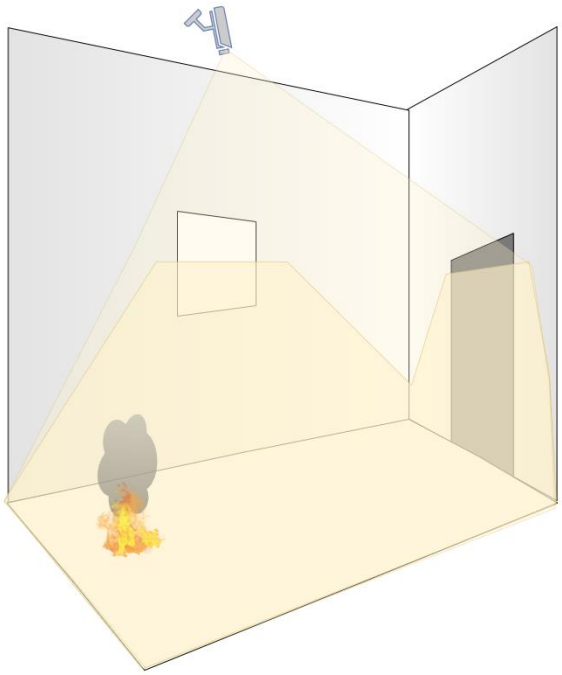
Adjust the zoom / focus of the camera lens according to the Axis® focus procedure as described in the camera manual. Do not forget to tighten the screws after setting up the focus and zoom to ensure they stay fixed.

Also consider the environmental requirements described above when positioning the camera and adjusting the field of view. In large areas, you may consider providing redundant coverage by adjacent cameras.



Cameras can be either wall- or pole mounted with a horizontal field of view or ceiling mounted with a more vertical field of view. The vertical view could be interesting in heigh spaces, depending on the nature of the space:





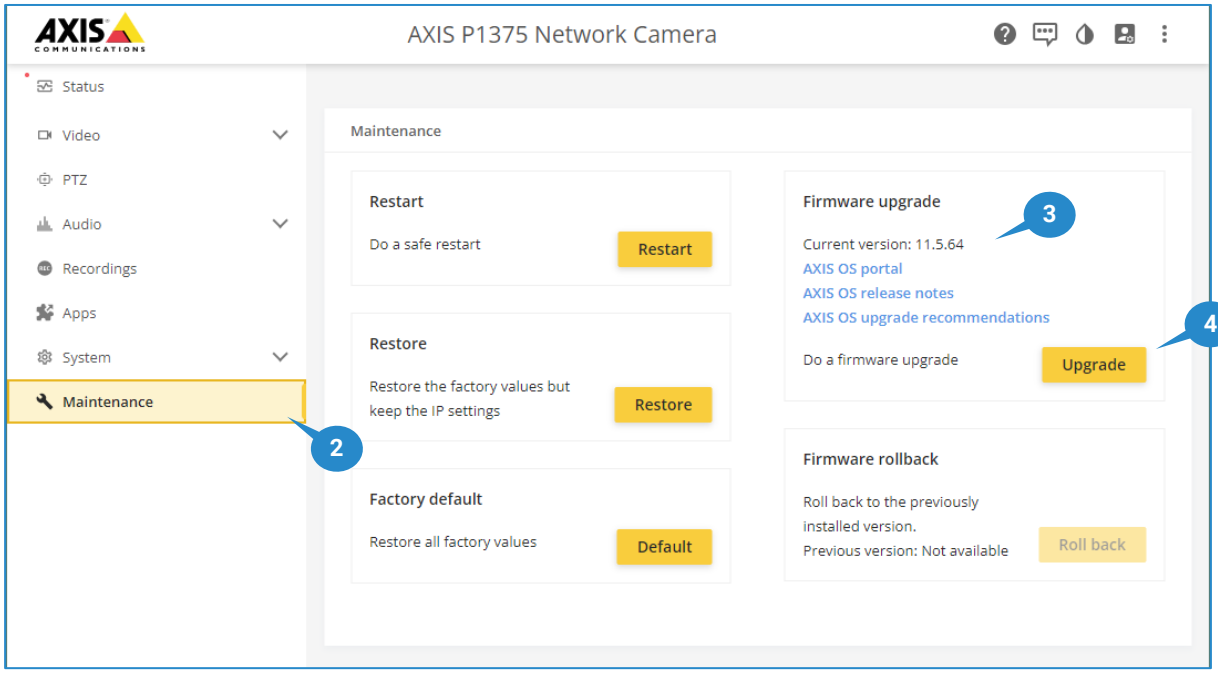
Information: Axis® provides a lens calculator tool on their website that assists in determining the field of view, based on lens type and focal length, mounting height, and distance in the scene.

Camera configuration

CAMERA FIRMWARE

Before installing FireCatcher software, verify that your camera has the required firmware (see Camera requirements). To verify the firmware version of your camera, perform the following steps:

1. Connect with a laptop, tablet, or smart phone to your camera, using your internet browser software and login to the camera webpage. Refer to the camera user manual on how to do this.
2. Select “Maintenance” from the menu pane.
3. The current firmware version is displayed in the Firmware upgrade section of the maintenance screen, as indicated in the screenshot below.



If the version is not compliant to the camera requirements for FireCatcher, you can download the required firmware from https://www.axis.com/support/firmware.

Proceed in the maintenance interface to upgrade the firmware version of your camera:

4. Select “Upgrade” and follow on-screen instructions.
5. Verify if the camera is properly upgraded by checking the version again in the maintenance menu.

Notice: In case the new (qualified LTS) firmware is a lower revision than the one that was installed, it is required to perform a factory restore (keeping IP-address/network information) after firmware downgrade to make sure that all settings are configured in a valid way.

CAMERA CONFIGURATION

For optimized smoke and flame detection performance, the camera should be configured with following recommended settings (mandatory settings are followed by mandatory):

- Image
  - Wide dynamic range
    - **WDR**: recommended OFF to avoid image artefacts.
      Only use when required (e.g. environment with non-uniform lighting) and no artefacts are generated by WDR.
    - **Local contrast**: 50
    - **Tone mapping**: preferred 30, always <=30
  - **White balance**:
    - **Light environment**: Automatic
  - **Day and night:**
    - **IR-cut filter**: ON (mandatory)

      ⚠ **Notice:** When the IR-cut filter is on AUTO, the camera will switch to infrared mode when the light level is too low. This will disable the flame detection as for flame detection a colour image is required.
    - **Threshold**: Free to choose.
  - **Exposure:**
    - **Exposure mode:** Automatic (mandatory)
    - **Exposure zone:** Automatic
    - **Maximum shutter:** 1/15s (mandatory)
    - **Maximum gain:** max 24 dB
    - **P-Iris lens**: make sure to select the correct lens.
    - **Blur-noise trade-off:** Middle between 'low noise' and 'low motion blur'. In low light circumstances, set to 'low noise'.
    - **Lock aperture:** ON (mandatory)
    - **Target aperture:** Middle between 'open' and 'closed'.
    - **Exposure level:** 50
    - **Defog:** OFF (mandatory)
  - **Image correction:**
    - **Barrel distortion correction (BDC)**: only if necessary
    - **Electronic image stabilization (EIS)**: only if necessary
  - **Capture mode**: make sure that the aspect ratio is supported.
- Stream
  - **General:**
    - **Resolution:** always select a supported aspect ratio (mandatory).
    - **Frame rate:** > Recommended = 0 or 12 but higher is allowed within AXIS streaming limitations.
    - **Compression**: 50
  - **H.264 and H.265 encoding:**
    - Free to choose
  - **Audio:**
    - Free to choose

In low light conditions with only smoke recognition (flame algorithm disabled), tone mapping may be set to 100 and blur-noise trade-off to low noise to improve the image.

FireCatcher installation

The FireCatcher software comes as an ACAP (Axis® Camera Application Platform) compatible package. The ACAP platform allows Axis® Development Partners (ADP) to build smart applications that run on Axis® cameras.

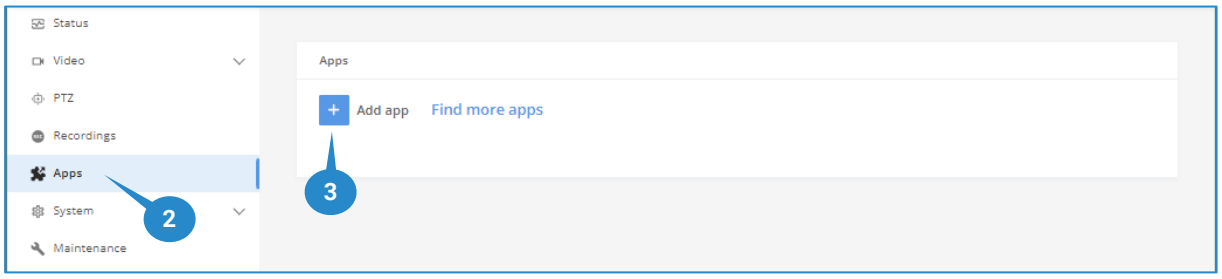
FireCatcher comes in the form of a single file with .eap extension. Installing the software on an Axis® camera involves uploading the file to the camera, activating the appropriate license, and potentially configuring the application parameters.

⚠ **Caution:** To avoid performance issues, it is strongly advised that no other ACAP application should be active while using FireCatcher.

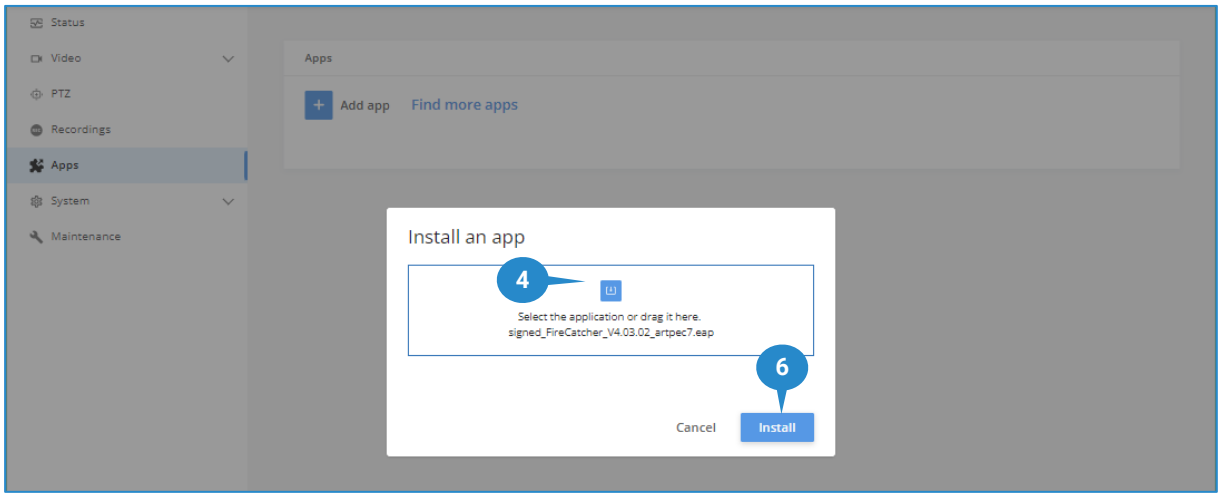
INSTALLING THE FIRECATCHER ACAP

To install the FireCatcher, perform the following steps:

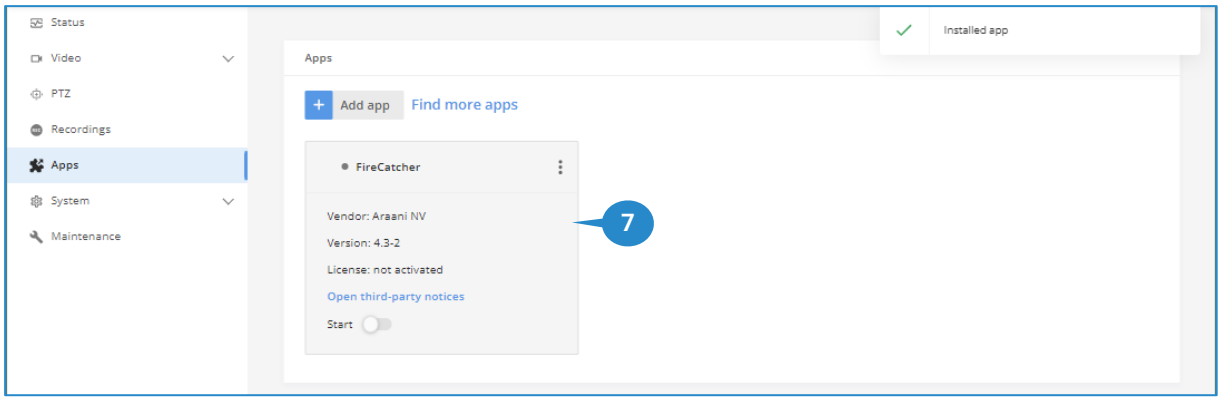
1. Connect with a laptop, tablet, or smart phone to your camera, using your internet browser software and login to the camera webpage. Refer to the camera user manual on how to do this.
2. Select “Apps” from the menu pane.
3. Select “Add App”.



4. Select the upload button to browse your local storage for the ACAP file.
5. Select signed_FireCatcher_V*x.xx.xx*_artpec*x*.eap.
6. Select Install.



7. The application will start installing. This may take a few minutes.
   After successful installation, the FireCatcher application should be visible in the “Apps” window.



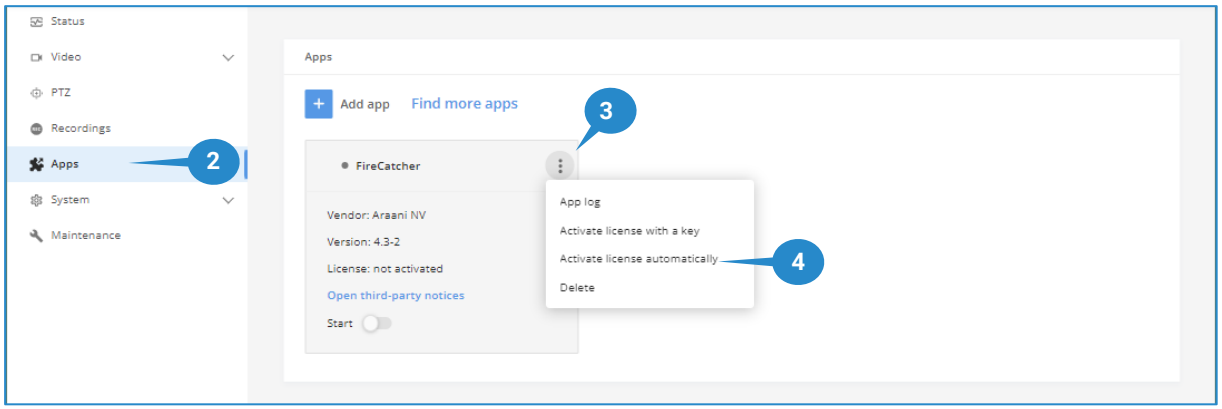
ACTIVATING THE FIRECATCHER LICENSE

With the purchase of FireCatcher, a **license activation code** is provided. This code is valid for a number of FireCatcher installations, as purchased.

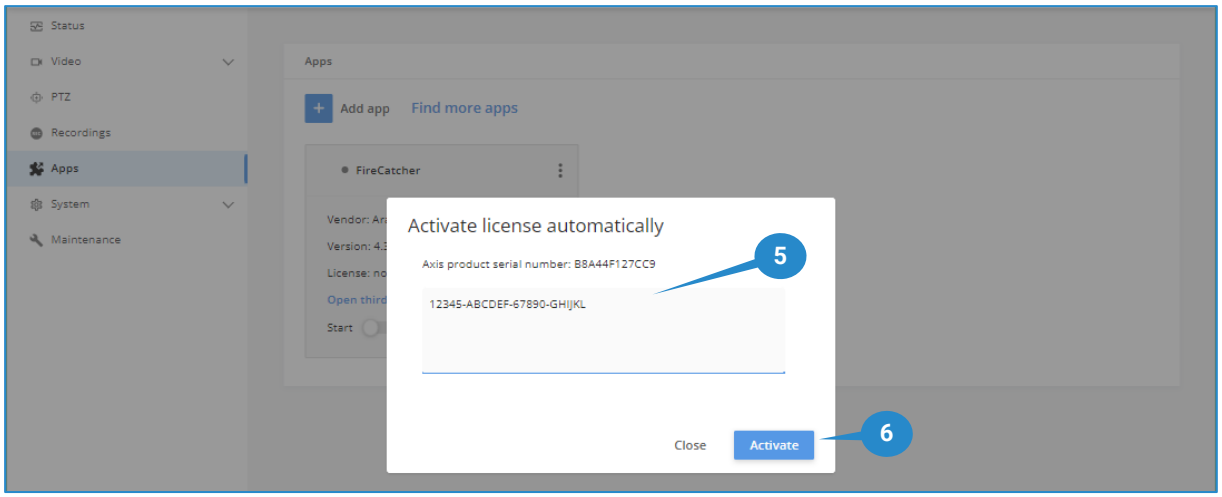
Case 1: the camera is connected to the internet

Perform the steps below to activate the FireCatcher app directly on the camera.

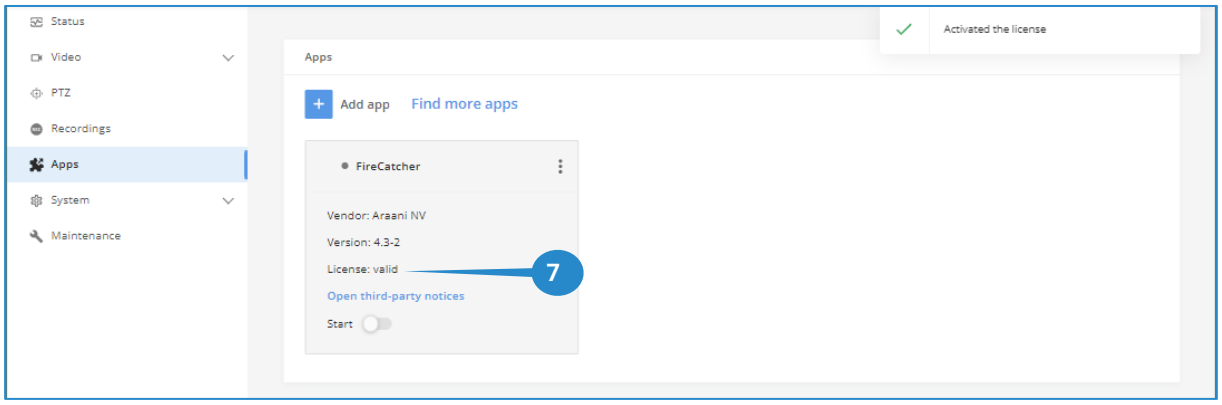
1. Connect to your camera, using your internet browser software and login to the camera webpage. Refer to the camera user manual on how to do this.
2. Select “Apps” from the menu pane.
3. Select the FireCatcher app menu button.
4. Select “Activate license automatically”



5. The license activation code can be directly entered in “Automatic license” field.
6. Select “Activate”
   The camera will connect to the Axis® licensing system. A license key for this camera will be created and automatically installed on the device. The camera will be registered in the Axis® licensing system as being licensed, and the license will be linked to your license activation code and your camera.



7. When installed correctly with a valid license key, following screen should re-appear with FireCatcher License 'valid'.

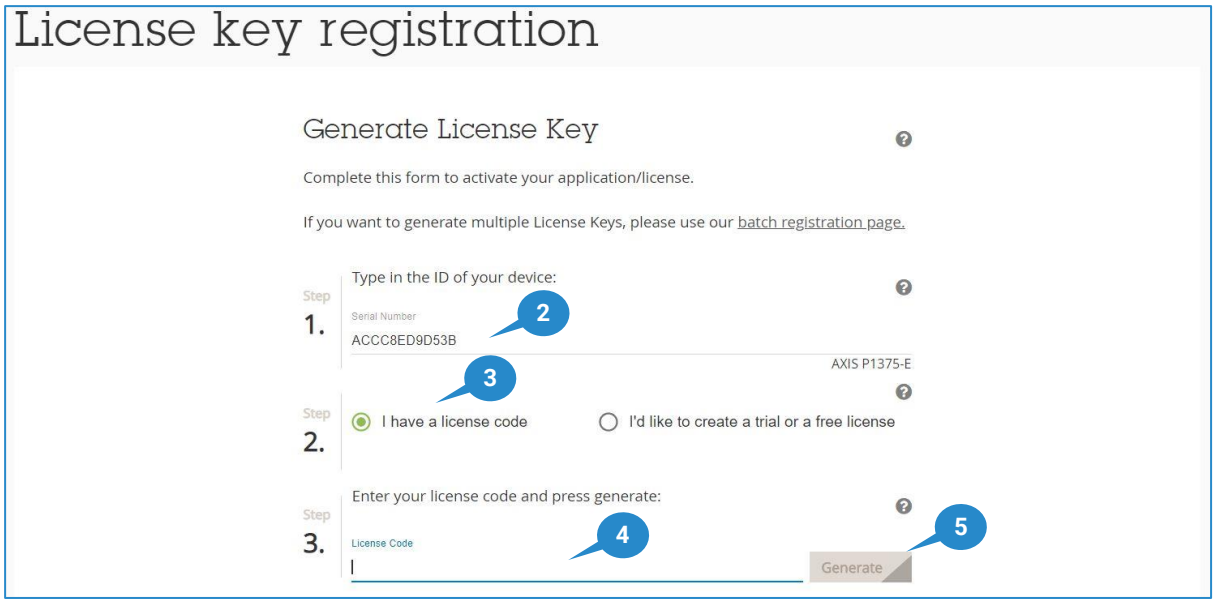


Case 2: the camera has no internet connectivity

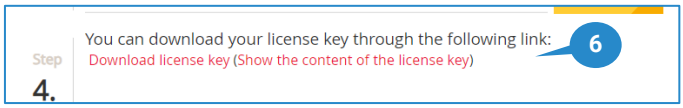
When the camera on which the FireCatcher application is installed has no direct internet connection, a license key must be generated upfront on a computer with internet connection.

To create the license key, perform the steps below.

1. Using your internet browser, connect to https://www.axis.com/products/camera-applications/license-key-registration#/registration.
2. Fill in the serial number of your camera. The serial number can be found in the status page or on a sticker on your camera housing, indicated by "S/N".
3. Select "I have a license code".
4. Fill in the license activation code, received with your purchase.
5. Click "Generate".

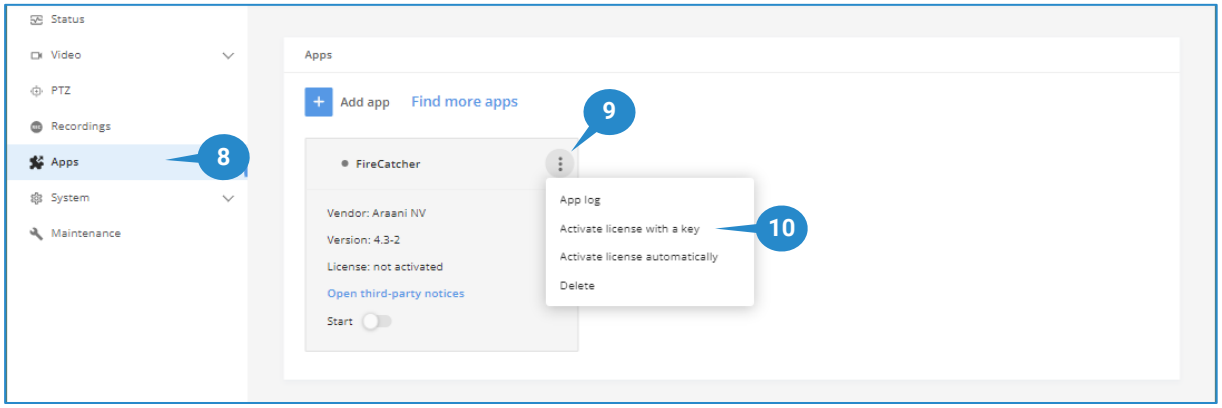


6. A message will appear from which you can download the license key to your local storage.

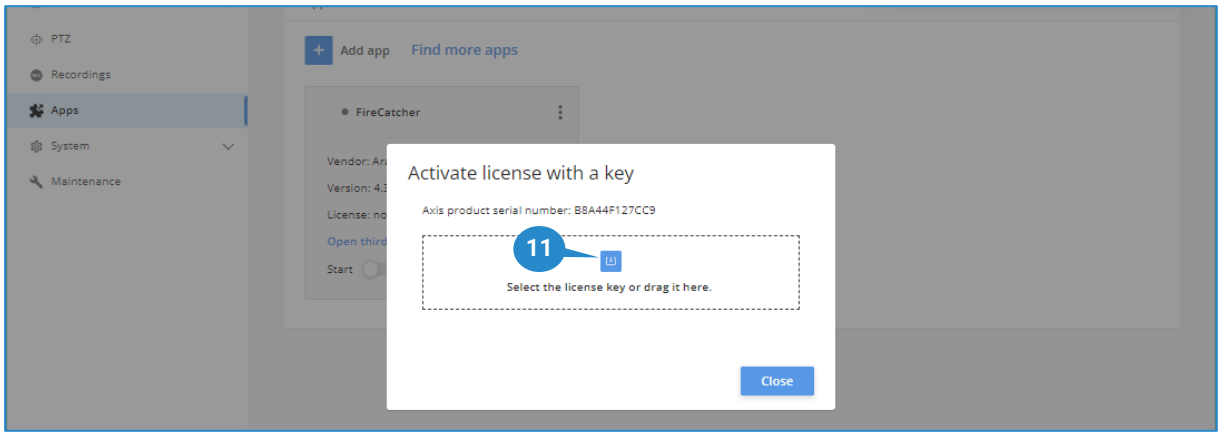


The license key, created in previous steps can now be uploaded and installed on the camera to activate the FireCatcher app. Follow steps below to activate the app:

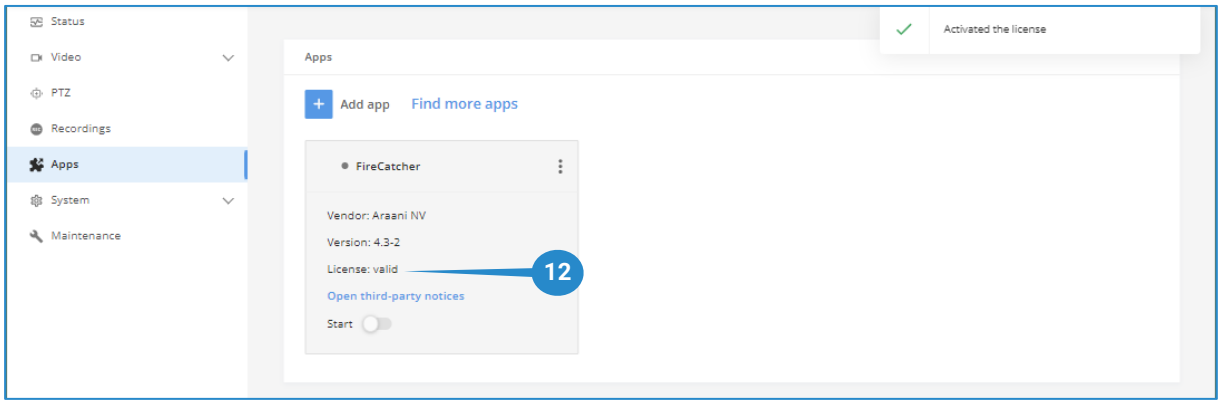
7. Connect to your camera, using your internet browser software and login to the camera webpage. Refer to the camera user manual on how to do this.
8. Select “Apps” from the menu pane.
9. Select the FireCatcher app menu button.
10. Select “Activate license with a key”



11. Select the upload button to browse your local storage for the *serialnumber*-FireCatcher.key file. If the key file is valid, it will automatically be installed.



12. When installed correctly with a valid license key, following screen should re-appear with FireCatcher License 'valid'.



ACTIVATE A TRIAL LICENSE FOR FIRECATCHER

If you prefer to try out FireCatcher before purchasing, follow the same steps as in Activating the FireCatcher license case 2. In step 3, select "I'd like to create a trial or a free license". Provide a valid e-mail address if requested. Proceed with the rest of the procedure.

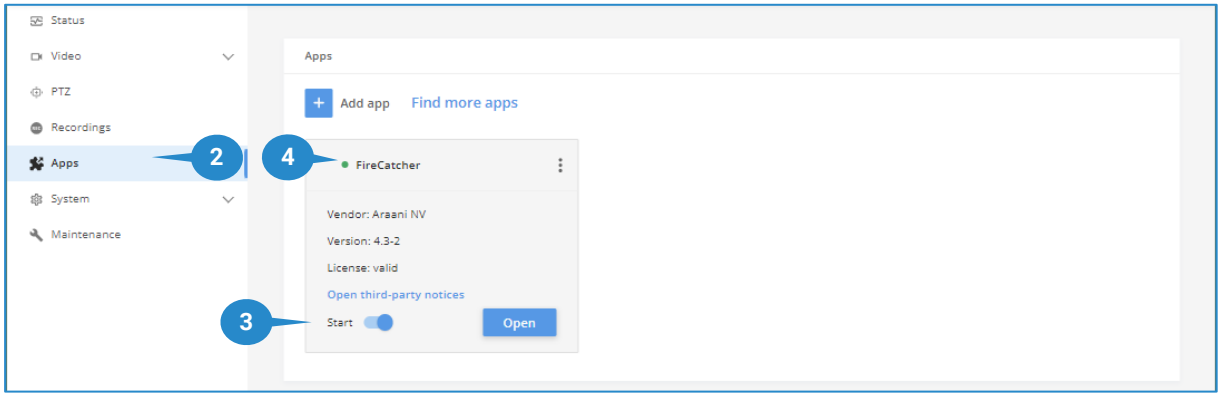
How to use FireCatcher

Starting / stopping FireCatcher

STARTING FIRECATCHER

After installation, FireCatcher needs to be started manually. To do so, follow the steps below.

1. Connect to your camera, using your internet browser software and login to the camera webpage. Refer to the camera user manual on how to do this.
2. Select “Apps” from the menu pane.
3. Select the FireCatcher app Start switch button.
4. The FireCatcher app button should change state and the status indicator should turn green.



START-UP BEHAVIOUR

At start-up, FireCatcher needs to learn the background of the scene. This takes maximum 1 minute. During this period, FireCatcher is not fully operational yet. The default start-up state however is “Operational”-mode. The reason for this default behaviour is to prevent FireCatcher to trigger a “Fault Signal” immediately after an upgrade. Within a maximum of 1 minute, FireCatcher will either remain in this condition, or go to “Fault Signal” condition.

If the FireCatcher application goes to fault condition after starting up, this can be due to:

- Not enough background contrast.
- Scene too dark: the light level is less than the minimum required light level.

In both cases, review the installation of your camera, taking into account the requirements and recommendations in Environment requirements and Camera Position / Field of view.

STOPPING THE FIRECATCHER APP

To stop the FireCatcher app, perform the same steps as Starting FireCatcher. When clicking the switch in step 3, the application will be stopped and the status indicator will turn gray.

Configuring FireCatcher detection

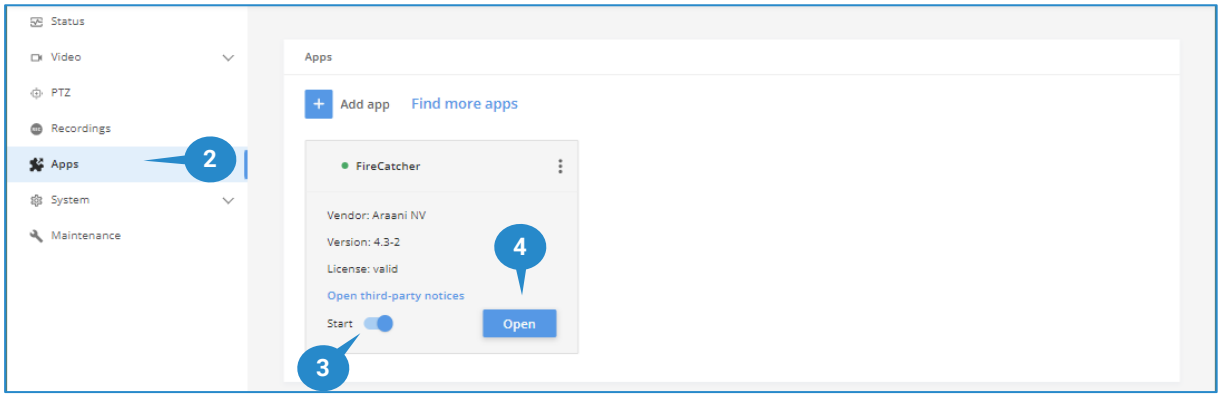
Notice: changing settings may affect detection performance. Only change from default settings if needed.

In most cases, default settings of FireCatcher will work fine. If detection is not satisfactory or if too many false alarms occur, you may want to change some of these settings.

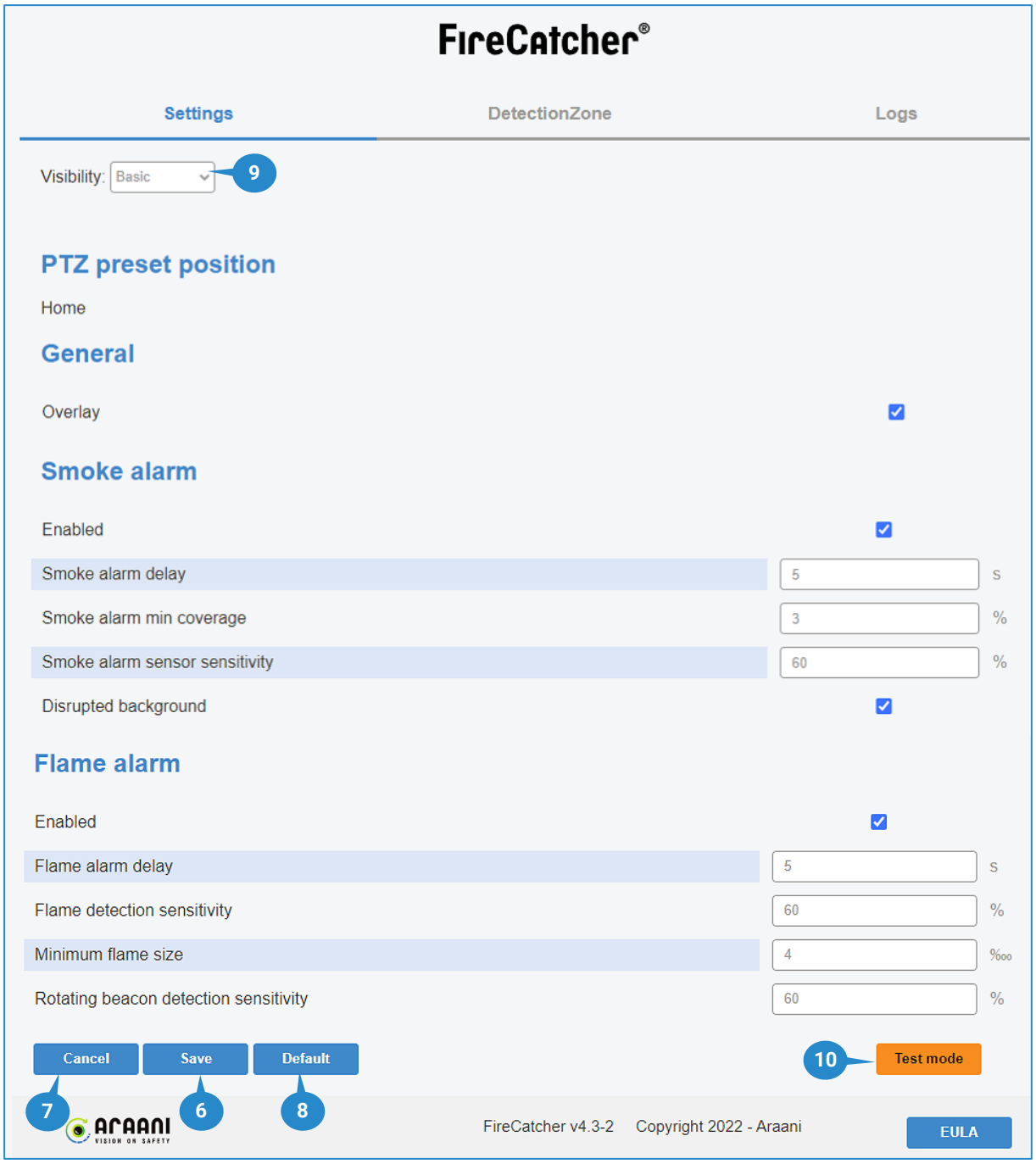
Accessing FireCatcher configuration

To access the settings of your detection app on the camera, proceed with steps below.

1. Connect to your camera, using your internet browser software and login to the camera webpage. Refer to the camera user manual on how to do this.
2. Select “Apps” from the menu pane.
3. Make sure the application is running, otherwise start FireCatcher.
4. Select the FireCatcher app Open button.



5. A new browser window will appear that contains the basic settings to configure FireCatcher.



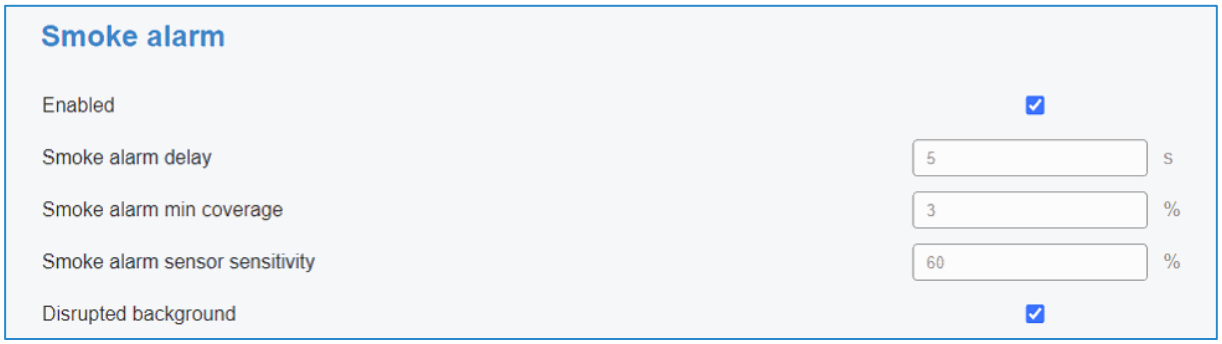
Refer to next sections for detailed information on all available settings.

When settings are changed, an asterisk will appear in the tab header of the configuration page. This indicates that the modifications are not saved yet. When trying to leave the page without saving, a pop-up warning will appear.

6. Select “Save” to register the new settings in the app.
7. “Cancel” can be used when changes to the settings have been done (but not saved) and one wants to return to the setting as is in the camera.
8. “Default” can be used to reset all settings to default value.
9. The visibility selector allows to select between Basic and Advanced settings. The advanced setting allows to finetune the detection when basic settings are not satisfactory.
10. The “Test mode” button will switch to the fire simulator for testing purposes.

Basic configuration of smoke detection

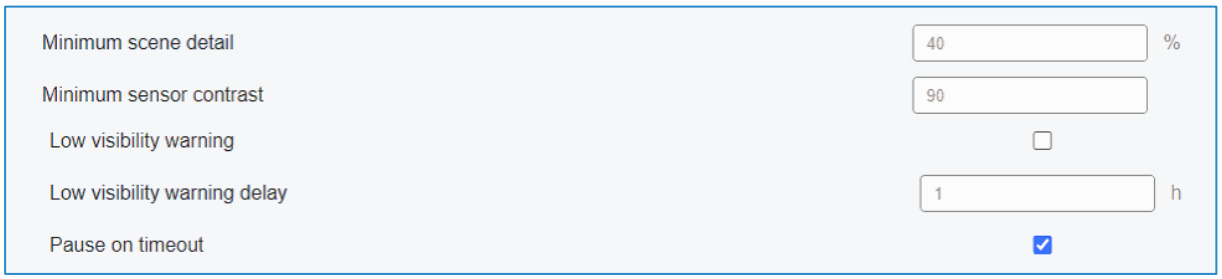
The smoke detection algorithm detects the presence of smoke in the image. The following settings are available to control the algorithm behaviour:



Name	Range	Unit	Default value	Meaning
Enabled	on - off		on	Enable or disable smoke detection.
Smoke alarm delay	2 - 60	Seconds	5	If the alarm condition is continuously present during this time, an alarm is generated.
Smoke alarm min coverage	2 - 30	%	3	Percentage of the field of view that needs to meet the requirements for alarm before an alarm is reported. The higher the value, the less sensitive detection. E.g.: 2% of a 1920 x 1080 image is an area of 203 x 203 pixels.
Smoke alarm sensor sensitivity	40 - 90	%	60	Sensitivity of the sensor to alarm. The higher the value, the more sensitive detection, but more risk on unwanted alarms.
Disrupted background	on - off		on	Switch ON in case of unwanted alarms, caused by frequent large disturbances in the background: motion of large objects, displacement of large objects, furniture, etc… e.g. a truck moving in front of the camera occasionally. Switch off in case of risk of explosion or potential fast smoke development that needs to be detected, e.g. EX environments.

Advanced configuration of smoke detection

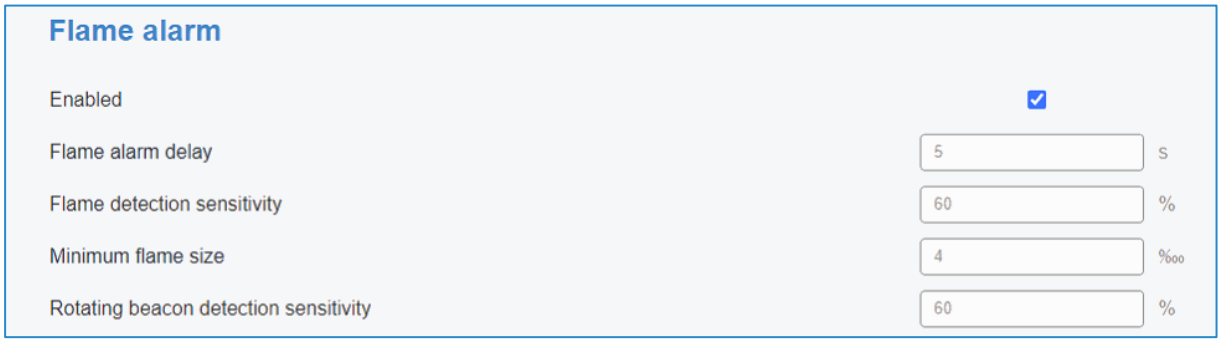
The following settings are available to control the algorithm behaviour in advanced settings mode:



Name	Range	Unit	Default value	Meaning
Minimum scene detail	40 - 70	%	40	Minimum percentage of the background that needs enough contrast to allow proper functioning of the analytics. If this condition is not met, a fault will be generated.
Min sensor contrast	0 - 1000		90	Minimum contrast on a sensor before it is valid. Increase this value from 100 to 110 in case of unwanted alarms due to large low-contrast parts with slow light changes in the field of view.
Low visibility warning	on - off		off	Launch a warning when the visibility of the image is getting too low, and coming close to a Fault Signal.
Low visibility warning delay	1 - 72	hours	1	Minimum time (in hours) during which the visibility should be poor before a visibility warning is released.
Pause on timeout	on - off		on	Enables the suspension of smoke detection when an external timeout.cgi command is received. While paused, the stream continues to be processed however, any identified events are muted and not signalled.

Basic configuration of flame detection

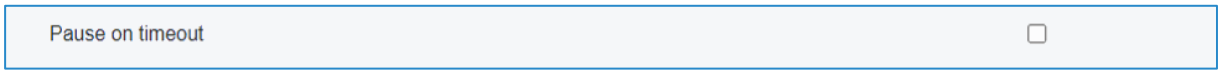
The flame detection algorithm detects presence of flames in the image. The following settings are available to control the algorithm behaviour:



Name	Range	Unit	Default value	Meaning
Enabled	on - off		on	Enable or disable flame detection.
Flame alarm delay	3 - 60	Seconds	5	The minimum duration that a flame must be detected before raising flame alarm.
Flame detection sensitivity	40 - 90	%	60	Sensitivity of the flame detector. The higher the value, the more sensitive the detection, but the higher the risk of unwanted alarms.
Minimum flame size	1 - 100	‰	4	Minimum size of a flame to be detected (expressed in per myriad of the field of view). E.g.: 4‰ of a 1920 x 1080 image is an area of 28 x 28 pixels.
Rotating beacon detection sensitivity	0 - 90	%	60	Sensitivity of the rotating beacon detector. The rotating beacon detector suppresses unwanted flame alarms caused by rotating beacons. The higher the more sensitive, set to zero to disable.

Advanced configuration of flame detection

The following settings are available to control the algorithm behaviour in advanced settings mode:

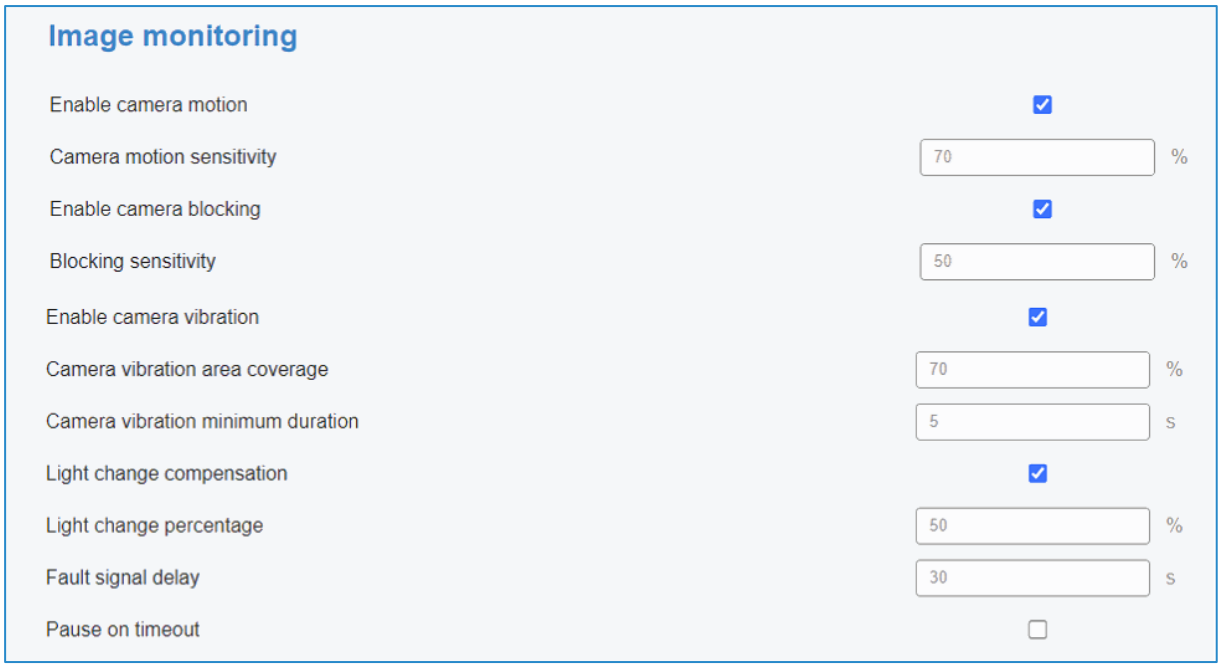


Name	Range	Unit	Default value	Meaning
Pause on timeout	on - off		off	Enables the suspension of flame detection when an external timeout.cgi command is received. While paused, the stream continues to be processed however, any identified events are muted and not signaled.

Advanced configuration: image monitoring

The image monitoring algorithm is protecting detection from tampering. When enabled, it can detect when the camera is moving, vibrating or if the image is blurred or completely blocked for any reason. The algorithm also allows to compensate for abrupt changes in external light conditions. This algorithm processes the full image - not only the detection zones - as opposed to the smoke and flame algorithm.

The following settings are available to control the algorithm behaviour:

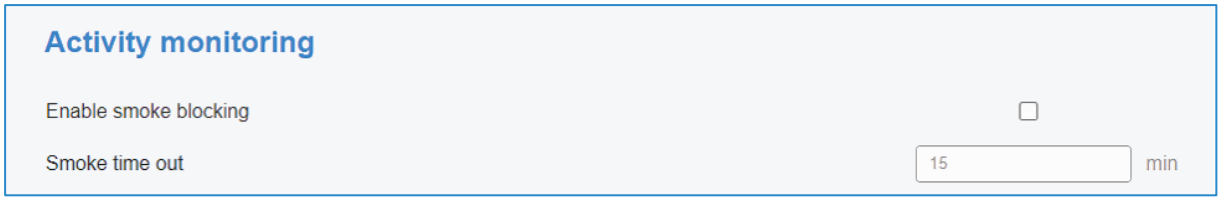


Name	Range	Unit	Default value	Meaning
Enable camera motion	on - off		on	Generate a fault signal on a fast rotation of the camera.
Camera motion sensitivity	10 - 90		70	The higher this value, the faster a camera motion event will be triggered.
Enable camera blocking	on - off		on	Generate a fault signal on a blurred or blocked image.
Blocking sensitivity	20 - 90		50	The higher this value, the faster a camera blocking event will be triggered.

Enable camera vibration	on - off		on	Enable/disable camera vibration detection. This will cause the detection algorithms to adapt sensitivity but will not generate any fault.
Camera vibration area coverage	10 - 100	%	70	Percentage of the detection zone that needs to meet the requirements for camera vibration before the event is triggered.
Camera vibration minimum duration	5 - 60	Seconds	5	Minimum duration of the camera vibration conditions before this condition is set.
Light change compensation	on - off		on	Activate robustness to light changes.
Light change percentage	20 - 50	%	50	The minimum part of the field of view that needs to be affected by abrupt light change before light change compensation is triggered.
Fault signal delay	5 - 180	Seconds	30	Minimum duration of a fault alarm before it is reported.
Pause on timeout	on - off		off	Enables the suspension of image monitoring when an external timeout.cgi command is received. While paused, the stream continues to be processed however, any identified events are muted and not signalled.

Advanced configuration: activity monitoring

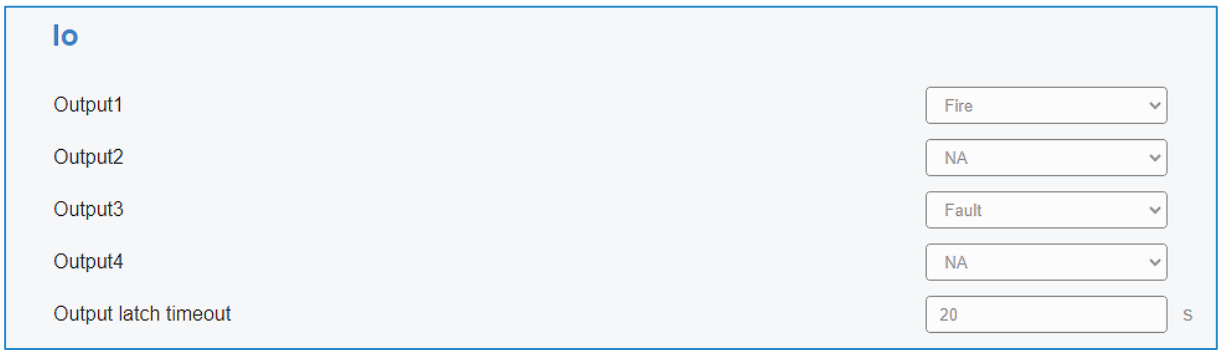
The activity monitoring algorithm allows to detect activity (motion) in the image and suspend smoke detection until activity has stopped for a predetermined period. This generates “SUPERVISORY” state. This can be used e.g. to automatically suspend detection during e.g. bulldozer activity. This will avoid false detection in areas where a lot of dust is generated during work time. Note that flame detection remains active during this period (if enabled).



Name	Range	Unit	Default value	Meaning
Enable smoke blocking	on - off		Off	Block Smoke Detection when activity is detected.
Smoke time out	1 - 90	Minutes	15	Block Smoke detection for this value of minutes after activity detection.

Advanced configuration: I/O

The I/O configuration allows to assign alarms and statuses to specific outputs if an external I/O module is connected. Note that I/O settings section is only available on installations with appropriate license.



Name	Options	Default value	Meaning
Output1	Fire Smoke Flame	Fire	Each of these settings allows to assign a function to the associated output signal on the I/O module. Following options can be assigned, depending on the output number: • Smoke: will activate the output when a smoke alarm is occurring. • Flame: will activate the output when a flame alarm is occurring. • Fire: will activate the output when either a smoke alarm or a flame alarm or both are occurring. • Fault: will activate the output when a fault is occurring. • Supervisory: smoke detection temporarily disabled due to motion detection or by external cgi command. • LowVisibilityWarning: will activate when low visibility warning is enabled and threshold is exceeded. • NA: not assigned.
Output2	Fire Smoke Flame Supervisory NA	NA	
Output3	Fault	Fault	
Output4	Fire Smoke Flame Fault Supervisory LowVisibilityWarning NA	NA	

Note that “activation” in the table above is considered as closing or opening the related output contact:

- Output 1, 2 and 4 are normally open (NO)
- Output 3 is always assigned to fault alarm and this output is normally closed (NC). A fault will actually open the contact.
- Outputs that are not assigned (NA) are always open.

Notice: The Supervisory function is not supported on the external ExpertDAQ module: setting this to an output will have no effect.

Name	Range	Unit	Default value	Meaning
Output latch timeout	0 - 120	Seconds	20	The setting controls the behaviour of the I/O contacts when activated: 0: I/O contacts are activated when the assigned status or alarm occurs and remain open until an external reset is manually initiated This is called “latched mode”. 1-120: when activated, the I/O contacts remain active for the set time after the alarm stopped and then deactivate automatically. This is called “non-latch mode”. This behaviour is consistent with most Fire Alarm Control Panels.

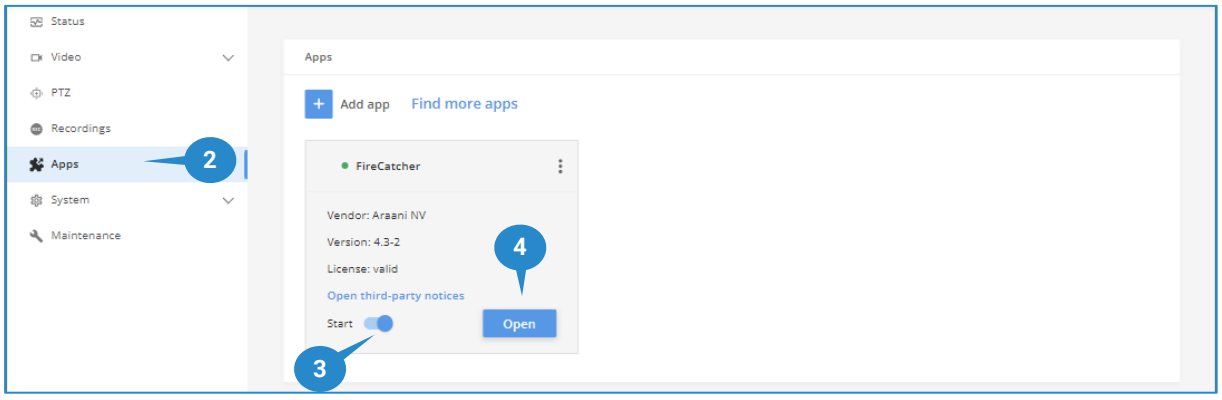
Configuring detection zones

To further optimize the detection or to avoid false triggering of alarms, e.g., due to very dynamic or badly illuminated zones in the field of view, the detection can be restricted to certain zones in the field of view. These zones can be drawn in the app configuration screen in the browser itself.

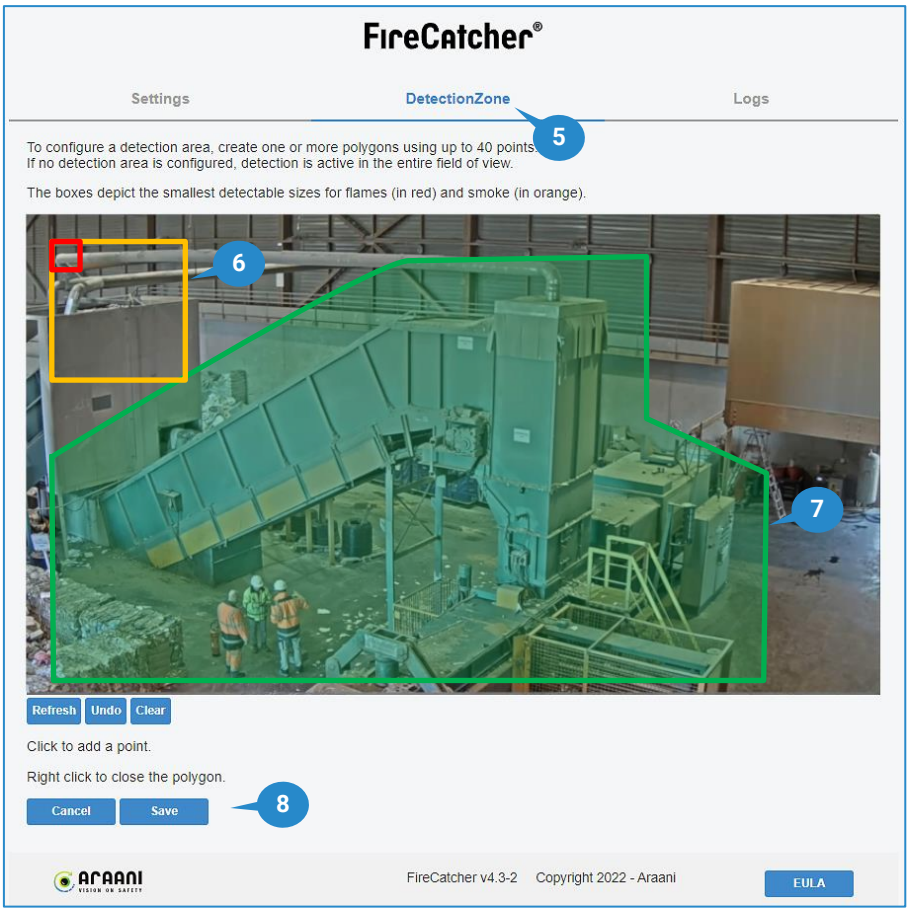
By default, the detection area is the whole field of view. If detection zones are defined, this will override the default and detection will only occur in the defined zones.

To define detection zones, perform following steps:

1. Connect to your camera, using your internet browser software and login to the camera webpage. Refer to the camera user manual on how to do this.
2. Select “Apps” from the menu pane.
3. Make sure the application is running, otherwise start FireCatcher.
4. Select the FireCatcher app “Open” button.



5. A new browser window will appear that contains the basic settings to configure FireCatcher. Select the “DetectionZone” tab.
6. A live picture is shown to assist in configuring the detection zones. Note that the boxes indicate the minimum surface of smoke (orange) and flame (red) as set in the configuration tab.
7. To draw a polygon detection zone on the visual image:
    a. Left click in the image to add a point.
    b. Right click to close the polygon (you need at least 3 points).
    c. Select “Undo” to undo the last action. Multiple actions can be undone.
    d. Select “Clear” to clear all drawn zones.
    e. Select “Refresh” to refresh the picture with the current live camera image.



8. Select “Save” to save the configuration of detection zones.

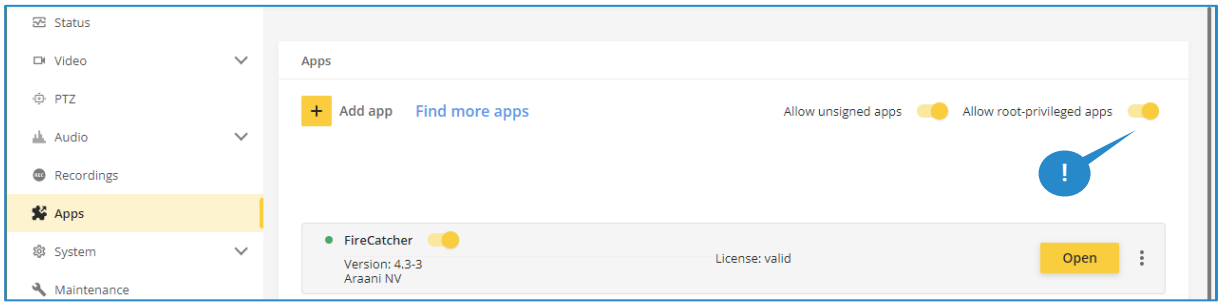
Up to 40 points can be used to draw the detection zones. The area of an individual zone must be at least 2% of the full image. The sum of the detection zones must be at least cover 25% of the full image. If smaller zones are drawn, a warning pop-up box will appear. Zones may overlap. For detection, the aggregated area is considered.

Working with PTZ cameras

FireCatcher is capable of working on pan tilt zoom cameras. This includes cameras with motorized lenses that only allow changes in zooming.

Attention: PTZ support is not intended for guard tour applications. As the analytics program needs to learn the background image after every move and smoke dispersion is a rather slow phenomenon, this may not function well in a guard tour application. PTZ support is provided for convenience and to avoid faults when occasional zoom or position changes are needed. A minimum stay of 10 minutes is recommended for each preset for the analytics to work as expected.

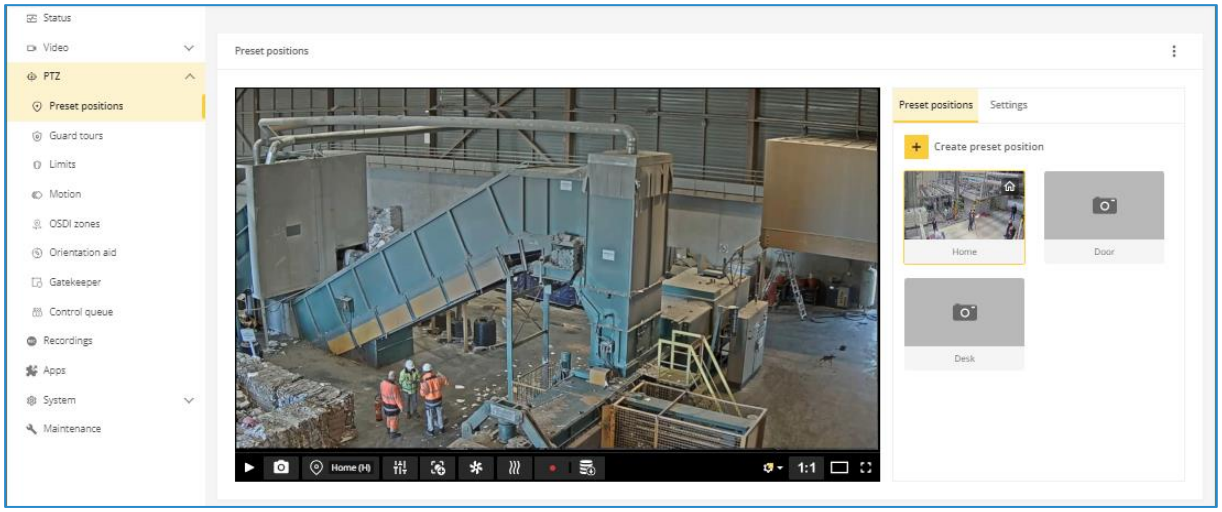
Attention: On cameras with Axis OS firmware >= 11.5, 'Allow root-privileged apps' must be enabled to allow FireCatcher to work in PTZ mode. This can be verified in the Apps setup page:



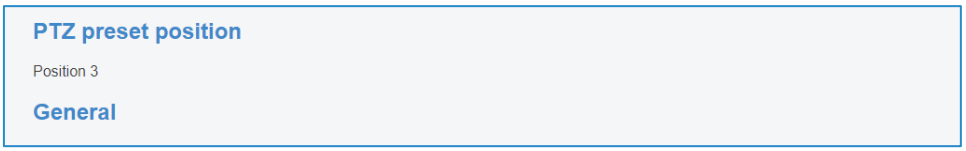
For each of the configured preset positions, a separate configuration is created. Up to 10 preset positions (and related settings) are supported. These individual configurations include all sensitivity settings and detection zones.

While moving or when the camera is positioned out of any preset position, the fire recognition algorithm is stopped (status 'STOPPED'). When the camera is returned to one of the named preset positions, the algorithm recognizes that position, automatically loads the correct configuration and starts learning the background again (status 'RECALIBRATING').

The camera presets and associated names are configured in the camera setup interface as illustrated below. Refer to your camera manual for details on PTZ preset configuration.



After moving to any of the configured presets, the associated configuration is loaded and the preset name is shown in the FireCatcher settings interface in the 'PTZ preset position' section as illustrated below.



Notice: Make sure all relevant PTZ positions are properly configured and named. Even for a camera with motorized lens that remains in fixed position after initial configuration, this position should be named (e.g. 'home'). Unnamed positions will not be identified, and fire recognition will not start.

Configuring display options

To visualize FireCatcher alarms inside the video stream, two options are available:

- Adding text overlay to the video that displays the FireCatcher status.
- Enabling overlay in the application to dynamically draw bounding boxes around the incident zone. A flame incident will be marked with a red bounding box while a smoke cloud will be marked with an orange bounding box.

VIEW FIRECATCHER STATUS

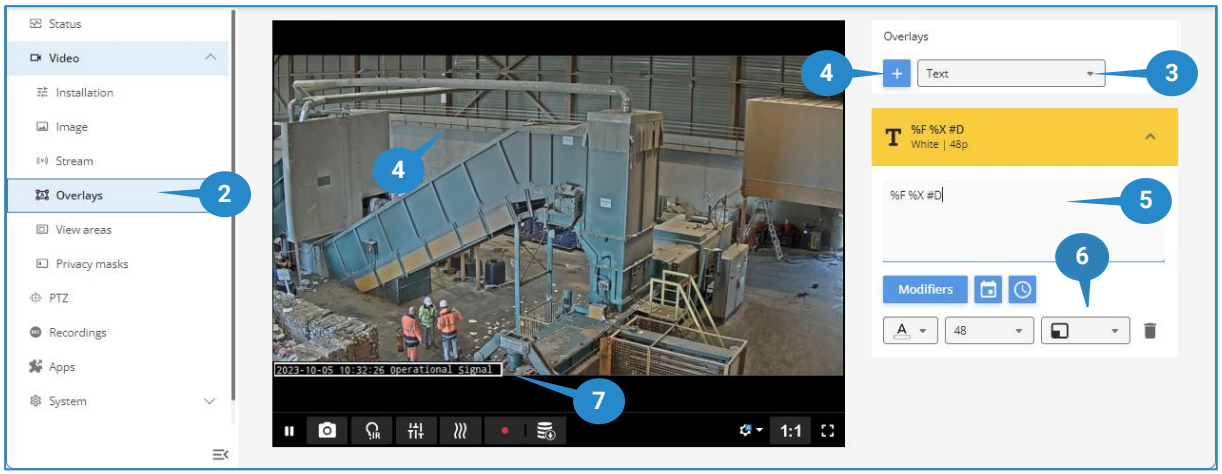
The FireCatcher app status is one of following:

- OPERATIONAL SIGNAL: the app is running; no incident is detected, and detection conditions are ok.
- FAULT SIGNAL: any condition that prohibits detection from working e.g. contrast or light level are not sufficient for proper smoke detection, camera image is blocked.
- FIRE ALARM: an incident condition is raised, either smoke and/or flame is detected.
- RECALIBRATING: learning background after starting up, reset or reconfiguring.
- STOPPED: the app stopped monitoring. This occurs while a PTZ camera is changing position or when the new position is not recognized as a preset position.
- SUPERVISORY SIGNAL: smoke detection temporarily disabled due to motion detection or by external cgi command.

This status can be visualized in the video stream by using the Axis® camera overlay capabilities. To visualize the FireCatcher status on screen, follow these steps:

1. Connect to your camera, using your internet browser software and login to the camera webpage. Refer to the camera user manual on how to do this.
2. Select “Overlays” from the menu pane.
3. Select “Text”.
4. Select The “+” button to create a new overlay.
5. In text box that appears, one can create a custom overlay text by using codes. The available FireCatcher status codes are dependent on your Axis OS version:
    a. For Axis OS firmware < 11.2.16
        i. Add #D to the overlay definition to add the FireCatcher status.
    b. For Axis OS firmware >= 11.2.16
        i. Add #D1 to the overlay definition to add the FireCatcher status.
        ii. ii. For troubleshooting, #D2 can be added to show the current measured SceneDetail level. That value gives an indication about the image quality.

    This can be combined with other custom fields such as date (%F) and time (%X) in the example below. Refer to your camera manual for all available options.
6. In the dropdown box, select the location where you want the overlay to appear in the image. This should always be bottom left or bottom right, to not influence the detection. Font, colour and size are customizable.
7. Leaving the menu item will automatically save the overlay and create it.



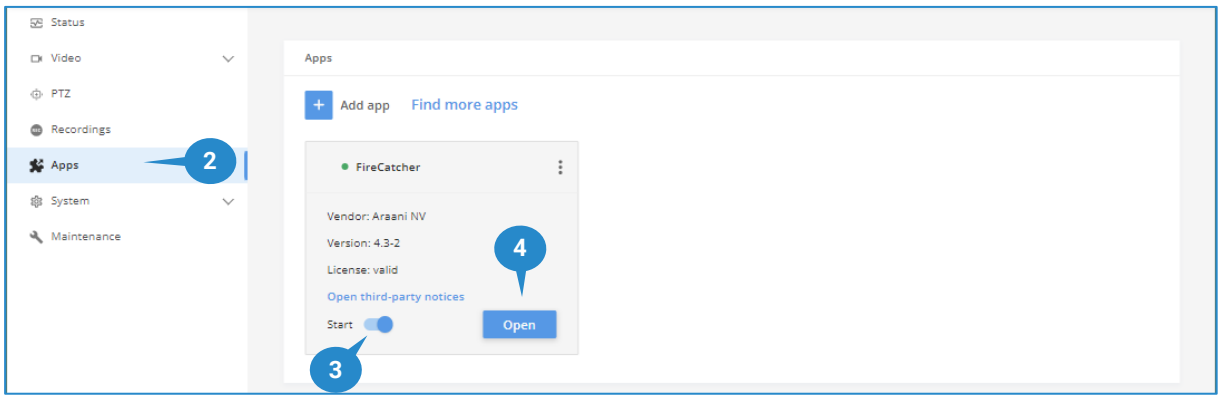
Notice: It is recommended to keep the overlay in the bottom left of the image. This zone will be ignored by the algorithms.

Attention: It is strongly discouraged to add other overlay items such as company logo or company name as this may occlude starting fire incidents and affect detection.

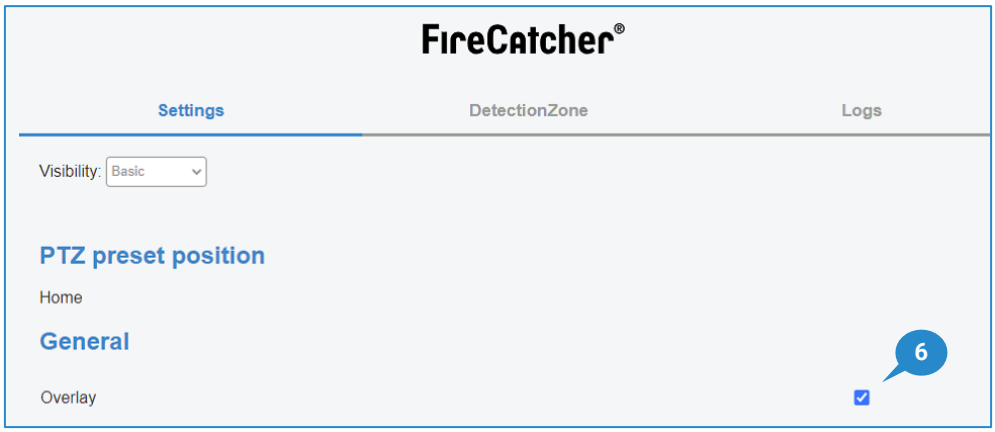
VIEW BOUNDING BOX

When smoke or flame is detected, the app can draw a bounding box around the incident in the video stream. This box dynamically changes as the incident zone grows or shrinks. To enable the drawing of this bounding box, it must be enabled in the FireCatcher configuration. Follow steps below to do this:

1. Connect to your camera, using your internet browser software and login to the camera webpage. Refer to the camera user manual on how to do this.
2. Select “Apps” from the menu pane.
3. Make sure the application is running, otherwise start FireCatcher.
4. Select the FireCatcher app Open button.



5. A new browser window will appear that contains all basic settings to configure FireCatcher.
6. Select “Overlay” to enable the bounding box in the streaming image.



7. Select “Save” to register the new settings in the app.
8. A bounding box will now appear on the image when an incident is detected.

How to test FireCatcher

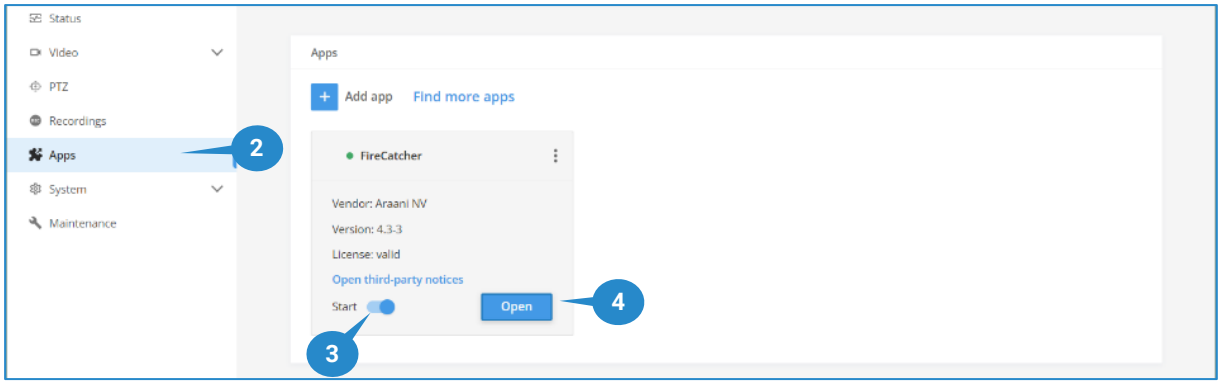
FireCatcher test mode

To test connectivity, alarm propagation and optional I/O, FireCatcher provides a built-in simulator test mode. This simulator allows to force the status of detection to operational signal, fault signal, smoke alarm, flame alarm and supervisory state. A built-in timer makes sure that the FireCatcher returns to operational mode, even if the test mode is not terminated manually.

STARTING TEST MODE

To start the simulator:

1. Connect to your camera, using your internet browser software and login to the camera webpage. Refer to the camera user manual on how to do this.
2. Select “Apps” from the menu pane.
3. Make sure the application is running, otherwise start FireCatcher.
4. Select the FireCatcher app Open button.

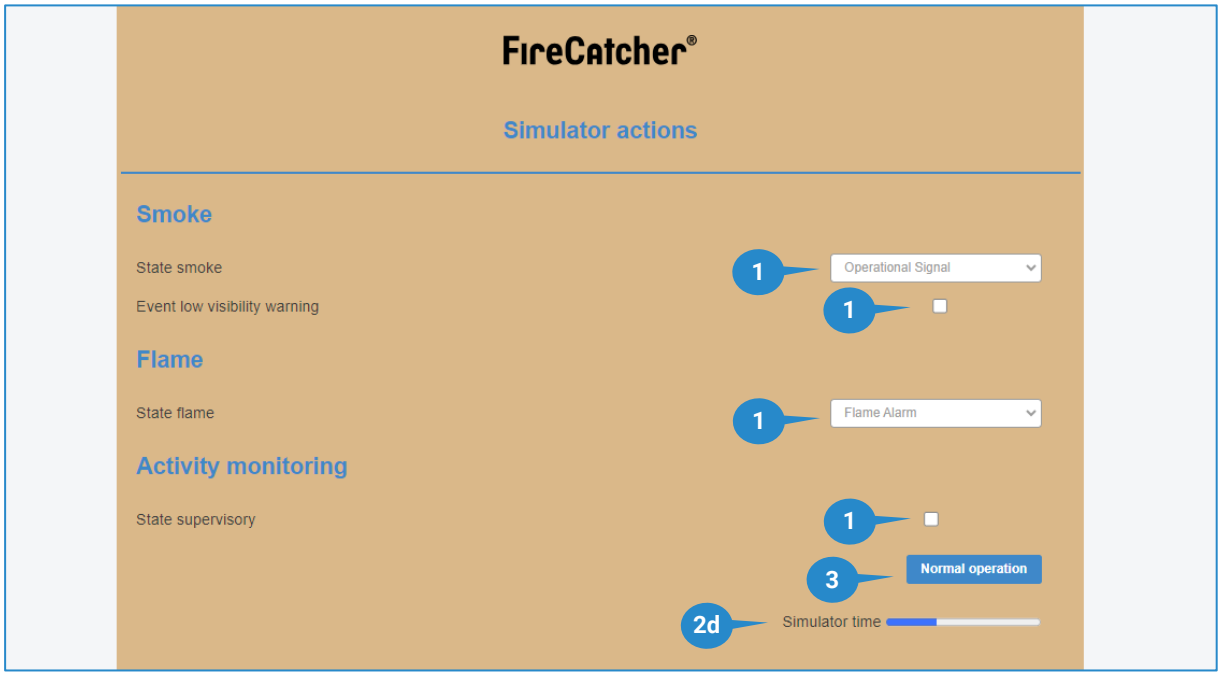


5. Select the “Test mode” button in the bottom right of the basic setup page.

USING TEST MODE TO VERIFY STATUS PROPAGATION

The simulator actions page allows to force the status of the detection algorithms as follows:

1. Select the desired state to be tested from either the smoke and/or flame algorithm and/or activate supervisory state or Low visibility warning event.
2. As soon as a state gets assigned:
    a. display status overlay will be adapted.
    b. potentially connected output states will change if assigned in the advanced configuration page.
    c. an alarm will be sent to potentially connected VMS clients.
    d. a built-in timer of 5 minutes will start or re-start. When the timer finishes, all states will be reset to the live situation and FireCatcher will stop test mode automatically. Progress of the time can be seen in the simulator time bar.
3. Select "Normal operation" if you want to end test mode and return to the configuration page manually and detection will start recalibrating.



Perform following actions to test all connections:

Wanted state	Action	Result
Operational Signal	Leave all states to Operational Signal and disable State supervisory.	No alarm output is active. Display overlay shows "Operational Signal".
Fault Signal	Start from Operational Signal state. Set State smoke = Fault Signal.	Fault output is active. Display overlay shows "Fault Signal".
Smoke alarm	Start from Operational Signal state. Set State smoke = Smoke Alarm.	Smoke alarm outputs are active. Fire alarm outputs are active. Display overlay shows "Fire Alarm".
Flame alarm	Start from Operational Signal state. Set State flame = Flame Alarm.	Flame alarm outputs are active. Fire alarm outputs are active. Display overlay shows "Fire Alarm".
Fire alarm	Use either Smoke alarm or Flame alarm scenario or both.	Fire alarm outputs are active + the outputs of the triggering alarms. Display overlay shows "Fire Alarm".

Supervisory	Start from Operational Signal state. Activate State supervisory.	Supervisory outputs are active if configured as such.
Low visibility warning	Start from Operational Signal state. Activate the event for low visibility warning.	Low visibility output is active if configured as such. Display overlay remains operational.

Testing detection with test fire and smoke

Attention: Before and during testing, make sure all installation guidelines as described in Installation guidelines are respected!

SAFETY PRECAUTIONS

Danger: Make sure to respect all safety precautions imposed in the location where the test will be performed.

Danger: Before and while conducting tests, consider all safety precautions below.

- Wear personal protective equipment:
  - Fireproof gloves.
  - Eye protection.
- Use demarcation material to secure the test zone:
  - Cones.
  - Safety ribbon.
- Fire safety:
  - Assure the proximity of a fire extinguisher.

Attention: Besides the functionality test described below, always refer to your region-specific test norms to comply with local regulations; e.g. EN54, NFPA .

REQUIRED MATERIALS

SMOKE SIMULATION

To perform a smoke test, try to simulate smoke in a safe way. You can choose from different options to simulate smoke:

- **Smoke pellets**. Make sure the volume of smoke is at least 24m³ in total, use multiple pellets if necessary (to find a local supplier, google: smoke tablets 24m³).
  Accessories:
  - a metal, fireproof cup, or bucket to put the tablets in.
  - a long nose lighter.
- **Smoke machine**. Make sure to use a powerful smoke machine that has capacity of 60 seconds or more of continuous smoke.
  Required:
  - power connection.
  - smoke machine liquid.

- **Other**: be aware of fire hazards before using other ways to test FireCatcher smoke recognition.

FLAME SIMULATION

To perform a flame test, try to simulate flames in a safe way with. You can choose from different options to simulate flames:

- **Flame video**. Use a fireplace video to simulate flames on a screen/laptop/tablet, this type of video can be easily found on YouTube or other video-sharing platforms. Select a video where the flames are present in most of the screen, e.g.:

- **Chemical solvents** or other types of combustibles can be used to create flames, but this is not recommended. This method requires expertise. Do not do this if you are not a fire safety specialist.

- **Other**: be aware of fire hazards before using other ways to test FireCatcher flame recognition.

TEST ZONE SETUP

Select a safe indoor area to perform the fire tests. For best result, position the test fire in the middle of the field of view.

Pay attention to following issues:

- Smoke:
  - Anticipate on where the smoke will travel (due to airflow, wind, air-conditioning, open doors…) and make sure to position the test fire in such a way that the smoke remains in the camera field of view for a maximum amount of time.
- Flame:
  - When using a fireplace video:

        - Make sure the size of the simulated flame is larger than the configured minimum flame size, and less than 33% of the image.
        - Make sure that the screen is perpendicularly oriented towards the camera, to have a proper/clear view off the video.
        - Avoid reflections on the screen.
        - Set the screen to maximum brightness. FireCatcher is looking for light intensity. Screen brightness can never compete with sunlight or bright lamps. Try to avoid these interferences in the field of view during the test or create a detection zone excluding these disturbing factors.
- Described testing methods may not be suitable for outdoor testing. Weather conditions may negatively affect dispersion of generated smoke and outdoor light will interfere with video screens.
- Make sure the site responsible is informed about the tests and you have the authorization to perform the tests.
- Make sure existing smoke alarms are disabled or generated alarms are properly managed and/or inform site safety responsible before conducting tests

SENSITIVITY VERSUS SIZE

Refer to the Camera Position / Field of view section for a proper understanding of required smoke and flame sizes before conducting tests.

TEST PROTOCOL

Step	Action	Check
1.	Install and configure the camera according the FireCatcher manual. Do not forget to check if the camera is compatible and the firmware is supported.	
2.	Activate overlay text and bounding boxes to display the FireCatcher status (see FireCatcher manual to enable this).	
3.	Make sure the site responsible is informed on the tests and you have the authorization to perform the tests. .	
4.	Make sure the alarms the test will generate are managed and will not be escalated.	
5.	Put the test fire in the test fire position as described in 'Test fire position' and place the demarcation.	
6.	Make sure that the test fire has enough fuel to generate smoke during at least x seconds (as configured) with a coverage of at least x% (as configured) at the same location in the field of view. Avoid entering the field of view for refuelling during the test.	
7.	Make sure FireCatcher is running in Operational mode.	
8.	Keep the field of view stable and avoid disturbance from vehicles, door/windows opening/closing, sudden light changes, people walking in the field of view…	
9.	Start the test fire, ideally without entering the field of view. If this is impossible, try to have only 1 person entering the field of view.	
10.	FireCatcher should detect the smoke/flame and will display this via overlay text and bounding boxes.	

Maintenance and troubleshooting

CAMERA MAINTENANCE

For consistent performance of FireCatcher, periodic maintenance of the camera is necessary.

The time intervals of this maintenance strongly depend on environmental elements such as dust, pollution, etc.

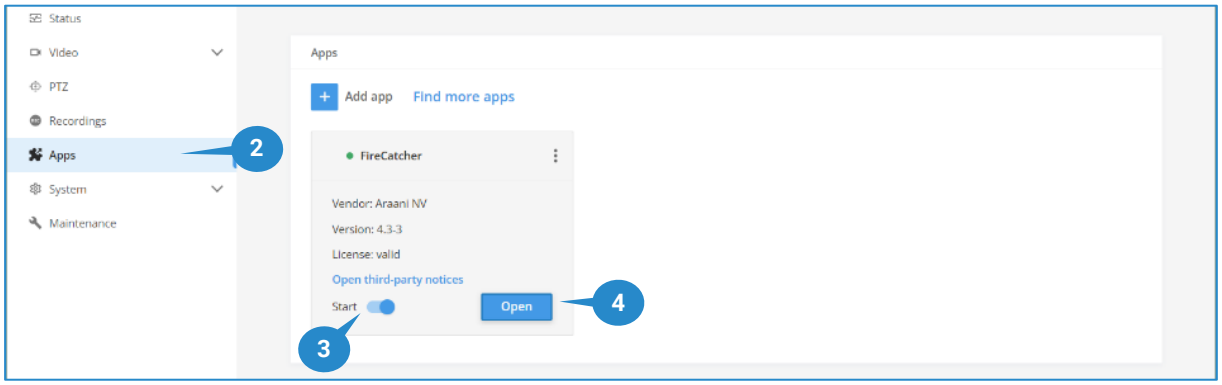
By default, a maintenance procedure should include these steps in the correct order:

1. Stop FireCatcher.
2. Clean lens and/or window of housing (clean the rest of the camera if necessary).
3. Verify date and time settings and adjust if necessary.
4. Re-focus lens.
5. Control field of view and make sure it is identical to the original field of view.
6. Update the camera firmware if available and if approved by Araani (check camera settings consistency after upgrade).
7. Update FireCatcher software.
8. Start FireCatcher software and check if FireCatcher is still in Operational state after the learning period of 5 minutes.

RETRIEVING DIAGNOSTICS INFORMATION

In case of problems with the FireCatcher detection, your support contact may request you to retrieve the logging information from the app. When contacting support services, it is advised to include this information by default in the problem report. Follow steps below to retrieve this diagnostics information.

1. Connect to your camera, using your internet browser software and login to the camera webpage.
   Refer to the camera user manual on how to do this.
2. Select “Apps” from the menu pane.
3. Make sure the application is running, otherwise start FireCatcher.
4. Select the FireCatcher app “Open” button.



5. Select the “Logs” tab.
6. To view the logging information of the application, select “View”.
7. To download the logging information of the application, select “Download”.
   A text file will be created with extension ‘.log’ that contains all available logging information. This file can be sent to your support contact for diagnosis and troubleshooting.


FireCatcher®
Settings
DetectionZone
Logs
5
View
Download
6
7

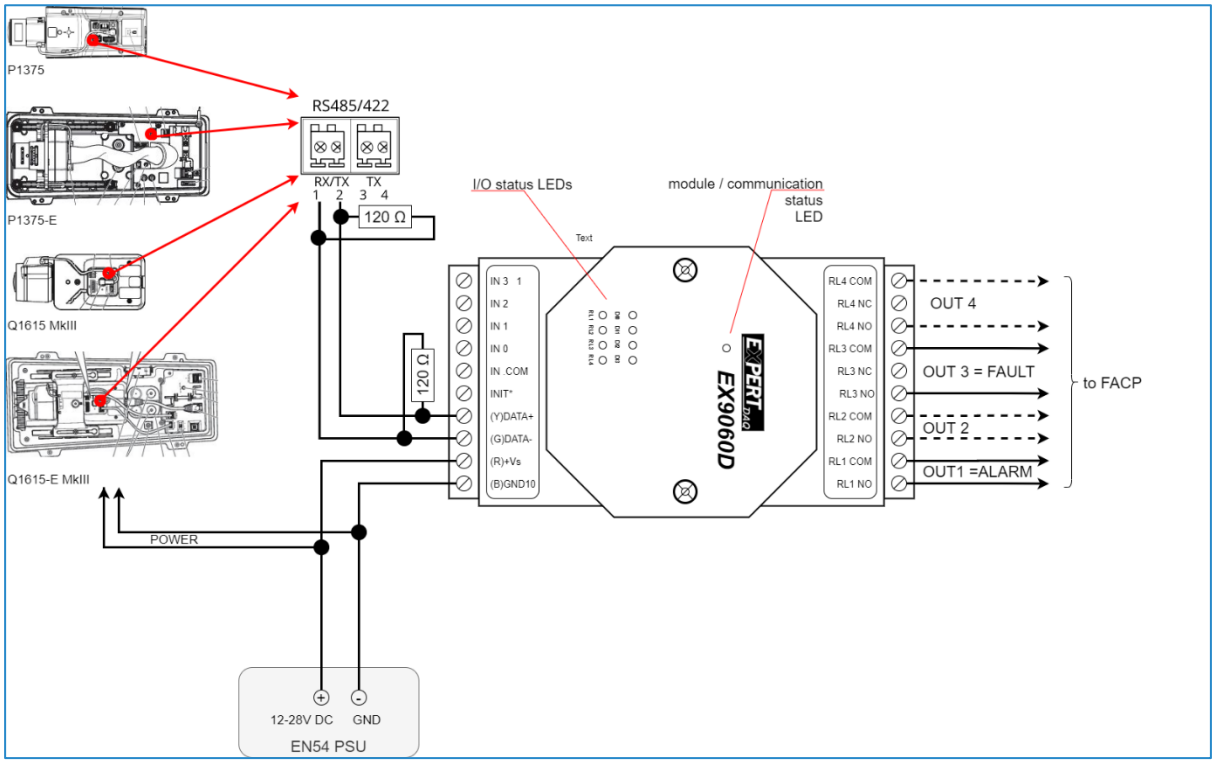
Integrating the ExpertDAQ EX9060D

FireCatcher can support external connection to a Fire Alarm Control Panel via the ExpertDAQ EX9060D I/O module. FireCatcher communicates to the module over a two-wire RS-485 link. Follow the guidelines below to set up this connection.

Connecting the module to the camera

Connect the ExpertDAQ EX9060D to the camera as illustrated below. Follow these guidelines:

- Connect power to the ExpertDAQ module.
  - Use an EN-54 compliant power supply.
  - 10-28 V DC is suitable for both the module and the cameras. In any case, the GND should be common for camera and I/O module.
- Connect the camera RS-485 connector to the module RS-485 terminals.
  - Use shielded cable that complies to local fire safety requirements.
  - Maximum length = 20 m.
  - Pay attention to the polarization of the link!
  - Apply correct termination on both sides of the link.



Connecting the module to the FACP

Refer to your FACP manual to verify capabilities and for instructions on how to connect the alarm and fault signal. This may require the use of resistors on the outputs to distinguish between alarm(s) and fault status.

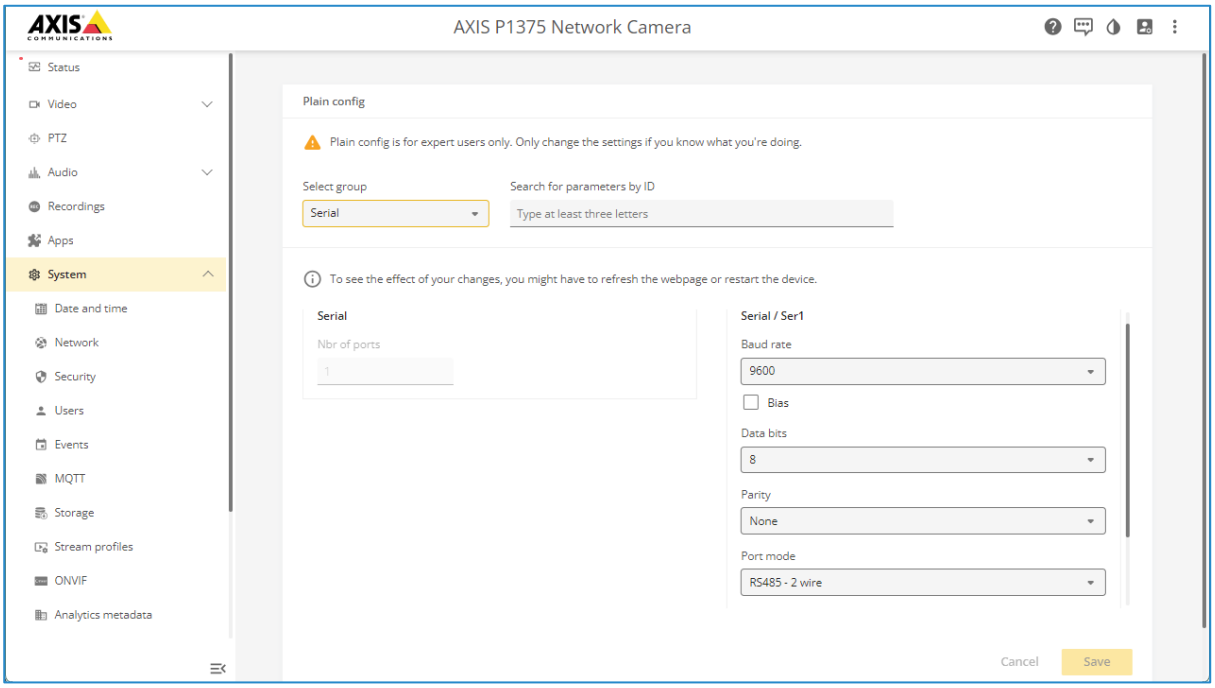
Configuring the camera serial communication

Configure the camera serial port settings as follows:

- Baud rate = 9600
- Number of data bits = 8
- Parity = none

- Number of stop bits = 1
- Port mode = 2-wire RS-485

Depending on your camera model, this may require using the plain config menu.



Status LEDs

The I/O module has several LEDs that indicate status of the signals and the module itself:

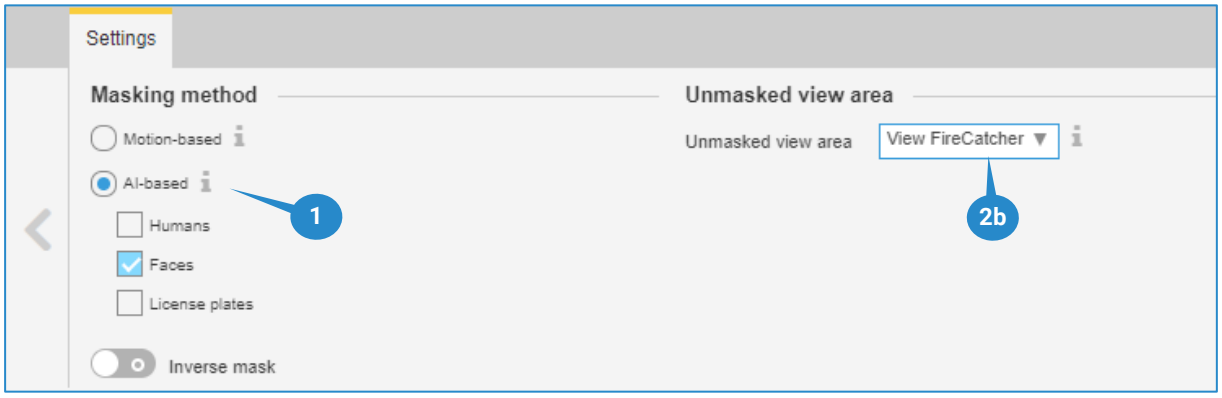
LED	Status	Description
Module status/ communication	Blinking	No communication established.
	ON	RS-485 communication established.
RL1, RL2, RL3, RL4	ON	Output 1-4 activated.
	OFF	Output 1-4 deactivated.
DI0, DI1, DI2, DI3	Not used	Input status, not used for this application.

For normal status and function of the status LEDs, refer to Configuring the (optional) digital output and the selected settings.

Using FireCatcher with Axis Live Privacy Shield (ALPS)

Axis Live Privacy Shield is an ACAP application that adds AI-based dynamic masking of moving and still objects such as humans, license plates, or backgrounds to the streaming video in order to safeguard privacy. FireCatcher can operate in combination with ALPS, subject to following conditions.

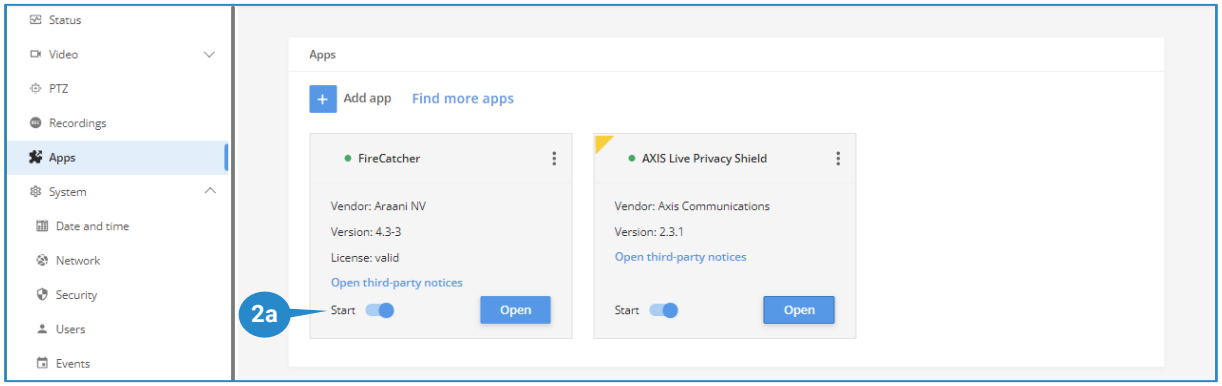
1. The camera has a deep learning processing unit (DLPU) and the ALPS application is assigned to run on it. This is done by selecting the AI-based version of ALPS as shown below. If the ALPS application does not show the AI-based option, then your camera has no DLPU and the ALPS applications must not be used. The motion-based option is executed on the main CPU of a camera and due to its heavy computing load will interfere with the FireCatcher detection.



2. FireCatcher needs access to an unmasked version of the video. This is realized through the use of a dedicated view area, called “View FireCatcher ”. This view is created automatically by the FireCatcher application at startup but it is not assigned automatically as the unmasked view area. For correct configuration, follow these steps:

    a. If ALPS was installed after FireCatcher, stop and restart the FireCatcher application. This will make sure the “View FireCatcher” is created.

    b. Select the “View FireCatcher” as the unmasked view area in the ALPS configuration interface.



Araani Application EULA

This End User License Agreement ("**EULA**") between you, the End User (as defined below), and Araani NV, a registered company with company number 0505.774.826 and registered office at Luipaardstraat 12; 8500 Kortrijk in Belgium ("**Araani**"), sets forth the terms and conditions under which Araani shall provide the End User with a license to the Application (as defined below), as well as the manner in which the End User should (not) use the Application.

Please note that this EULA may be updated from time to time. The latest version shall always be available on Araani's Website and on the Application. Araani shall send the End User a notification in the Application when an update of the EULA is available. The new version enters into effect when the End-User receives the notification.

1. DEFINITIONS

Application	FireCatcher application, including any updates, upgrades, enhancements, modifications or new versions made available by Araani to (the) End User(s).
Application Documentation	All written materials, binders, user manuals and other documentation/materials supplied by Araani and related to use of the Application.
FireCatcher	Araani's non-certified FireCatcher, which is an intelligent camera, that will trigger an alarm if fire (smoke or flame) is detected
EULA	This End User License Agreement which includes (i) the conditions under which the End User shall obtain a license to the Application; and (ii) the manner in which said license/Application should or should not be used by the End User.
End User	The person or legal entity that installs and uses the Application, including its employees or any authorized person acting on its behalf.
External Services	Third party software or hardware to which the Application may have access or with which it may communicate.
Intellectual Property Rights	Any and all of Araani's rights to patents, design, utility models, trademarks, trade names, know-how, trade secrets, copyrights, photography rights and other industrial and intellectual property rights relating to the Application, whether registered or not.
License Fee	Amounts due by the End User for obtaining and using a license to the Application.
Privacy Legislation	(i) the General Data Protection Regulation of 27 April 2016 ("the Regulation of the European Parliament and of the Council on the protection of individuals with regard to the processing of personal data and on the free movement of such data and repealing Directive 95/46/EC"), including all future changes and amendments thereof; and/or (ii) all similar national data protection laws that are applicable to the processing of personal data within the scope of this EULA.
Supplier(s)	Araani authorized vendor(s) of the Application or of a hardware device equipped with the Application.
Trial license	The temporary installation and use of the Application in order to evaluate the performance, quality and suitability of the Application.
Website	Araani's official website: https://www.araani.com.

2. SCOPE OF LICENSE

2.1 Standard license to Application

2.1.1 Subject to approval to and compliance with this EULA, Araani grants, for the duration of this EULA (*cfr.* **Article 3**), the End User a limited, personal, non-commercial and non-transferable license to (i) use the Application and/or (ii), install this Application on a hardware device that it owns or controls (where applicable).

2.1.2 The number of allowed installations and uses depends on the type of license:

- ✓ A **single instance license** allows the End User to use and/or install the Application on one (1) hardware device.
- ✓ A **bulk license** allows the End User to use/and or install the Application on the number of hardware devices as described in the order.

2.1.3 The terms of this EULA shall govern the Application as well as any standard upgrades, updates, enhancements or other modifications to the Application provided by Araani, unless such upgrade, update, enhancement or other modification is accompanied by a new or customized End User License Agreement.

2.2 Trial license

2.2.1 Trial licenses are available to the End User for the Application with a limited activation period. Continued use of the Application beyond said activation period requires the purchase of a standard license to the Application.

2.2.2 The terms described in this EULA apply both to standard and to Trial licenses.

2.2.3 By installing the Application with Trial license, the End User automatically acknowledges the Intellectual Property Rights of Araani (*cfr.* **Article 6**).

2.3 Non-transferable

2.3.1 The End User acknowledges that both the standard license (*cfr*. **Article 2.1**) and the Trial license (*cfr.* **Article 2.2**) are non-transferrable. This means that the End User may not / cannot:

- ✓ transfer such licenses to any third parties, including its affiliates. Accordingly, any third party / parties requiring the Application must request their own copy of the license;
- ✓ move licenses to other hardware devices. An activated license is linked to the unique serial number of a specific hardware device and therefore cannot be installed again on other pieces of (a) hardware device(s). Such action requires the purchase of a new license or is subject to a service contract, e.g. in case of hardware failure (provided that this hardware is (still) covered by the warranty);
- ✓ distribute or make the Application available over a network where it could be accessed or downloaded by third parties.

3. DURATION

3.1 This EULA applies for the duration of the use of the Application by the End User, unless terminated in accordance with **Article 9**, and takes effect from the moment that the Application is used on the intended hardware device.

4. CONDITIONS OF USE

4.1 Acceptable use of the Application

4.1.1 The End User hereby agrees to use the Application in accordance with certain restrictions and conditions. In particular, the End User shall not use the Application in a manner that Araani believes:

- ✓ copies (part of) the Application in any way shape or form (except as permitted by this EULA);
- ✓ reverse-engineers, disassembles or otherwise attempts to derive the source code of the Application;

- ✓ modifies, alters, tempers with, or otherwise creates derivative works of the Application;
- ✓ transfers the license to the Application to a third party in violation with **Article 2.3** of this EULA;
- ✓ violates Privacy Legislation;
- ✓ violates or otherwise encroaches on the rights of Araani or others, including, but not limited to, infringing or misappropriating any privacy, human, intellectual property, proprietary right;
- ✓ advocates or induces illegal activity;
- ✓ interferes with or adversely affects the Application or use of the Application by other End Users;
- ✓ is in general to be considered abnormal use of the Application.

4.1.2 The End User commits itself to:

- ✓ apply all reasonable techniques, practices and/or technology (e.g. use of strong passwords that are regularly changed) to prevent unauthorized use of the Application by a third party;
- ✓ always use the latest, updated version of the Application as (and if) made available by Araani (cfr. **Article 7.1**);
- ✓ notify any malfunction or disruption (due to, for example, bugs or malicious code) of the Application to the Supplier of which the End User bought the license).

4.2 Legal disclaimer

4.2.1 The End User recognizes that it is aware that fire safety is subject to strict standards and regulations. Accordingly, the End User acknowledges that the Application may never replace a mandatory fire detector. For such function, Araani refers to its certified solutions. Fire indications by the Application should only be raised after human verification.

4.2.2 The Application should in all cases be used by the End User only for the purpose for which it is intended, taking into account the specifications indicated above.

4.2.3 In no event can Araani or its affiliates be held accountable for any – direct or indirect – damages for loss or damage of property, death or personal injury to any person caused by (the non-detection of) fires, or related occurrence.

5. DATA PROTECTION

5.1 In principle, access to / the use of the Application by the End User does not automatically result in the processing by Araani of personal data. However, Araani may receive and process the personal data of an End User in the event it is requested by a Supplier to provide second line support;

5.2 In such case, Araani shall process such personal data of the End User in accordance with Privacy Legislation and with the Araani privacy policy as published on the Website: https://www.araani.com/en/standalone-pages/privacy-policy/.

6. INTELLECTUAL PROPERTY RIGHTS

6.1 The End User acknowledges that Araani is and remains the sole owner of all Intellectual Property Rights related to the Application, developed by Araani itself (or by a third party for the benefit

of Araani). Nothing in this EULA shall be construed as to limit Araani's right, title and interest in the Application.

6.2 Araani warrants that the Application does not infringe upon the intellectual property rights of any third parties. If a third party (successfully) claims that the Application infringes upon its intellectual property rights, Araani shall obtain the right to use the third-party software or will amend or replace it so as to allow the End User to lawfully use it.

7. WARRANTY

7.1 Compatibility

7.1.1 Araani warrants for one (1) year that the Application shall run on compatible hardware devices and that the Application shall perform substantially as described in the Application Documentation.

7.2 Software maintenance and updates

7.2.1 During the first year of the license, Araani shall (proactively) take all commercially and technically reasonable measures to ensure that the Application is error/defect-free and free of malicious code. To that effect, Araani shall to its best abilities make sure that the Application is regularly updated and shall perform software maintenances if required. Beyond said first year, Araani shall only be required to proactively update the Application to fix severe bugs or other malicious code that make it impossible or seriously prevent the use of the Application (in general or by a specific End User).

7.2.2 The End User acknowledges that the aforementioned is subject to its own efforts to:

- ✓ notify any bugs of or other errors in the Application to the Supplier; and
- ✓ use, at all times, the latest (updated) version(s) of the Applications, if made available to the End User.

7.3 Exemptions

7.3.1 Araani shall not warrant:

- ✓ that the Application shall work on every hardware device and on future versions and upgrades of such hardware device, given the ever evolving and changing nature of technology;
- ✓ that all defects in the Application shall be corrected;
- ✓ the compensation for damage caused by an alteration or a modification made by the End User or another non-authorized person, or the correction or reparation of any malfunction caused by such alteration/modification;
- ✓ the correction or reparation of a malfunction caused by (non-limited) **(i)** the improper use or installation of the Application in violation with **Article 4.1.1**; **(ii)** negligence of the End User or any other breach of its commitments under **Article 4.1.2**; or **(iii)** a power surge or failure at the End User's location.

7.3.2 Araani is not responsible for examining or maintaining the compliance of external hardware devices, in which the Application is installed and shall not warrant the compensation of any damage or the correction of any malfunction of the Application caused by such external hardware device.

7.3.3 If national law applicable to the use of the Application provide that certain warranties cannot be excluded or can only be excluded to a limited extent, this EULA shall be interpreted in accordance with such national law provisions.

8. LIMITATION OF LIABILITY

8.1 Araani's liability

8.1.1 Araani's total liability to the End User for all claims relating to this EULA or the use of the Application shall not exceed the License Fee.

8.2 Exemption for indirect damages

8.2.1 Araani shall not be liable for any incidental, special, indirect, or consequential damages whatsoever, such as, but not limited to: damages for loss of property, loss of profits, loss of revenue, loss of data, business interruption, reputational damage, (legal) advisory fees, etc.

8.3 Misuse of the Application

8.3.1 The End User recognizes that the Application cannot be considered as a (substitute for a) smoke detector. Accordingly, Araani cannot be held liable by any person for any damages for loss or damage of property, death or personal injury to any person caused by (the non-detection of) fire or related occurrence.

8.4 Wilful misconduct, gross negligence, personal injury or death

8.4.1 The limitations of liability set forth in this **Article 8** shall not apply to damages caused by wilful misconduct or gross negligence, personal injury or death attributable to Araani or the Application.

9. TERMINATION

8.1. Breach of any of the terms of this EULA by the End User shall result in the immediate revocation of the standard or Trial license. In such case, the End User shall not be entitled to a refund of the License Fee.

8.2. Upon termination (for whatsoever reason), the End User is obliged to destroy all copies of the Application and associated license files, including backup or archival copies on external storage, and uninstall the Application from all hardware devices it owns or controls.

10. EXTERNAL SERVICES

7.1. The End User agrees to use External Services at its sole risk. Araani is not responsible for examining or evaluating the content or accuracy of any External Services, and shall not be liable for any such External Services.

7.2. The End User shall not use the External Services in any manner that is inconsistent with the terms of this EULA or that infringes the Intellectual Property Rights of Araani or any third party.

7.3. External Services may not be available in the End User's languages and may not be appropriate or available for use in any particular location. To the extent the End User chooses to use such External Services, it is solely responsible for compliance with any applicable laws.

7.4. Araani reserves the right to change, suspend, remove, disable or impose access restrictions or limits on any External Services at any time, in which case it shall reasonably notify the End User thereof.

11. MISCELLANEOUS

11.1. End User acknowledges that it has fully read and understood all terms within this EULA.

11.2. This EULA supersedes any other agreement (oral or written) between Araani and the End User with the same scope. The aforementioned does not apply to customized End User License Agreement between the End User and Araani.

11.3. No deviation from this EULA shall be accepted, without prior consent of Araani.

12. GOVERNING LAW AND DISPUTE RESOLUTION

12.1. This EULA and all relations, disputes, claims and other matters arising hereunder (including non-contractual disputes or claims) shall be governed exclusively by, and construed exclusively in accordance with, the laws of Belgium, without regard to conflicts of law provisions.

12.2. The competent courts located in Kortrijk, Belgium shall have exclusive jurisdiction to adjudicate any dispute or claim arising out of or relating to this EULA (including non-contractual disputes or claims).