BOSCH

Video Content Analysis VCA 7.10
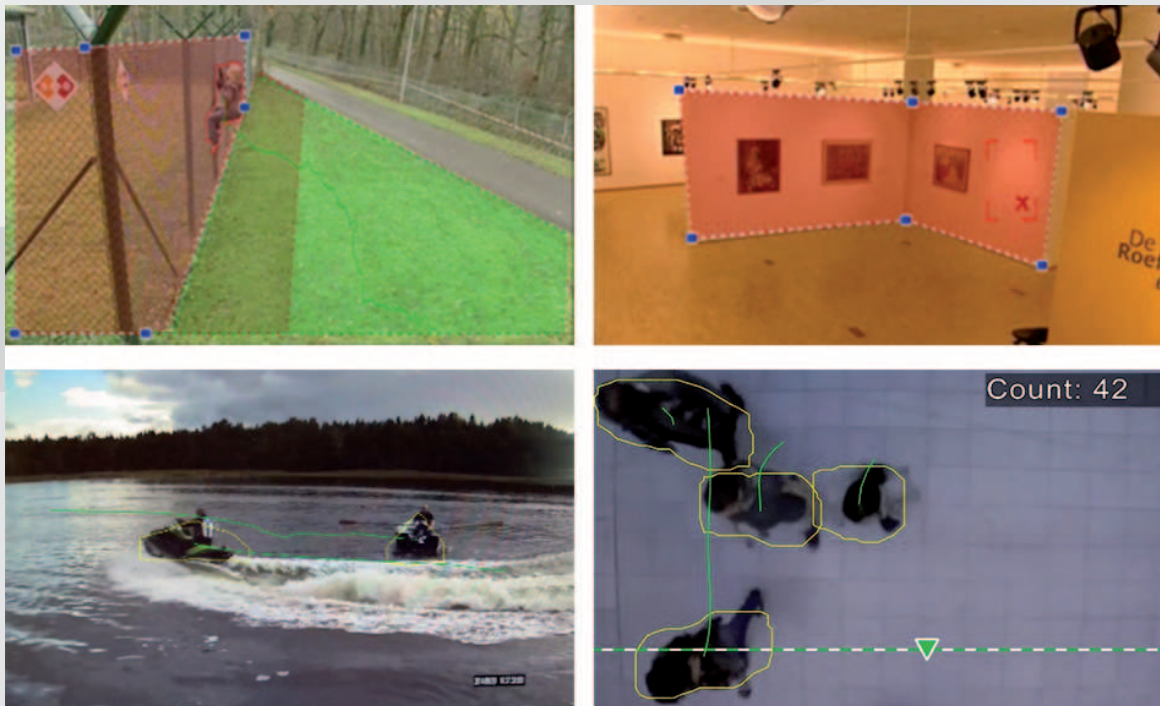

en   Software Manual

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1   Introduction

1.1   About this manual

This manual is intended for persons responsible for configuring and managing video analysis software from Bosch. This manual provides background information about video analysis and describes how to configure the software.

1.2   About this help

This Help is intended for persons responsible for configuring and managing video analysis software from Bosch. This Help provides background information about video analysis and describes how to configure the software.

1.3   Conventions in this document

The following symbols and notations are used to draw attention to special situations:

> **Notice!**
> This symbol indicates special features and provides tips and information for easier, more convenient use of the software.

Terms that you can find in the program, such as menu options, commands or text in the user interface, are written in **bold**.

1.4   Accessing the Help

Use the Help within the program. This Help provides background information about video analysis and describes how to configure the software.
To access the Help in Configuration Manager:
1.   Press F1.
      or
      On the **Help** menu, click the help entry.
      The dialog box for the Help is displayed.
2.   If the pane to the left is not visible, click the **Show** button.
3.   For more information, click the topics in the Help.
To access the Help in web browser:
1.   Press F1. The Help window is displayed.
2.   For more information, click the topics in the Help.

> **Notice!**
> Open the Help in the program to obtain information about using the Help, for example, searching, finding and printing information.

1.5   Additional documentation

More information
For more information, software downloads, and documentation, visit www.boschsecurity.com and go to the respective product page.

2   System overview

General information about video content analysis (VCA)

Video content analysis is the process of automatically analyzing video images to alarm on predefined events like the detection of moving objects in the monitored area or tampering with the camera. It can also be used to gather statistics about the detected objects. Depending on the camera type the following VCA algorithm are available in Bosch cameras:

– Intelligent Video Analytics:
  Mission-critical, long-distance intrusion detection in extreme weather conditions. Detection and tracking of moving objects.
  (see *Intelligent Video Analytics, page 10*)
– Intelligent Video Analytics Flow:
  Basic motion detection of cells in a grid with velocity and direction. Used for counter flow detection in crowds.
  (see *Intelligent Video Analytics, page 10*)
– Essential Video Analytics:
  Reliable video analytics for small and medium businesses, large retail stores, commercial buildings, and warehouses. Detection and tracking of moving objects.
  (see *Essential Video Analytics, page 12*)
– MOTION+:
  Basic change detection of cells in a grid. Can be used to trigger recordings.
  (see *MOTION+, page 25*)
– Tamper detection:
  Detects camera occlusion, turning away from the monitored scene, extreme lighting conditions and basic idle / removed object detection.
  (see *Tamper detection, page 27*)

Metadata

Metadata are the collected information from video content analysis algorithms. For Essential Video Analytics and Intelligent Video Analytics this includes all information about detected and tracked objects in the monitored area as follows:

– Alarm and counting events
– Object position and trajectory
  – In the image (2D)
  – Geolocation / ground plane coordinates (3D)
– Object shape
  – Bounding box
  – Outline
– Object properties
  – Object classification (**Upright persons**, **Cars**, **Trucks**, **Bikes**)
  – Object size (in the image and in reality)
  – Object speed and orientation
  – Object color histogram
  – Object ID

For MOTION+, the amount of change for each cell in the MOTION+ grid is included in the metadata. For Intelligent Video Analytics Flow, the metadata describe the computed motion direction.

Example:

Separate video and metadata streams. The metadata stream includes the outline of the detected car.
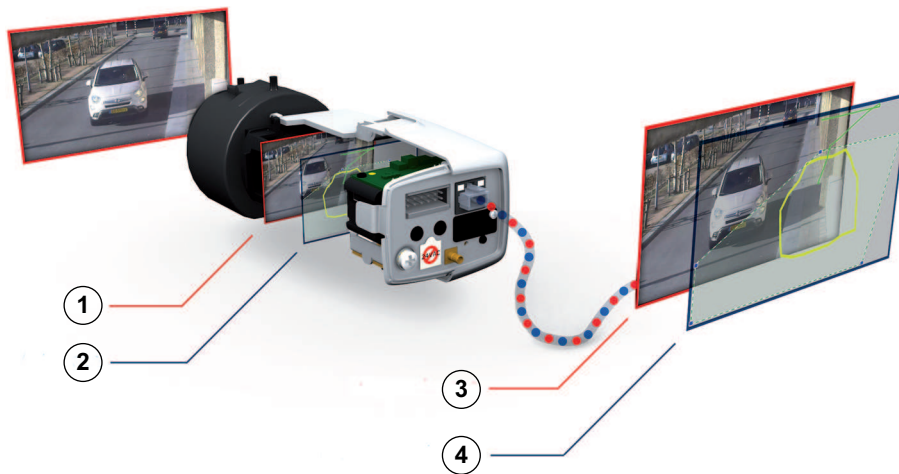
1	Video	**2**	Metadata
3	Video stream	**4**	Metadata stream

Intelligence-at-the-edge concept

The video analytics software is available in Bosch IP cameras. This intelligence-at-the-edge concept allows a decision on which videos are captured based on video content analysis (VCA). Bandwidth and storage can be reduced by recording alarm situations only or by selecting the best video encoding quality and frame rates exclusively for alarms. Alarm conditions can be signaled by a relay output on the unit or an alarm connection, to stream video to a decoder or video management system. Alarms can also be transmitted to a video management system to start extended alarm scenarios. As well as creating alarms, the software produces metadata that describes the content of the analyzed scene. This metadata is sent over the network, and may also be recorded, together with the video stream.
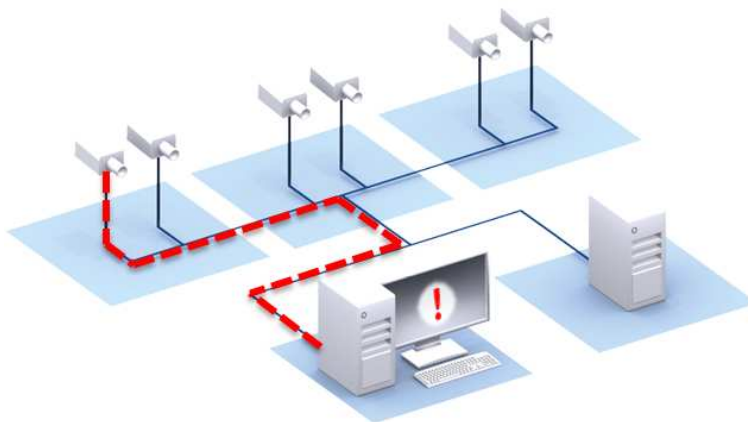
Forensic Search

The recorded metadata can be used for a full forensic search where the rules can be changed even after the fact within Bosch Video Management System (BVMS) or Video Client. New tasks can be defined and adapted for each search, and the recorded metadata is then scanned and evaluated accordingly. Forensic Search is very time efficient and can scan a huge recording database for events within seconds.

Notice!
You cannot change the metadata after they are generated. For Forensic Search, any task based on evaluating the metadata can be used, modified and optimized. However, the metadata itself cannot be changed anymore.

Configuration complexity on demand

The video analytics software automatically alarms on any object in the scene. More complex setups are supported as well: up to 8 independent tasks can be set up in the GUI, and the alarm objects for each task can be restricted according to their properties.

Camera calibration can be added for perspective correction and to obtain object properties in metric or imperial systems. A wizard is available to support the calibration by marking lines and angles in the scene. A task script editor is available for fine tuning and combining predefined tasks, and additional 8 tasks can be set up there.

Intuitive graphical user interface

Setup is available via device web page as well as via Configuration Manager. A wizard-based graphical user interface guides through the configuration. All configuration options are visualized exemplarily as overlays for feedback and can directly be manipulated for intuitive configuration.

When movement is detected, the object is outlined in yellow on the display and its motion is displayed as a green trajectory. If an object and its motion match the rule conditions defined for one of the detector tasks, an alarm is created and the object outlines are switched to red. Additionally, an idle object is marked with an **[I]** and a removed object with an **[X]**.

VCA quality

The quality of video content analysis depends heavily on environmental condition, for example:

– Visibility conditions like day, night, fog or occluding objects
– Cameras on poles shaking due to wind
– Vegetation moving in the wind
– Reflections and shadows

For further information, refer to the complete limitations for each provided video content analysis method.

See also

– *Limitations Intelligent and Essential Video Analytics, page 15*
– *Limitations Intelligent Video Analytics Flow, page 19*
– *Limitations MOTION+, page 26*
– *Limitations Tamper detection, page 27*

3   VCA algorithms

3.1   Intelligent and Essential Video Analytics

Intelligent Video Analytics and Essential Video Analytics detect moving objects and track them over time. Many alarm and statistic tasks are available to analyze the motion of the objects in the monitored scene including location, direction and speed as well as their properties like size, speed, type and color.

Intelligent Video Analytics differs from Essential Video Analytics that the object detection and tracking algorithm of Intelligent Video Analytics is more advanced. This results in higher robustness to challenging weather conditions, shaking cameras, water in the background, and larger detection ranges.

3.1.1   Intelligent Video Analytics

Intelligent Video Analytics 7.10 by Bosch is the guard-assistant system of choice when you need mission-critical, long-distance intrusion detection in extreme weather conditions or other high-performance video analytics.

The software system is state-of-the-art intelligent video analytics that reliably detects, tracks, and analyzes moving objects while suppressing unwanted alarms from spurious sources in the image.

Intelligent Video Analytics adapts to difficult conditions like changes in lighting or environment such as rain, snow, clouds, and leaves blowing in the wind. It also compensates automatically for camera shaking.

Advanced tasks like multiple line crossing, loitering, crowd density estimation, and people counting are available. Object filter based on size, speed, direction, aspect ratio, and color can be defined.

For calibrated cameras, the software automatically distinguishes between the object types upright person, car, bike, and truck. And with version 6.30 the detection of objects at double the distance of version 6.10 is now available.

It allows you to record all of the object information and change the rules even after the fact for fully configurable forensic search.

Background subtraction Intelligent Video Analytics and Essential Video Analytics

Intelligent Video Analytics and Essential Video Analytics use background subtraction technique to extract the image foreground from the background for further processing.
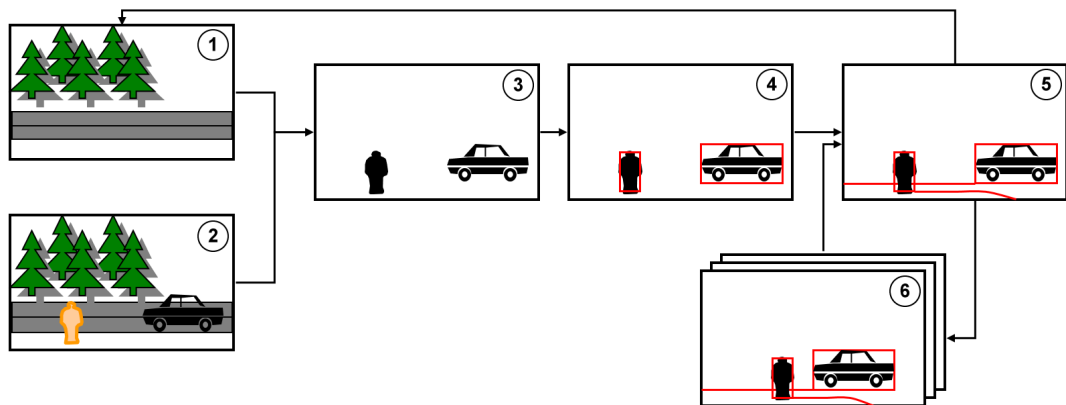
1	Background image	2	Current image
3	Foreground (background update)	4	Detected objects (background update)
5	Tracking (background update)	6	Tracks in previous frames (background update)

Motion detection with Intelligent Video Analytics Flow

To detect the direction of moving objects in the camera image, a separate application, the Intelligent Video Analytics Flow, is available. You can use the Intelligent Video Analytics Flow for wrong way detection, for example.
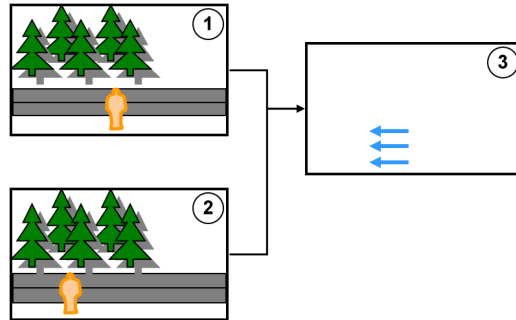
1	Former image	**2**	Current image
3	Motion estimation		

3.1.2 Use cases Intelligent Video Analytics

Intelligent Video Analytics is suitable for mission-critical applications and delivers extremely reliable results even under severe environmental conditions.

Intelligent Video Analytics covers the following use cases, for example:

– Perimeter protection:
  – Critical infrastructure
  – Airports and industries
  – Government buildings
  – Jails
  – Border patrol
– Harbor, canal and coast surveillance
– Traffic monitoring:
  – Enforce no-parking zones
  – Wrong-way detection
  – Monitor road side for broken cars
  – Traffic counts
– Protection of valuable items (alarm on touch or removal of museum exhibits)
– People counting
– Occupancy, queue and crowd detection

Dedicated tracking modes

Intelligent Video Analytics includes dedicated tracking modes optimized for the following tasks:

– Intrusion detection
– Indoor people counting
– Asset protection (don't touch!)
– Tracking of ships

Alarm and statistic tasks

The following alarm and statistic tasks are available:

– Detect objects within, entering, or leaving a single area or up to 3 areas in a specified order
– Detect multiple line crossing from single line up to 3 lines combined in a specified order
– Detect objects traversing a route

- Detect loitering in an area related to radius and time
- Detect objects which are idle for a predefined time span
- Detect removed objects
- Detect objects who's properties such as size, speed, direction, and aspect ratio change within a configured time span according to specification (for example something falling down)
- Count objects crossing a virtual line
- Count objects within an area and alarm if a predefined limit is reached
- Detect a certain crowd level in a predefined field
- Detect specified motion direction and speed even in crowds (for example a person moving the wrong way in a one-way gate)
- Detect objects that move contrary to the motion of all other objects in the scene, even in crowds
- Take snapshots of frontal faces
- Combine tasks using scripts

Filters
To enhance robustness, the software can be configured to ignore specified image areas and small objects. For calibrated cameras, the software automatically distinguishes between upright persons, bikes, cars, and trucks. Furthermore, object size, speed, two-way direction, aspect ratio, and color filters can be used in any combination to create specific detection rules for exactly the objects you are looking for. Statistics on object properties are stored and can be displayed for fine tuning the object filters. Object properties can also be defined by selecting an appropriately similar object in the video.

3.1.3 Essential Video Analytics

Essential Video Analytics 7.10 by Bosch is the system of choice when you need reliable video analytics for small and medium business, large retail stores, commercial buildings, and warehouses.

The software system reliably detects, tracks, and analyzes moving objects while suppressing unwanted alarms from spurious sources in the image.

Advanced tasks like multiple line crossing, route following, loitering, idle and removed object detection, crowd density estimation, and overhead people counting are available. Object filter based on size, speed, direction, aspect ratio, and color can be defined.

For calibrated cameras, the software automatically distinguishes between the object types upright person, car, bike, and truck.

3.1.4 Use cases Essential Video Analytics

Essential Video Analytics is suitable for small and medium companies, large retail stores, commercial buildings and warehouses to cover the following use cases:

- Detecting (indoor) intrusion for smaller environments
- Detecting queues and crowds
- Enforcing health and safety regulations (including the enforcement of no-parking zones and the detection of blocked emergency exits)
- Business analytics (including people counting, queuing and crowd density information)

Dedicated tracking modes
Essential Video Analytics includes dedicated tracking modes optimized for the following tasks:

- Intrusion detection
- Indoor people counting
- Asset protection (don't touch!)

Alarm and statistic tasks

The following alarm and statistic tasks are available:

– Detect objects within, entering, or leaving a single area or up to 3 areas in a specified order
– Detect multiple line crossing from single line up to 3 lines combined in a specified order
– Detect objects traversing a route
– Detect loitering in an area related to radius and time
– Detect objects which are idle for a predefined time span
– Detect removed objects
– Detect objects who's properties such as size, speed, direction, and aspect ratio change within a configured time span according to specification (for example something falling down)
– Count objects crossing a virtual line
– Count objects within an area and alarm if a predefined limit is reached
– Detect a certain crowd level in a predefined field
– Combine tasks using scripts

Filters

To enhance robustness, the software can be configured to ignore specified image areas and small objects. For calibrated cameras, the software automatically distinguishes between upright persons, bikes, cars, and trucks. Furthermore, object size, speed, two-way direction, aspect ratio, and color filters can be used in any combination to create specific detection rules for exactly the objects you are looking for. Statistics on object properties are stored and can be displayed for fine tuning the object filters. Object properties can also be defined by selecting an appropriately similar object in the video.

3.1.5 Feature overview and comparison

The following tables show the available features for Intelligent Video Analytics and Essential Video Analytics.

Alarm tasks	Essential Video Analytics	Intelligent Video Analytics
Detect any object	✓	✓
Object in field	✓	✓
Crossing line	✓	✓
Entering field	✓	✓
Leaving field	✓	✓
Loitering	✓	✓
Following route	✓	✓
Removed object	✓	✓
Idle object	✓	✓
Counter	✓	✓
Occupancy	✓	✓
Crowd detection	✓	✓

Alarm tasks	Essential Video Analytics	Intelligent Video Analytics
Condition change	✓	✓
Similarity search	✓	✓
Flow in field	-	✓
Counterflow in field	-	✓

Object filters	Essential Video Analytics	Intelligent Video Analytics
Duration	✓	✓
Size	✓	✓
Aspect ratio v/h	✓	✓
Speed	✓	✓
Direction	✓	✓
Color	✓	✓
Object classification	✓	✓

Tracking modes	Essential Video Analytics	Intelligent Video Analytics
Standard tracking	✓	✓
3D tracking	✓	✓
3D people tracking	✓	✓
Ship tracking	-	✓
Museum mode	✓	✓

Others	Essential Video Analytics	Intelligent Video Analytics
Calibration	✓	✓
Geolocation	✓	✓
VCA Masking	✓	✓
Face detection	-	✓
Camera Trainer (only in combination with Bosch Cloud Based Services)		✓
Robustness for extreme weather conditions	-	✓

Others	Essential Video Analytics	Intelligent Video Analytics
Compensation for shaking cameras	-	✓
Double detection distance	-	✓

3.1.6   Limitations Intelligent and Essential Video Analytics

This chapter describes limitations you should be aware of when using Intelligent Video Analytics or Essential Video Analytics. Though Intelligent Video Analytics is much more robust in many cases and makes much less errors than Essential Video Analytics, the root causes for potential errors are still shared with Essential Video Analytics and therefore stated here summarily for both algorithms.

> **Notice!**
> In case of doubt use the Intelligent Video Analytics algorithm.

Limitations of object tracking:

(Intelligent Video Analytics / Essential Video Analytics)

– Due to reflections, objects or motion might not be reliably detected or too many objects or motions might be detected. False alarms can be caused by:
  – Reflective backgrounds
  – Glass (glazed building frontages)
  – Water as a background
  – Light beams moving in the dark
– Sudden appearance of spotlights, moving headlights or torch beams lightening up an area can be mistaken for an object.
– Large areas of reflected light can also cause spurious motion detection. However, light reflections caused by falling raindrops, for example, are small enough to be ignored for statistical purposes and owing to the uniform nature of their motion.
– Motion of vegetation due to wind is covered for slow, continuous and uniform wind. If this motion overlaps with objects, false as well as missed detections are possible. To avoid this, adjusting the camera position is necessary.
– Strong wind, storms and heavy blasts from different directions, especially in the foreground of a scene, can trigger false alarms.
– Suddenly appearing sharp shadows of clouds, trees and buildings can be mistaken as objects. Soft shadows are covered by the algorithm.
– The outline of an object in strong sunlight with a crisp shadow may include the shadow of the object. Consider this for aspect ratio and object size filters. Soft shadows are covered by the algorithm.
– A constant background is necessary in order to detect motion reliably and to assign that motion to a particular object. The more the background changes, the harder it is to distinguish moving objects from the background. For example, a person walking in front of a hedge that is moving in the wind very probably cannot be detected.
– If objects cannot be distinguished from each other or from the background, the motion of an individual object cannot be detected, for example, individuals in a large crowd or a idle object in a large crowd.

- Merging effects can occur when objects standing very close together or closely passing each other. Merging effects are visible through a common outline over more objects. This means that a new bigger object appears in the scene and the former detected and tracked object get lost, including all effects on the selected detection tasks. The same effect happens when this object is split in separate objects. To avoid this, check the camera scene, optimize the camera position and configure the software accordingly.
- The detection and analysis of objects entering the image is delayed until significant size and motion have been observed. To avoid this, center all evaluations in the image. With Intelligent Video Analytics on CPP6 and CPP7 cameras, the sensitivity parameter allows you to choose additionally a trade-off between fast object detection and less false alarms due to insignificant motion.
- Using the **Click-object-in-field** function, the quality of the metric results (size, speed, aspect ratio) very much depends on the correct calibration. Observe that the color filter used in this function is related to the outlined area of an object. In most cases this outlines include additional surrounding information like the background, for example, the road asphalt. To obtain the best result for the desired object, we recommended that you delete these unwanted colors in the histogram.

Minimal object size and processing resolution:
(Intelligent Video Analytics / Essential Video Analytics)
The Intelligent Video Analytics and Essential Video Analytics algorithm use different processing resolutions on different devices and for different image aspect ratios. Here the processing resolutions for different video aspect ratios.
- Essential Video Analytics
    - 4:3 - 320x240
    - 16:9 - 320x180
- Intelligent Video Analytics (CPP6/7), 3D tracking on, noise suppression OFF / MEDIUM, for moving / started / stopped objects
    - 1:1 - 640x640
    - 4:3 - 640x480
    - 16:9 - 640x360
- Intelligent Video Analytics (CPP6/7), 3D tracking off or noise suppression STRONG or placed/taken objects
    - 1:1 - 320x320
    - 4:3 - 320x240
    - 16:9 - 320x180
- Intelligent Video Analytics (CPP4)
    - 5:4 - 255x204
    - 4:3 - 240x180
    - 16:9 - 320x180

In corridor mode, the height and width are switched. The Intelligent Video Analytics and Essential Video Analytics algorithm can reliably detect objects that have at least 20 square pixel in this internal resolution, for example, 3x8 pixel for an upright person.

Limitations of automatic object type classification:
(Intelligent Video Analytics / Essential Video Analytics)
Note: A camera calibration is required for object classification. The **3D tracking** mode must be selected.
- No differentiation of crawling or rolling persons from animals. Only upright walking or standing persons are classified as persons.

– Persons and bikes seen from the front are easily confused. A bike from the front will only be classified as such if it is fast enough, otherwise it will be classified as a person.
– No differentiation between bicycle and motorbike.
– Small objects with only a few pixel can be confused (for example, objects far away from the camera).
– All objects start as an unknown object. They are only classified over the time if the object class can be determined sufficiently reliable.

Limitations of color configuration:
(Intelligent Video Analytics / Essential Video Analytics)
If you are specifically looking for objects in motion with certain color properties, take the following into consideration:
– An object is almost never displayed in a consistent color in the image data. Pixels on the outer edge of a detected object in particular often contain the color information of the background and not the object.
  Objects such as automobiles comprise a variety of parts (body, windows, tires). Each individual part of the object is displayed in a different color. For example, the mudguards in red and the tires in black.
– The color properties of an object depend upon the lighting conditions. If the lighting conditions in a captured image changes, then the captured color of the object also changes.
  Objects on a street appear in different hues depending on the time of day and weather conditions.
– An object that changes its position or direction of motion may then appear with different color properties.
  For example, automobiles are often marked on the side in color but not on the back. When people are seen from the front, the hue of the face determines the color impression. However, if the person turns around, the color properties are then defined by the hair or headdress.

Limitations of 3D tracking mode:
(Intelligent Video Analytics / Essential Video Analytics)
Note: A calibration of the scene is required. If the scene is not well calibrated, the tracking can deliver wrong or no results.
– All objects must move on a single, flat ground plane. Multiple floors, staircases and vertical object motion can lead to wrong results.
– A camera height of more than 2.5 meters is required. A camera height of more than 3 meters offers the best results.
– Objects that are located entirely above the horizon are not detected, for example, flying objects. In **3D tracking** mode object motion is restricted to the ground plane.

Limitations of 3D people tracking:
(Intelligent Video Analytics / Essential Video Analytics)
Note: A camera calibration is required for object classification. The **3D people tracking** mode must be selected.
– Top down views require a camera height of more than 3 meters. A camera height of more than 4 meters offers the best results.
– Select a camera lens so that the head diameter of a person is between 7% and 14% of the screen width and 8% and 16% of the screen heights.
– Other moving objects, reflections on the ground, blinking lights, changing light conditions, shadows, trolleys or persons carrying bags or umbrellas can lead to wrong counting results.

–   Children close to other persons cannot be detected.
–   If the respective number of people in the scene is exceeded, more and more frames without metadata are created. The tracking will continue as long as possible.
    The number of people in a scene that can be tracked in real time is:
    –   Approximately 10 for Intelligent Video Analytics on CPP4 cameras.
    –   Approximately 20 for Intelligent Video Analytics on CPP6 and CPP7 cameras.
    –   Approximately 10 for Essential Video Analytics.
–   Line counting at the edge of the field of view may not work.
–   **3D people tracking** is not possible in low light conditions.
–   No differentiation between persons and objects with similar size (for example, suitcases, strollers).
–   People with bags could be detected as multiple persons.

Limitation of counting:
(Intelligent Video Analytics / Essential Video Analytics)
–   Partly concealed objects and objects that cannot be tracked well, because of speed, background conditions or size, can cause false counting results.

Limitations of panoramic cameras:
(Intelligent Video Analytics / Essential Video Analytics)
–   The algorithms are only used on the circle view. The results are transformed into the panorama view.
–   Camera calibration is possible, but the calibration wizard is not available.

Limitations of geolocation:
(Intelligent Video Analytics / Essential Video Analytics)
Note: A camera calibration is required. To achieve better performance, activate the **3D tracking** mode.
–   Tracking is only possible on a single ground plane.
–   A viewer is needed to show the geolocations on a map.

Limitations of idle/removed object detection:
(Intelligent Video Analytics / Essential Video Analytics)
–   **Placed objects** / **Taken objects** detection is most robust if the object that is placed or taken is much smaller than the object which handles it.
–   If a person places or removes a bike, the bike can be detected as placed / taken or as started / stopped as the bike is similar in size to the person. Therefore, check for all idle / removed objects if this is relevant.
–   Cars should always be detected as started / stopped objects as they are much larger then persons entering or leaving them.
–   With Intelligent Video Analytics on CPP6 and CPP7 cameras, in regions with a lot of background motion, only stopped objects are detected. Activation of the detection all other idle / removed object types in these regions is only possible by deactivating the noise suppression.

Limitations of water vehicle tracking:
(only available with Intelligent Video Analytics on CPP6 and CPP7 cameras)
–   The tracking mode is not suitable for tracking people moving along the beach.
–   Applications like a lock where water rushes in white foam into the lock after the lock gates open are not supported.
–   High waves can cause false alarms.
–   Two boats close together and following each other are detected as one boat.

3.1.7 Limitations Intelligent Video Analytics Flow

In certain environments the use of this type of motion detection system may not always be advisable. To obtain useful results, observe the following:

– If the computing power is reduced because of enhanced encoding power, fast speeds can no longer be detected.
– The minimum object size for reliable detection must be at least 8 blocks. Each with a size of 8 x 8 QCIF-pixel.
– Objects that cross the camera view in less than 2 seconds cannot be detected.
– Flow can be detected if the velocity and direction of an object is roughly constant for a configurable short period of time or distance.
– Textured objects that stand out from the background are more likely to be detected than those that are similar.
– Objects that move backward and forward or move in a zig zag do not trigger flow detection. An object can only trigger flow detection if it predominantly moves in a straight line. However, if objects are temporarily concealed by a tree, for example, detection is not restricted.
– The sensitive area must cover the direction of the movement that should be detected. Multiple sensitive areas must flow seamlessly into one another. Otherwise, no Flow can be detected in this direction.
– Heavy camera movement can cause false alarms and lead to objects not being detected.
– To detect slow moving objects the range of the main flow must be at least 45°.
– To detect temporarily covered objects set the activity value very high.

3.1.8 Licenses

Intelligent Video Analytics and Essential Video Analytics are available on all suitable cameras ex work. No license is needed.

Note however, that some previous CPP4 cameras are only prepared for using the Intelligent Video Analytics software. These cameras need licenses.

> **Notice!**
> Upgrading Intelligent Video Analytics versions
> If you have already licensed an earlier version of Intelligent Video Analytics for the device, you simply need to upgrade the firmware of the device. Then the license is automatically upgraded. A new license key is not required. No fee will be charged.

> **Notice!**
> You obtain the current firmware from your customer service or from the download area on our Internet site.
> Upgrade the firmware directly by using the Web browser view of the device or by using Configuration Manager.

3.2 Camera Trainer

3.2.1 Introduction

The Camera Trainer module was developed to improve the capabilities of the Intelligent Video Analytics program by using machine learning technology.

Compared to the Intelligent Video Analytics and the Essential Video Analytics program, the Camera Trainer module cannot only detect and classify moving objects but also non-moving objects. And compared to the Intelligent Video Analytics and the Essential Video Analytics program, the Camera Trainer module can also separate objects that are close together - not only persons - and keep a history of past movement.

General machine learning software for computer vision typically needs thousands of positive examples of the target objects, and even more negative examples, to recognize the specific target everywhere.

However, a single camera looks only at a single scene, and a few hundred examples can be enough to define how a specific target object must occur in this field of view, independently of illumination or weather conditions. The Camera Trainer module allows users to train the camera interactively to recognize user-specified target objects or object states, as long as the targets have a distinctive edge structure.

Camera Trainer process overview

Interactive detector training		Object detection		Evaluation
To train your detector, provide a few examples of the desired target object or target state and examples how the target object does not look like. Iteratively refine the detector results until the result is satisfying. Upload the trained detector to the camera.	➡	The camera detects the object and generates metadata.	➡	The camera evaluates whether a detected object generates an alarm or increases a counter.

3.2.2 Use cases

Compared to the Intelligent Video Analytics and the Essential Video Analytics program the Camera Trainer feature is suitable for the following use cases:

– Object separation
  The Camera Trainer module can reliable separate and detect objects that are close together, for example, parked cars, trucks, ships, and icicle detection. You can also train the program to detect parts of an object, for example, the windscreen.
– Long-term tracking
  The Camera Trainer module directly detects objects that do not move over a longer period of time, for example, monitoring of parked cars over a long period of time.
  Note: To reliable detect moving objects, the Intelligent Video Analytics and Essential Video Analytics program brings non-moving objects to the background within a few minutes, and therefore cannot be used for long object observation. The Camera Trainer module has no background image and detects non-moving, objects - regardless of the time period.
– Learning new object types
  The Camera Trainer module can also be trained on other, new moving objects, for example, shopping carts or trains.
  Note: The Intelligent Video Analytics and Essential Video Analytics program can only classify cars, trucks and bikes if they can be visually separated from other objects.
– State detection
  The Camera Trainer module can be used for state detection, for example. The detector can be trained to detect open or closed booms of parking barriers, or floods and snow

heights by means of a easily visible measuring bar.
Note: The Intelligent Video Analytics and Essential Video Analytics program can detect moving objects. State detection is not possible.

3.2.3 Limitations

Observe the following limitations when using the Camera Trainer module:
– Configuration
To configure the Camera Trainer module you can only use the Configuration Manager program. Using the web browser for configuration is not possible.
– Scene-specific information
You can only train the Camera Trainer module to detect objects in a certain view. If you have trained the detector to a specific scene, the object you want to detect later must have the same size, perspective, pose and background.
Same size: That means, the distances to the object you want to detect must be the same because the size of an objects depends from the distance.
Same perspective: That means, you must not change the position of the camera or the field-of-view after you have trained the detector. Both changes prevent a detection.
Same pose: That means, if you have trained the detector on objects in front view or side view, the object must have this pose to be detected.
Same background: That means, you must separate the background from the object. A detector trained to detect a car on the street cannot identify forest, for example. If you want to detect a car in a forest, add the forest as negative sample.

Trained detector	Same size	Same perspective	Same pose	Same background
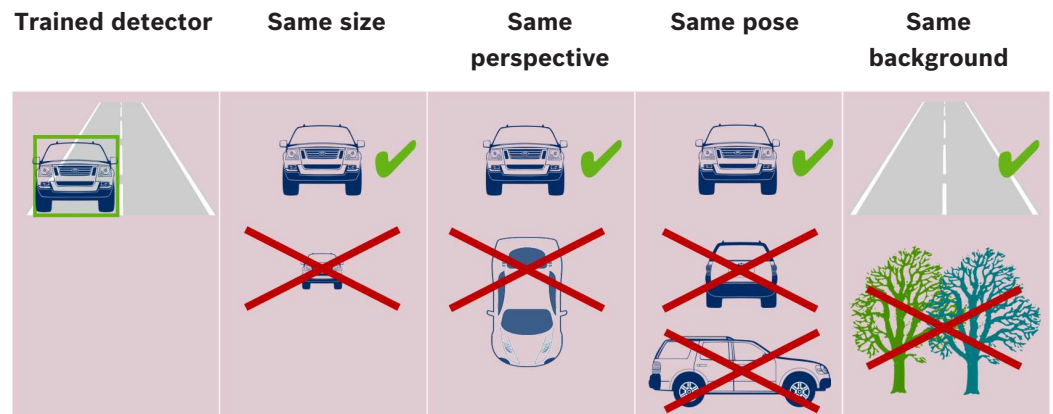
Note:
You can improve the results and eliminate many limitations as follows:
– Add additional samples to train the detector.
– In case of distance, perspective and pose, train additional detectors for the same use case.
Example: Train a second detector for objects that are further away. Make sure both detection areas are overlapping; so it is possible to detect the object twice. Both are different tracks and cannot be combined.

– Strong similarity of objects
The Camera Trainer module evaluates rough edges and texture information. Therefore, it is not possible to differentiate object with edges too similar.

Identification	**Headgear**	**Safety vest**

No differentiation between persons wearing or not wearing safety vests due to missing color filters.

Care make / car model	**Car color**
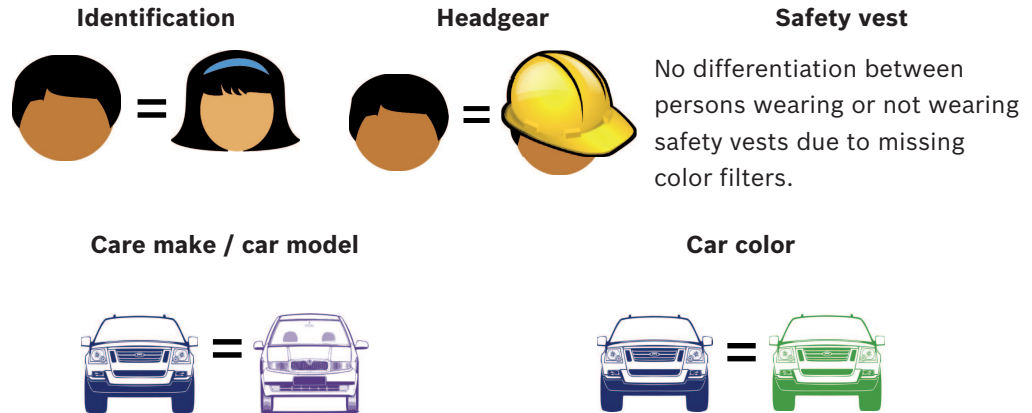
– No color differentiation of objects
  The Camera Trainer module cannot differentiate objects with different colors. The object filter **Color** is not available.
– Object tracking
  To be tracked reliable, objects must overlap for 50% with their last detected position. After 5 frames of not finding the object, the object will be deleted.
– No 3D evaluation of objects
  3D evaluation is not possible because 3D evaluation requires objects on the same ground plane. But with the Camera Trainer module you can detect parts of objects which are not necessarily on the ground plane. These objects would be estimated further away than they are in reality. Therefore 3D evaluation is deactivated for all Camera Trainer objects.
  Example: No evaluation of speed, metric size, and geolocation detection.
  Only the persons are on the same ground plane but the horizontal boom of the barrier is above the ground plane.
  The algorithm of the Camera Trainer module cannot locate the boom because the boom is above the ground and appears to the camera further away than it really is.

Ground plane   Real   Perceived
                      position   position
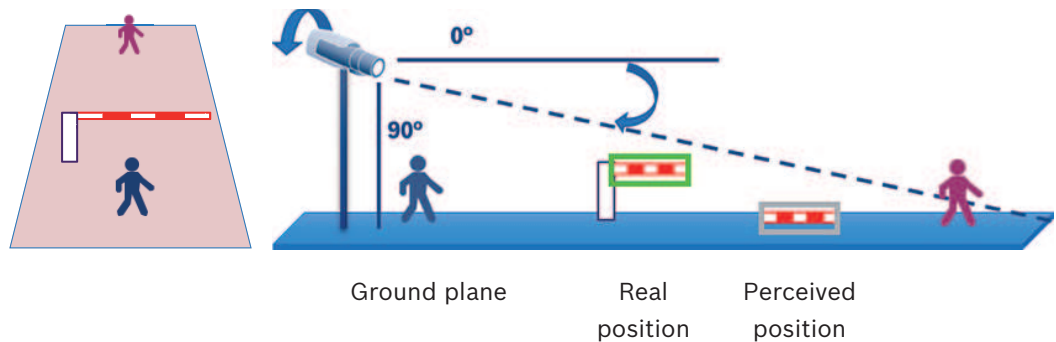
– Real-time performance (12.5/15 fps depending on base frame rate) cannot be guaranteed and frame drops may occur if more than 10 detectors in the largest available size are trained; or more detectors with correspondingly smaller size.
– Forensic search
  – Alarm / counter tasks can be changed
  – Trained detectors cannot be changed

3.2.4   Supported / not supported tasks

Supported tasks

The following tasks support the Camera Trainer module:

- **Object in field**
  See *Configuring the Object in field task, page 57*
- **Entering field**
  See *Configuring the Entering field task, page 71*
- **Leaving field**
  See *Configuring the Leaving field task, page 73*
- **Crossing line**
  See *Configuring the Crossing line task, page 59*
- **Loitering**
  See *Configuring the Loitering task, page 61*
- **Following route**
  See *Configuring the Following route task, page 65*
- **Counter**
  See *Configuring the Counter task, page 77*
- **Occupancy**
  See *Configuring the Occupancy task, page 79*
- **Condition change**
  See *Configuring the Condition change task, page 63*
- **Similarity search**
  See *Configuring the Similarity search task, page 76*

Not supported tasks
The following tasks do not support the Camera Trainer module:
- **Idle object** [1]
  See *Configuring the Idle object task, page 69*
- **Removed object** [1]
  See *Configuring the Removed object task, page 67*
- **Crowd detection** [2]
  See *Configuring the Crowd detection task, page 76*
- **Tampering** [2]
  See *Configuring the Tampering task, page 66*
- **Flow in field** [2]
  See *Configuring the Flow in field task, page 95*
- **Counterflow in field** [2]
  See *Configuring the Counterflow in field task, page 96*

[1] The **Idle object** / **Removed object** tasks are related to Intelligent Video Analytics / Essential Video Analytics background image handling. As background handling is not needed for detector training, this tasks are not supported.
If an alarm is needed for a scene-specific object that stay too long at the same position, use the **Object in field** task with sufficient long debounce time.
If an alarm is needed for a scene-specific object no longer at the same position, you must use the VCA task script language.

[2] The **Crowd detection**, **Tampering**, **Flow in field** and **Counterflow in field** tasks cannot evaluate single objects and their location; but statistics, optical flow and other properties.

See also
- *Tasks, page 35*
- *Tasks (Flow), page 46*

3.2.5   Supported / not supported object filters

Supported object filters

The following object filters support the Camera Trainer module:
–   Class
–   Direction
–   Size [1]
–   Aspect ratio [1]

[1] Scene-specific objects have a fixed size and aspect ration. Therefore a **Size** and **Aspect Ratio** filter only make sense if separation against other objects is needed.

Not supported object filters

The following object filters do not support the Camera Trainer module:
–   Velocity (no 3D ground tracking)
–   Color

See also
–   *Conditions in tasks, page 36*

3.2.6   Technical details

–   Detectors: maximum 16
–   Objects per detector per frame: maximum 100
–   Objects per frame (including VCA): maximum 1024
–   Samples per detector: maximum 1024 positive samples and 1024 negative samples
–   Detectors running in real-time:
    –   Largest size: approximately 10 detectors
    –   Smallest size: 16 detectors
–   Image resolution (accessed by detector)
    –   640x360 / 640x480 / 640x640
    –   320x180 / 320x240 / 320x320
–   Detector blocks: 8x8 pixel
–   Minimum detector blocks: 4x4 pixel
–   Maximum detector blocks: 64
    Note: If more than 64 blocks with 8x8 pixels are needed, automatic switch to low-resolution 320x180 image.
–   Maximum height: 16 blocks (128 pixel)
–   Maximum width: 32 blocks (256 pixel)
–   Maximum size of quadratic detector: approximately 1/5 of image width and 1/3 of image height for 16:9
    Note: Non-quadratic detectors are possible.
–   Size is automatically restricted in the Configuration Manager program.

3.2.7   Supported cameras

The Camera Trainer module is available on all Bosch IP color cameras using Intelligent Video Analytics on CPP 6 / 7 / 7.3 platform with firmware version 7.10 and later. Thermal cameras are not supported (for example, DINION IP thermal 8000 / MIC IP fusion 9000 thermal channel).
Camera Trainer **capable cameras**:
Following list includes all cameras supported up to the publication date of this manual.
–   CPP6
    –   DINION IP starlight 8000 MP (NBN-80052)
    –   DINION IP ultra 8000 UHD (NBN-80122)

- – FLEXIDOME IP panoramic 7000 (NIN-70122)
- – CPP7
    - – DINION IP starlight 7000 HD (NBN-73013, NBN-73023, NBN-74023)
    - – FLEXIDOME IP starlight 7000 HD (NIN-73013, NIN-73023)
- – CPP7.3
    - – MIC IP starlight 7000i (MIC-7502-Z30)
    - – MIC IP fusion 9000i (MIC-9502-Z30) color channel

Note: 3rd Party cameras (ONVIF) are not supported.

3.2.8 Licenses

A free of charge license is required to activate the Camera Trainer program.

To activate the license in the Configuration Manager program:

1. Start the Configuration Manager program.
2. Select the camera, click the **Service** tab, then click the **Licenses** tab.
3. In the **Activation key** box, enter the license key, then click **Save**.
   The activated licenses are displayed in the **Installed licenses** list.

---

i | **Notice!**
You can also activate the license using the web browser.

3.3 MOTION+

MOTION+ is available on all Bosch IP cameras.

Change detection with MOTION+

MOTION+ can detect and analyze changes in the signal using image processing algorithms. Such changes can be due to motion in the camera's field of view.

Thereby MOTION+ detects changes in the image by comparing the current image with a some seconds older image.

The changes are aggregated in detection blocks. You can configure how many of these detection blocks must indicate changes over which amount of time before generating an alarm event.
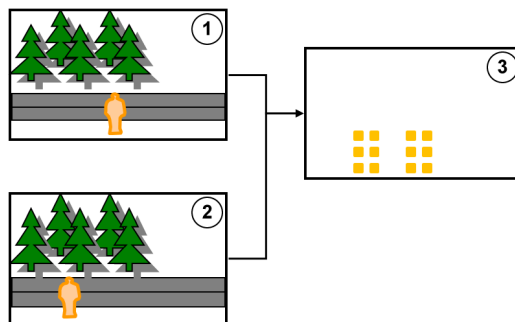
1	Former image	**2**	Current image
3	Change detection		

MOTION+ resolution

MOTION+ aggregates pixel information into processing blocks. These blocks are, in the internal resolution used for processing, either 6x6 pixel large with 1 pixel overlap to the next blocks, or 8x8 pixel with no overlap to neighbouring blocks, depending on whether the device

was Intelligent Video Analytics capable up to Firmware 6.10 and earlier. From Firmware 6.10 and later, all devices use the 8x8 pixel block raster. At the image border, there is an insensitive area with a width of approximately one block.

MOTION+ blocks

6 x 6 block raster,
1 pixel overlap

8x8 block raster,
without overlap

3.3.1   Use cases

MOTION+ is available on all Bosch IP cameras and suitable for event based recording.

> **Notice!**
> For proper intrusion detection, use the Essential Video Analytics or IVA Intelligent Video Analysis program.

3.3.2   Limitations MOTION+

Observe the following limitations when using MOTION+:

– Due to reflections, objects or motion might not be reliably detected or too many objects or motions might be detected. False alarms can be caused by:
  – Reflective backgrounds
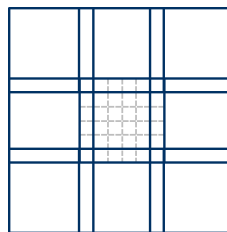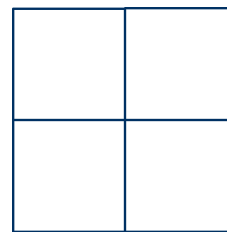 – Glass (glazed building frontages)
  – Water as a background
  – Light beams moving in the dark
– Sudden appearance of spotlights, moving headlights or torch beams lightening up an area can be mistaken for an object.
– Large areas of reflected light can also cause spurious motion detection. However, light reflections caused by falling raindrops, for example, are small enough to be ignored for statistical purposes and owing to the uniform nature of their motion.
– Motion of vegetation due to wind is covered for slow, continuous and uniform wind. If this motion overlaps with objects, false as well as missed detections are possible. To avoid this, adjusting the camera position is necessary.
– Strong wind, storms and heavy blasts from different directions, especially in the foreground of a scene, can trigger false alarms.
– Suddenly appearing sharp shadows of clouds, trees and buildings can be mistaken as objects. Soft shadows are covered by the algorithm.
– The outline of an object in strong sunlight with a crisp shadow may include the shadow of the object. Consider this for aspect ratio and object size filters. Soft shadows are covered by the algorithm.
– A constant background is necessary in order to detect motion reliably and to assign that motion to a particular object. The more the background changes, the harder it is to distinguish moving objects from the background. For example, a person walking in front of a hedge that is moving in the wind very probably cannot be detected.

> – If objects cannot be distinguished from each other or from the background, the motion of an individual object cannot be detected, for example, individuals in a large crowd or a idle object in a large crowd.

3.3.3 Licenses

MOTION+ is activated on all suitable cameras ex work. No license is needed.

> **Notice!**
> You obtain the current firmware from your customer service or from the download area on our Internet site.
> Upgrade the firmware directly by using the Web browser view of the device or by using Configuration Manager.

3.4 Tamper detection

The built-in tamper detection allows you to detect camera manipulations. An alarm event can be triggered as soon as the camera is moved, partially obscured, severely defocused, covered or sprayed.

3.4.1 Use cases

The feature is suitable for the following use cases:
– Detecting camera blinding
– Detecting whether camera is moved off target
– Detecting insufficient overall illumination
– Detecting idle or removed objects

3.4.2 Limitations Tamper detection

The **Tamper detection** feature is not available on thermal cameras.

3.4.3 Licenses

No license is needed. You must activate the **Tamper detection** feature in the VCA configuration.

> **Notice!**
> You obtain the current firmware from your customer service or from the download area on our Internet site.
> Upgrade the firmware directly by using the Web browser view of the device or by using Configuration Manager.

3.5 Intelligent Tracking

The Intelligent Tracking software automatically zooms in a selected Intelligent Video Analytics object and tracks the object with the camera as far as possible.
This means for the following cameras:
– For AUTODOME / MIC IP 7000 cameras
  The Intelligent Tracking software automatically zooms in the selected object and tracks it.
– For FLEXIDOME IP panoramic 7000 cameras
  The Intelligent Tracking software is available in the virtual PTZ video image and controls the dewarping deactivation.
– For DINION / FLEXIDOME IP 7000 / FLEXIDOME IP 8000 cameras
  The Intelligent Tracking software can control a region of interest (ROI) stream.

Motion detection with clustering of same motion and tracking
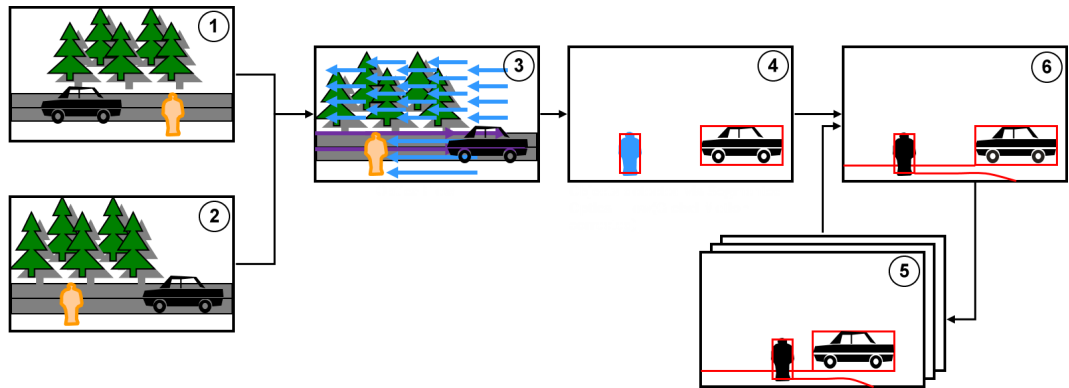
1	Former image	**2**	Current image
3	Optical Flow	**4**	Objects detected with Segmented Optical Flow (Global Motion corrected)
5	Tracks in previous frames	**6**	Tracking

3.5.1   Use cases

Intelligent Tracking is suitable for any scenarios where moving objects must be tracked.

3.5.2   Limitations Intelligent Tracking

The Intelligent Tracking feature is available on AUTODOME and MIC cameras.

– Intelligent Video Analytics is required to start the Intelligent Tracking software:
  Note: MOTION+ and Intelligent Video Analytics Flow cannot start the Intelligent Tracking software.
– The Intelligent Tracking software cannot reliable detect objects if motion is in the background, for example, wind in trees or moving water. If possible, mask out these areas.
– AUTODOME / MIC IP 7000 cameras
  – If a suspicious object is tracked with the Intelligent Tracking software, another suspicious object will not be detected in the areas currently not covered by the cameras field of view.
  – If the camera needs to significantly zoom in a distant suspicious object, the object may be lost while zooming.
  – Objects moving towards the camera, especially with low perspective, may appear too small to be tracked reliably.
  – The Intelligent Tracking software cannot detect objects on the water surface.

3.5.3   Licenses

No license is needed.

4 Basics for Intelligent and Essential Video Analytics

This chapter describes basic information when using Intelligent Video Analytics and Essential Video Analytics.

4.1 Camera image

A camera image is that part of a area which is monitored by the camera.

4.2 Objects

Objects are typically people or vehicles moving within the area seen by the camera. Objects can be filtered according to certain properties (size, aspect ratio, direction of movement, speed, location, color). An alarm event can be generated if objects match certain parameters. Objects that do not match the criteria you define are filtered out and do not generate an alarm event.

In general the base point of an object is relevant for generating an alarm event. Some tasks allow you to make another selection.

4.3 Object triggers

Object triggers allow you to select the exact moment, when an object generates an alarm event. The basis for analysis is either the virtual frame (bounding box) around an object or the calculated 3D base point for **3D tracking** and **3D people tracking**.

The default behaviour for alarming is: **Object base point**

Depending on the application, the following types of object triggers are used:
– Object triggers that are based on fields
– Object triggers that are based on lines
– Object triggers that are based on routes

Notice!

To display the virtual frame around an object: Right-click into the camera image, then click **Show** > **Object Bounding Boxes**.

To display the trajectory of an object: Right-click into the camera image, then click **Show** > **Trajectories**

4.3.1 Object triggers based on fields

The object triggers are available in all tasks that enable you to restrict the detection area to a field.

The following object triggers are available:
– **Object base point:** An object generates an alarm if the base point of the object is inside the sensitive area.

– **Object center**: An object generates an alarm if the center of the object is inside the sensitive area.

– **Edge of box**: An object generates an alarm if one of the edges of the virtual frame around the object is inside the sensitive area.

– **Complete box**: An object generates an alarm if the virtual frame around the object is completely inside the sensitive area.

> **Notice!**
>
> When configuring the **Leaving field** task, note that the alarm is generated as soon as the object is no longer in the field. Thus the different object triggers behave as follows:
>
> The object trigger **Edge of box** generates an alarm event if no edge of the object is any longer within the field and thus the object is completely outside the field.
>
> The object trigger **Complete box** generates an alarm event as soon as any part of the virtual frame around the object is outside the field.

See also

- *Configuring the Object in field task, page 57*
- *Configuring the Loitering task, page 61*
- *Configuring the Condition change task, page 63*
- *Configuring the Removed object task, page 67*
- *Configuring the Idle object task, page 69*
- *Configuring the Entering field task, page 71*
- *Configuring the Leaving field task, page 73*
- *Configuring the Occupancy task, page 79*

4.3.2   Object triggers based on lines
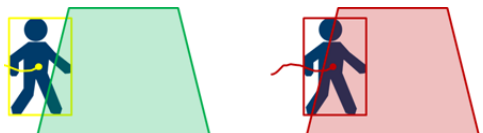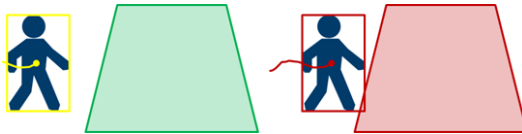
The object triggers are available in all tasks that enable you to restrict the detection to line crossing.

The following object triggers are available:

– **Object base point:** An object generates an alarm if the base point of the object crosses the line.

– **Object center**: An object generates an alarm if the center of the object crosses the line.

See also

- *Configuring the Crossing line task, page 59*
- *Configuring the Counter task, page 77*

4.4   Calibration

Camera calibration is necessary to detect objects correctly for the following features:

– Object filter for size and speed in the metric or imperial system.

- – Object filter of the following type:
  - – **Upright persons**
  - – **Bikes**
  - – **Cars**
  - – **Trucks**
- – **3D tracking** mode, which tracks objects on the ground plane
- – **3D people tracking** mode, which interprets everything as person and tracks these on the ground plane. Use this tracking mode for people counting, optimally for a top-down view.
- – Geolocation of tracked objects.
- – Double detection distance (only for Intelligent Video Analytics on CPP6 and CPP7 cameras).

With camera calibration a link is made for each camera position between the size of the real-life situation and the dimensions as they appear on the camera image. For example, you tell the software that an object on the camera image is 2 m high in reality.

To obtain a calibration, some known camera values are set automatically by the system. Other values must be entered manually, for example, tilt angle, roll angle, camera height, focal length (if variable).

Notice!

For AUTODOME, MIC and CPP7 cameras the roll angle and tilt angle is set automatically.
For AUTODOME, MIC and FLEXIDOME cameras, the focal length is set automatically. All these values can also be changed manually on demand.
To update changes in camera position and orientation, close the VCA configuration and open it again.

Tilt angle [°]
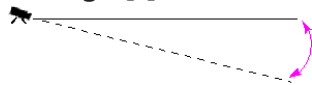
A tilt angle of 0° means that the camera is mounted parallel to the ground.
A tilt angle of 90° means that the camera is mounted vertically in birds eye view perspective.
The flatter the tilt angle is set, the less accurate the estimate of object sizes and speeds will be.
The settings must be between 0° and 90°.
Estimates are no longer possible when you have reached 0°.

Roll angle [°]
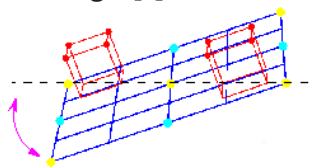
The roll angel can deviate from the horizontal by up to 45 degrees.

Elevation [m]

Typically the elevation of the mounted camera above the ground.

Focal length [mm]

The focal length is determined by the lens. The shorter the focal length, the wider the field of view. The longer the focal length, the narrower the field of view and the higher the magnification.

	Notice!
i	The camera must be recalibrated each time the camera position is changed.

See also
– *Calibrating the camera, page 81*
– *Configuring the global settings, page 84*

4.5   Object classification

Object classification is used to simplify the usage of the Intelligent Video Analytics program by providing an automatic object type detection based on specific values typically for this objects types.
In some scenarios, the differentiation of objects is needed, for example, a gate where only cars are allowed to pass but no persons.
The object classification differentiates between:

– **Upright persons**

– **Cars**

– **Trucks**

– **Bikes** (either bicycle or motorbike)
– Camera Trainer object classes (if licensed)

	Notice!
i	To activate object classification, calibrate the camera and choose a 3D tracking mode. To display the object classification flags, right-click into the camera image, then click **Show** > **Class Flag**.

See also
– *Calibration, page 30*
– *Configuring the Object in field task, page 57*
– *Configuring the Crossing line task, page 59*
– *Configuring the Loitering task, page 61*
– *Configuring the Condition change task, page 63*
– *Configuring the Following route task, page 65*
– *Configuring the Removed object task, page 67*
– *Configuring the Idle object task, page 69*
– *Configuring the Entering field task, page 71*
– *Configuring the Leaving field task, page 73*
– *Configuring the tracking parameters, page 85*

4.6   Field

Fields are polygons that cover a certain area, for example an entrance or the open space in front of a barrier. These fields are created by you. Objects that move within a field can generate an alarm event.

See also
– *Configuring the Object in field task, page 57*

4.6.1   Displaying fields in the camera image

Fields are displayed as follows:

A field that is not being used in any tasks is displayed in gray.

A field that is being used in a task is displayed in green. Used fields can be edited but not deleted.

A field for which there is currently an alarm event is displayed in red.

4.6.2   Creating and editing a field

You can create a new field. A field can also be edited at any time. This includes:
–   Changing the field size
–   Moving the field
–   Inserting or deleting nodes

To create a new field:
▸   Click into the camera image to begin with the first corner of the field, then click again for each corner. Finish the field by double-clicking.

To change the size of the field:
1.   Select the field.
2.   Drag the line or the corners (nodes) of a field to the desired position in the camera image.

To move a field:
1.   Select the field.
2.   Drag the field as a whole to the desired position in the camera image.

To insert a corner (node):
1.   Select the field.
2.   Right-click a line, then click **Insert Node**.
      or
      Double-click a line. A node is automatically inserted.

To delete a corner (node):
1.   Select the field.
2.   Right-click a node, then click **Delete Node**.

4.7   Line

A line can be compared to a virtual trip wire. Objects that cross a line you have defined in a pre-defined direction can trigger an alarm event.

See also

4.7.1 Displaying lines in the camera image
Lines are displayed as follows:
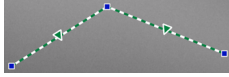
A line that is being used in a task is displayed in green. Used lines can be edited but not deleted.
The triangle marks the direction in which an object must cross a line in order to generate an alarm event. If an alarm event is generated each time the line is crossed, regardless of the direction, no arrow is displayed.
A line can consist of several segments.
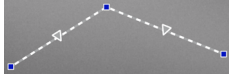
A line that is not being used in any tasks appears dimmed.

Notice!
If a line is integrated into a task, you can choose the direction in which the line must be crossed in order to trigger an alarm.

4.7.2 Creating and editing a line
You can create a new line. A line can be edited at any time. This includes:
– Inserting and deleting nodes
– Moving nodes (changing size and direction)
– Moving lines

To create a new line:
▸ Click into the camera image. Each click creates a new node of the line. Double-click to finish the line.

To insert a node:
1. Select the line.
2. Right-click a line or a segment of the line, then click **Insert Node**.
   or
   Double-click a line. A node is automatically inserted.

To delete a node:
1. Select the line.
2. Right-click a node, then click **Delete Node**.

To change the size and direction of a line:
1. Select the line.
2. Drag a node and move it to the desired position.

To move the line:
▸ Drag the line and move it to the desired position.

4.8 Route
Objects that move along a route you have defined in a pre-defined direction can trigger an alarm event. It is possible to include deviations from this route using the relevant tolerance defaults.

Notice!
If a route is integrated into a task, you can select the direction in which movement along the route must trigger an alarm.

See also
– *Configuring the Following route task, page 65*

4.8.1 Displaying routes in the camera image

Routes are displayed as follows:
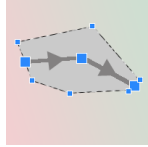
A route that is not being used in any tasks is displayed in gray.
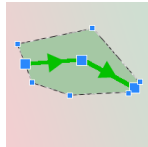
A route that is being used in a task is displayed in green. Used routes can be edited but not deleted.
A triangle marks the direction in which an object must follow the path in order to generate an alarm event. If an alarm event is generated each time there is movement along the route, regardless of the direction, no arrow is displayed.

4.8.2 Creating and editing a route

You can create a new route. A route can be edited at any time. This includes:
– Inserting or deleting nodes
– Moving nodes (changing the course of a line)
– Changing the tolerance range
– Moving routes

A route is displayed as a line with an assigned direction. The line includes a tolerance range, which is displayed as an area. The tolerance range is axis-symmetric to the respective section of the central line. An extension to the tolerance range can be individually defined at any node.
To create a new route:
▸ Click into the camera image. Each click creates a new node of the route. Double-click to finish the route.

To insert a node:
1. Select the route.
2. Right-click a line, then click **Insert Node**.
   or
   Double-click a line. A node is automatically inserted.

To delete a node:
1. Select the route.
2. Right-click a node, then click **Delete Node**.

To change the course of the route:
1. Select the route.
2. Drag a node of the route and move it to the desired position.

To change the tolerance range:
1. Select the route.
2. Drag the marking next to a node and move it to the desired position.

To move the route:
▸ Drag the route and move it to the desired position.

4.9 Tasks

The result of a task is usually an alarm event. An alarm event can be analyzed in a CCTV system in many ways. In this way, a recording can be started, a door closed or an e-mail sent, for example.

Examples of typical events that can trigger an alarm:
- – An object moves within a defined area.
- – An object crosses one or more lines, for example an automobile drives into a parking space.
- – An object stops in certain areas without any target-specific motion (loitering).
- – An object moves along a defined route.
- – A piece of luggage is set down (idle object).
- – An object is removed (theft).
- – The camera is tampered with.

> **Notice!**
> You can configure the **Counter** and **Occupancy** tasks not to generate an alarm event but deliver the counts only.

See also
- – *Configuring tasks, page 57*

4.9.1 Creating and editing a task

To create a new task:
▸ Click **New**, select the task, then click **OK**.

To change the task name:
▸ Click the task, then click the name of the task and change it.
Note: A task has an red background if an alarm event is currently being triggered by this task.

To edit a task:
▸ Select the task, click **Edit**, then change the settings.
or
Double click the icon to the left of the task name to open the task for editing.

To activate a task:
▸ In the **Alarm** column, click the check box to the right of the task name.

To rename a task:
▸ Select the task, then click the task name and enter the new name.

To delete a task:
▸ Select the task, then click **Delete**.

4.10 Conditions in tasks

You can precisely limit the property (condition) of an object that triggers an alarm event.
Objects that do not correspond to the properties specified do not trigger an alarm event.
A property is used to search for an object if you activate the relevant option.
After an option has been activated, the property range can be set directly or with the manipulable visualization provided.
Properties can also be adopted from a tracked object by selecting it. This selected object is then marked with a yellow flag.

Object Area [m²]
Only objects whose size (the area covered) corresponds to the entered values generate an alarm event.

Aspect Ratio V/H
Objects whose aspect ratio corresponds to the entered values generate an alarm event.

The minimum and maximum ratios are graphically displayed in the camera image as two yellow rectangles. By default, values are set with which all objects trigger an alarm event.
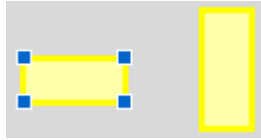
The ratio is the quotient of the vertical and horizontal extension of the object in the image captured by the camera. The actual aspect ratio can deviate from this.
The aspect ratio of a vehicle changes if it changes its direction by 90°.
Persons captured directly from above always have the same aspect ratio in the image, irrespective of their actual size.
Note: The aspect ratio of a person changes if the person falls down or stands up, except the **3D people tracking** mode is selected. In **3D people tracking** mode the person shape remains in upright position.

Speed [km/h]
Only objects moving at a speed that corresponds to the entered values generate an alarm event.

Notice!
The speed of a motion at a right angle to the camera can be determined much more accurately than the speed of a motion directly toward or away from the camera.
The speed of closer objects can be determined much more accurately than that of objects further away.
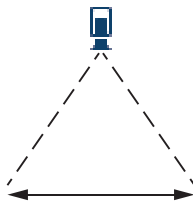
Object moves at a right angle to the camera:
speed is detected more accurately
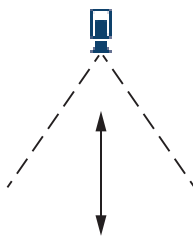
Object moves in camera's line of sight:
speed is detected less accurately

Direction 1 [°] / Direction 2 [°]
Only objects moving in a certain direction generate an alarm event. The direction is determined by entering an angle.
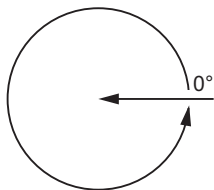
0° corresponds to the direction of motion from right to left.
It is counted counter-clockwise.

Another direction can be optionally entered. In this way, movements are captured in two directions.

The direction is graphically displayed by a yellow circle segment in the camera image.

Notice!

Only use the speed and direction filters for detecting truly significant movements. Select your settings to ensure the most robust results possible.

4.11   Color

You can describe the color properties of the searched object. The color properties of an object are mainly used in forensic searches to detect moving objects by their color. As objects rarely appear in one single color, the colors are detected by analyzing the different proportions of color according to their frequency. This means that, for example, you can search for objects that consist of up to 25% dark red pixels but also include up to 20% light gray pixels at the same time.

Color properties used for filtering can be adopted and refined using a marked object.

Notice!

The detection of color is not possible for objects that are only displayed with very few pixels.

Colors are described using the HSV color model.
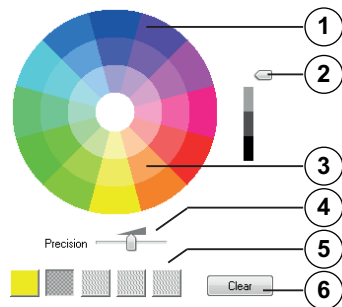
1   Color cylinder

All colors are displayed in 3D. In the illustration, you see a color cylinder from above, in which the saturation fades from the exterior to the interior and the value fades from the top to the bottom.

In the color wheel, the tones used in the search for objects are displayed unshaded.

Notice!

The graphic displays the maximum spectrum that is taken into account. If several colors are selected, this spectrum is only taken into account in full if the other colors correspond exactly to their individual definitions. The greater the deviation, the narrower the spectrum that is taken into account for the individual colors in the search.

2   Slider (brightness)

Use this slider to select the degree of brightness for the colors. The display shows a higher or lower section of the color cylinder according to the slide control setting.

3   Colors

Colors you can select for the search. The colors are displayed in the squares below the color cylinder.

4   **Precision** slider.
Defines how exactly the colors must correspond for an object to be detected.
Slider at the far left position: The selected color is not detected.
Slider at the far right position: The selected color must match exactly to be detected.
Note: The accuracy range you have defined with the slider can be used for only one color or can be shared between several selected colors.
This means:
–   One color uses the entire accuracy range and the other colors must match exactly.
       or
–   All colors share less accuracy between each other.

5   Displays the colors you have selected in the color cylinder. The further left the selected color is arranged in the squares, the higher its proportion of the object's color properties.
The importance of the colors in the search is from left to right: 25%, 20%, 15%, 10% and 5%.
Note: If a lot of different colors with low precision are selected, almost all colors trigger unwanted alarms. We recommend being more selective and precise.

6   **Clear**
Deletes a selected color.

4.12   Global settings

Intelligent Video Analytics allows frontal face detection. Face information are included in the metadata stream.
Snapshots of the best face images are generated automatically and uploaded to FTP or Dropbox accounts.
You can search for faces using the web page.

> **Notice!**
> The **Global Settings** page informs you whether the selected camera is calibrated. And in case of panoramic cameras, where you must calibrate the camera.

4.13   Sensitive area

Use VCA masks to exclude disturbing objects or areas that are irrelevant for alarm event generation.
Only objects moving outside VCA masks, in the sensitive area of the camera image, are detected as such and generate an alarm event. Objects moving inside VCA masks cannot generate an alarm event even if they are caught by the camera.
In the default setting, the whole camera image is defined as sensitive area.

> **Notice!**
> Initial object detection is only performed in sensitive areas. However, the object shape may grow considerably into insensitive areas to include those parts of the object as well.

Examples where we recommend the use of VCA masks:
–   Railroad:

Passing trains can trigger unwanted motion alarms.
– Public streets:
Passers moving across a public space should not be detected in order to save unnecessary computing power and prevent unwanted false alarms.
– Neighboring properties:
Areas in which moving objects are not anticipated.
– Sky:
Birds or planes can trigger false alarms.
– Trees, bushes or flags that move in the wind.

> **Notice!**
> Using Intelligent Video Analytics for forensic search in recordings, motion analysis is only possible in the area that was previously marked as the sensitive area in the recording.

See also
– *Configuring the sensitive area, page 84*
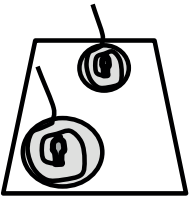
4.14 Loitering

This task generates an alarm event if an object only moves slightly within a certain area for a specified period. The area is defined by a field in the camera image.
The alarm can also be restricted to objects within a detection field. This detection field is independent from the evaluated loitering radius.
The loitering radius is always centered on the evaluated object. If the object is in motion, the loitering radius moves as well and the loitering condition is re-evaluated based on the former path of the object.

Examples:	
	No alarm: Object trajectory is in the loitering radius but object is not in the field
	Alarm: Object is in the field and the object trajectory is in the loitering radius. Loitering radius and detection field are independent. An alarm is also generated if the object but not the complete loitering radius is in the detection field.
	Alarm: Object is in the field and the object trajectory is in the loitering radius.

	Calibration: The loitering radius is adapted according to the camera calibration.

4.15 Crowd fields

A crowd field is that part of the image captured by the camera that is analyzed for crowd detection. Objects moving outside a crowd field cannot generate an alarm event even if they are caught by the camera.

Only objects within the crowd field are detected as such. An alarm event is generated if within a crowd field a certain density of objects is reached.

See also
–   *Configuring the crowd fields, page 87*

4.16 Metadata inspection - statistics

Displays histograms with statistics on the relevant detected motions, either for a selected field or for the whole screen.

The statistics help you to monitor the properties of a marked object over a longer period of time and to observe the changes. This allows you to refine the filter criteria for objects. For example, you may see accumulations of objects that have not triggered an alarm under the current filter criteria even though this might have been desirable.

The creation of the displayed statistics starts as soon as you open the window. The longer the window is left open, the more values will be entered into the statistics.

The statistics show the following histograms:
–   **Object Area [m²]**: accumulation of objects with a certain area.
–   **Aspect Ratio V/H**: accumulation of objects with a certain aspect ratio.
–   **Speed [km/h]**: accumulation of objects moving at a certain speed.
–   **Direction [°]**: accumulation of objects moving in a certain direction.
–   **Color**: Displaying color properties.
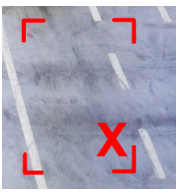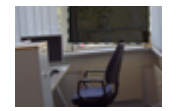
See also
–   *Metadata inspection - statistics, page 87*

4.17 Image information

Depending on the configuration of Intelligent Video Analytics and Essential Video Analytics, additional overlays in the image, for example object outlines, can provide more information. These object outlines are displayed in real time and are always synchronized exactly with the moving object. During life view, the metadata arrive one frame after the respective camera image, and thus the outlines do not always exactly surround the object.

Display	Description
	Objects that generate an alarm event under the current settings appear on the camera image inside a **red** outline.

Display	Description
	An object that has triggered one alarm event but does not generate another appears inside an **orange** outline (example: object has crossed a line). During forensic search, an object that will trigger an alarm event has an orange outline from the beginning.
	Objects that are detected as moving but do not generate an alarm event under the current settings appear inside a **yellow** outline.
	The point at which an object is detected as idle is displayed inside a frame and marked with an **i**.
	The point at which an object is detected as having been removed is displayed inside a frame and marked with an **X**.
	A **green** line represents the recent trajectory of an object.
	A **yellow** flag marks the currently selected object. The properties of this object can be displayed when a task is created. The properties are also displayed in the **Metadata Inspection** statistics. An object can only be selected if you have selected the **Metadata Inspection** tab or if you process the **Approximation** step when creating a task.
	VCA masks are displayed in transparent black.
	Indicates that an object is detected as person.
	Indicates that an object is detected as car.
	Indicates that an object is detected as truck.
	Indicates that an object is detected as bike.

4.18   Scenarios

Scenarios are application with pre-defined settings that are adapted to specific use cases. All relevant settings, from tasks to metadata, are set automatically by the system.

The following scenarios are available:

–   Intrusion (one field)

–   Intrusion (two fields)

–   People counting

–   Traffic incidents

–   Traffic wrong way

> **Notice!**
>
> A camera calibration is required for all scenarios.
>
> Using the scenarios will reset the VCA configuration to the scenario defaults.
>
> All values (**Metadata Generation** and **Tasks**) can be edited after activating the scenario defaults.
>
> Delete tasks that do not fit your use cases.

4.18.1   Intrusion (one field)

This scenario is a very robust intrusion detection for medium distances. It is optimized for detecting persons. For other objects, the object filter for **Aspect Ratio** and **Speed** should be deleted.

Selecting the scenario the algorithm automatically adapts the settings as follows

–   3D tracking

      For perspective evaluation and automatic rejection of false alarms with unplausible size for their location.

–   Sensitivity 60%

–   Strong noise suppression

      For a least amount of false alarms and best robustness to all weather conditions.

–   Task: **Object in field** (single field)

–   Object filter: Aspect Ratio minimum 1.5 and maximum 10

      Typical for persons. Adjust the value if other objects should be detected, for example, cars.

–   Object filter: Speed more than 2 km/h

      Typical for persons. Adjust the value if other objects should be detected, for example, cars.

–   Idle object / Removed objects disabled

–   Tamper detection disabled

To activate the scenario:

1.   In the **Main Operation** tab, select **Intrusion (one field)**.

2.   Click **Apply** to activate the scenario. A message is displayed that the VCA configuration will be set to the scenario default.

3.   Click **Yes**. The settings are applied automatically.

4.18.2   Intrusion (two fields)

This scenario is suitable for intrusion detection for long distances, for example, along fences. It is optimized for detecting persons. For other objects, the object filter for **Aspect Ratio** and **Speed** should be deleted.

Selecting the scenario the algorithm automatically adapts the settings as follows

 – 3D tracking
   For perspective evaluation and automatic rejection of false alarms with unplausible size for their location.
 – Sensitivity 60%
 – Medium noise suppression
   Enables double detection distance together with 3D tracking, while still rejecting many false alarms.
 – Tasks: **Left to right** and **Right to left** based on the **Object in field** task with 2 fields in corresponding order.
 – Object filter: Aspect Ratio minimum 1.5 and maximum 10
   Typical for persons. Adjust the value if other objects should be detected, for example, cars.
 – Object filter: Speed more than 2 km/h
   Typical for persons. Adjust the value if other objects should be detected, for example, cars.
 – Idle object / Removed objects disabled
 – Tamper detection disabled

To activate the scenario:
1. In the **Main Operation** tab, select **Intrusion (two fields)**.
2. Click **Apply** to activate the scenario. A message is displayed that the VCA configuration will be set to the scenario default.
3. Click **Yes**. The settings are applied automatically.

4.18.3 People counting

This scenario is suitable for counting people crossing lines.

Selecting the scenario the algorithm automatically adapts the settings as follows
 – 3D people tracking
   Everything is interpreted as a person. This allows to separate close persons.
 – Sensitivity 100%
   and
   Noise suppression off
   Objects moving through in top-down perspectives, as recommended for counting, as well as in close range to the camera in general, spend only very little time in the camera's field of view. In order to detect them immediately, no complex trajectory evaluation for suppressing false detections from complex backgrounds or harsh weather conditions should be done, nor is it necessary. Raising sensitivity means that objects will be accepted by the video analytics within shorter time and distance traveled. Noise suppression uses additional trajectory analysis to suppress false objects, delaying the detection. Therefore, it is also disabled for the people counting scenario.
 – Task: **Counter** (line crossing)
 – Line: Debounce time 0.1 seconds
   By lowering the debounce time to 0.1 seconds, people need to be observed only a very short period. One frame before and one frame after crossing the line is sufficient to be detected as line crossing. A debounce time of 0 seconds should never be used, because a person standing on the line would produce many counts.
 – Stopped object: Debounce time 300 seconds
   Raising the debounce time to 300 seconds means that all objects that stopped moving will be tracked for another 300 seconds before being put into the background and therefore get lost for the algorithm. If people regularly stand still in your scenario for longer than 300 seconds, increase the stopped object debounce time even further.

–   Idle object / Removed objects disabled
–   Tamper detection disabled

To activate the scenario:
1.   In the **Main Operation** tab, select **People counting**.
2.   Click **Apply** to activate the scenario. A message is displayed that the VCA configuration will be set to the scenario default.
3.   Click **Yes**. The settings are applied automatically.

4.18.4   Traffic incidents

This scenario is suitable for general traffic incidents, for example wrong way drivers, pedestrians on the road and slow and stopped vehicles.

Selecting the scenario the algorithm automatically adapts the settings as follows
–   3D tracking
      Due to perspective evaluation, for example, speed evaluation, and good robustness.
–   Stopped object: Debounce time 15 seconds
–   Static object: Debounce time 20 seconds
–   Tasks: **Wrong way, Pedestrian, Slow vehicle, Stopped vehicle** and **Dropped object**
–   Tamper detection disabled

To activate the scenario:
1.   In the **Main Operation** tab, select **Traffic incidents**.
2.   Click **Apply** to activate the scenario. A message is displayed that the VCA configuration will be set to the scenario default.
3.   Click **Yes**. The settings are applied automatically.

4.18.5   Traffic wrong way

This scenario is suitable for detecting wrong way drivers.

Selecting the scenario the algorithm automatically adapts the settings as follows
–   3D tracking
      Due to perspective evaluation, for example, speed evaluation, and good robustness.
–   Sensitivity 80%
      Higher sensitivity to detect fast cars sooner. No challenging background assumed.
–   Medium noise suppression
      For longer detection distances.
–   Task: **Wrong way**
      Object crossing one line after the other. A crossing of both lines is necessary to reliable filter false alarms, for example, in case of shadows or merged objects.
–   Line: Debounce time 0.1 seconds
      By lowering the debounce time to 0.1 seconds, a car needs to be observed only a very short period. One frame before and one frame after crossing the line is sufficient to be detected as line crossing. A debounce time of 0 seconds should never be used, because a car standing on the line would produce many counts.

To activate the scenario:
1.   In the **Main Operation** tab, select **Traffic wrong way**.
2.   Click **Apply** to activate the scenario. A message is displayed that the VCA configuration will be set to the scenario default.
3.   Click **Yes**. The settings are applied automatically.

5   Basics for Intelligent Video Analytics Flow

This chapter describes basic information when using Intelligent Video Analytics Flow.

5.1   Tasks (Flow)

A task describes events that trigger an alarm event when detected in the camera image.

A task can be created using a wizard. Expert users can adapt tasks created in this way to their requirements using Intelligent Video Analytics Task Editor.

Examples of typical events that can trigger an alarm event:

–   An overall motion (flow) within an area.
–   Motion against the flow.
–   The camera is tampered with.
–   Crowd or queue detection.

The result of a task is usually an alarm event. An alarm event can be analyzed in a CCTV system in many ways. In this way, a recording can be started, a door closed or an e-mail sent, for example.

See also

–   *Configuring tasks, page 94*

5.1.1   Creating and editing a task

To create a new task:

▸   Click **New**, select the task, then click **OK**.

To change the task name:

▸   Click the task, then click the name of the task and change it.
      Note: A task has an red background if an alarm event is currently being triggered by this task.

To edit a task:

▸   Select the task, click **Edit**, then change the settings.
      or
      Double click the icon to the left of the task name to open the task for editing.

To activate a task:

▸   In the **Alarm** column, click the check box to the right of the task name.

To rename a task:

▸   Select the task, then click the task name and enter the new name.

To delete a task:

▸   Select the task, then click **Delete**.

5.2   Fields

Fields are polygons that cover a certain area, for example an entrance or the open space in front of a barrier. These fields are created by you. Objects that move within a field can generate an alarm event.

See also

–   *Configuring the Flow in field task, page 95*
–   *Configuring the Counterflow in field task, page 96*

5.2.1   Displaying fields in the camera image
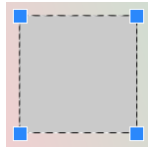
Fields are displayed as follows:

A field that is not being used in any tasks is displayed in gray.
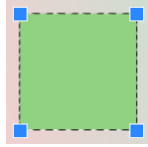
A field that is being used in a task is displayed in green. Used fields can be edited but not deleted.
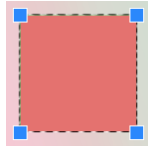
A field for which there is currently an alarm event is displayed in red.

5.2.2   Creating and editing a field

You can create a new field. A field can also be edited at any time. This includes:

–   Changing the field size
–   Moving the field
–   Inserting or deleting nodes

To create a new field:

▸   Click into the camera image to begin with the first corner of the field, then click again for each corner. Finish the field by double-clicking.

To change the size of the field:

1.   Select the field.
2.   Drag the line or the corners (nodes) of a field to the desired position in the camera image.

To move a field:

1.   Select the field.
2.   Drag the field as a whole to the desired position in the camera image.

To insert a corner (node):

1.   Select the field.
2.   Right-click a line, then click **Insert Node**.
      or
      Double-click a line. A node is automatically inserted.

To delete a corner (node):

1.   Select the field.
2.   Right-click a node, then click **Delete Node**.

5.3   Sensitive area

In the default setting, the whole camera image is defined as sensitive area. Use VCA masks to exclude disturbing objects or areas that are irrelevant for alarm event generation.
Only flows outside VCA masks, in the sensitive area of the camera image, are detected as such and generate an alarm event. Flows inside VCA masks cannot generate an alarm event even if they are caught by the camera.

See also
– *Configuring the sensitive area, page 97*

5.4   Metadata inspection - statistics

Displays histograms with statistics on the relevant detected motions, either for a selected field or for the whole screen.

The statistics help you to monitor the properties of a marked object over a longer period of time and to observe the changes. This allows you to refine the filter criteria for objects. For example, you may see accumulations of objects that have not triggered an alarm under the current filter criteria even though this might have been desirable.

The creation of the displayed statistics starts as soon as you open the window. The longer the window is left open, the more values will be entered into the statistics.

The statistics show the following histograms:

– **Slow Speed Direction Histogram [°]**
  Medium Speed Direction Histogram [°]
  Fast Speed Direction Histogram [°]
  (accumulation of objects moving at a specified speed in a certain direction)

– **Activity Histogram [% of area]**
  (accumulation of activity)

See also
– *Metadata inspection - statistics, page 98*
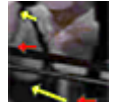
5.5   Image information

> **Notice!**
> The Intelligent Video Analytics Flow functionality differs from the Intelligent Video Analytics object recognition. The Intelligent Video Analytics Flow functionality detects an optical flow formed by the movement of individual blocks. Intelligent Video Analytics Flow does not use a camera calibration.

Depending on the configuration of Intelligent Video Analytics Flow, additional overlays in the image can provide further information.

Display	Description
	Red arrows indicate a detected flow that will generate an alarm event in accordance with the current settings.
	Yellow arrows indicate a detected flow that will not generate an alarm event.
	The arrows indicate the direction of movement of the detected block. The length of an arrow indicates the speed of the block. This ensures that movements that have been defined in more detail can be filtered out and will not trigger an alarm.

6   Basics for MOTION+

This chapter describes basic information when using MOTION+.

6.1   Camera image

A camera image is that part of a area which is monitored by the camera.

6.2   Field

Fields are polygons that cover a certain area, for example an entrance or the open space in front of a barrier. These fields are created by you. Objects that move within a field can generate an alarm event.

See also
– *Configuring the Detect any motion task, page 100*
– *Configuring the Motion in field task, page 100*

### 6.2.1   Displaying fields in the camera image

Fields are displayed as follows:

 A field that is not being used in any tasks is displayed in gray.

 A field that is being used in a task is displayed in green. Used fields can be edited but not deleted.

 A field for which there is currently an alarm event is displayed in red.

6.2.2   Creating and editing a field

You can create a new field. A field can also be edited at any time. This includes:
– Changing the field size
– Moving the field
– Inserting or deleting nodes

To create a new field:
▸ Click into the camera image to begin with the first corner of the field, then click again for each corner. Finish the field by double-clicking.

To change the size of the field:
1. Select the field.
2. Drag the line or the corners (nodes) of a field to the desired position in the camera image.

To move a field:
1. Select the field.
2. Drag the field as a whole to the desired position in the camera image.

To insert a corner (node):
1. Select the field.

2.   Right-click a line, then click **Insert Node**.
      or
      Double-click a line. A node is automatically inserted.
To delete a corner (node):
1.   Select the field.
2.   Right-click a node, then click **Delete Node**.

6.3 Tasks

A task describes events that trigger an alarm event when detected in the camera image (an object moving within a defined area, for example).
The result of a task is usually an alarm event. An alarm event can be analyzed in a CCTV system in many ways. In this way, a recording can be started, a door closed or an e-mail sent, for example.

See also
–   *Configuring tasks - general, page 100*

6.3.1 Creating and editing a task

To create a new task:
▸   Click **New**, select the task, then click **OK**.
To change the task name:
▸   Click the task, then click the name of the task and change it.
      Note: A task has an red background if an alarm event is currently being triggered by this task.
To edit a task:
▸   Select the task, click **Edit**, then change the settings.
      or
      Double click the icon to the left of the task name to open the task for editing.
To activate a task:
▸   In the **Alarm** column, click the check box to the right of the task name.
To delete a task:
▸   Select the task, then click **Delete**.

6.4 Sensitive Area

Sensitive area is that part of the camera image where motion can be detected.
Use VCA masks to exclude disturbing objects or areas that are irrelevant for alarm event generation.
Only objects moving outside VCA masks, in the sensitive area of the camera image, are detected as such and generate an alarm event. Objects moving inside VCA masks cannot generate an alarm event even if they are caught by the camera.
In the default setting, the whole camera image is defined as sensitive area.
Examples where we recommend the use of VCA masks:
–   Railroad:
      Passing trains can trigger unwanted motion alarms.
–   Public streets:
      Passers moving across a public space should not be detected in order to save unnecessary computing power and prevent unwanted false alarms.
–   Neighboring properties:
      Areas in which moving objects are not anticipated.
–   Sky:

Birds or planes can trigger false alarms.
–   Trees, bushes or flags that move in the wind.

> **Notice!**
> Using MOTION+ for forensic search in recordings, motion analysis is only possible in the area
> that was previously marked as the sensitive area in the recording.

See also
–   *Configuring the sensitive area, page 101*

6.5   Metadata inspection - statistics

When you select the **Metadata Inspection** tab, some histograms with statistics on the relevant
detected motions are displayed, either for a selected field or for the whole screen.
The statistics help you to monitor the properties over a longer period of time and to observe
the changes. This allows you to refine the filter criteria.
The creation of the displayed statistics starts as soon as you open the MOTION+ window. The
longer the window is left open, the more values will be entered into the statistics.
The statistics show the following histograms:
–   **Cell Cluster Histogram [% of Whole Screen]**
–   **Activity Histogram [% of area]**

See also
–   *Metadata inspection, page 102*
–   *Configuring the Motion in field task, page 100*

7   Basics for Tamper detection

This chapter describes basic information when using the **Tamper detection**.

Reference image

A fixed video image that shows the desired state concerning camera orientation and scene illumination, for example.

Reference check

Continuously compares the reference image with the current video image. If the current video image in the marked areas differs from the reference image, an alarm is triggered. This detects tampering that would otherwise not be detected.

The feature is suitable for the following use cases:

–   Detecting camera blinding
–   Detecting whether camera is moved off target
–   Detecting insufficient overall illumination
–   Detecting idle or removed objects

See also

–   *Configuring Tamper detection, page 103*

8   Starting VCA applications

You can start video analysis (VCA) as follows:
–   Use the Configuration Manager program.
        or
–   Use the Web browser view of the device.

The following applications are available:
–   Intelligent Video Analytics
–   Intelligent Video Analytics Flow
–   Essential Video Analytics
–   MOTION+
–   Tamper detection

Notice!

You must move the camera to the required position first in each case. When using
AUTODOME and MIC cameras, the individual presets must be specified before configuring the
VCA application for each preset. All settings you make, relate to the selected camera position.
This means that you must reconfigure the VCA application for this camera whenever you
change the direction or position of the camera.

See also
–   *Starting VCA using Configuration Manager, page 53*
–   *Starting VCA using Web browser, page 54*

8.1   Starting VCA using Configuration Manager

The Configuration Manager program can be installed on any Windows PC that communicates
with the respective device over a network. The Configuration Manager program needs no
license and no additional programs are required to analyze live images.
The system requirements and operation of Configuration Manager are described in the
Configuration Manager manual.
To start VCA using Configuration Manager:
1.   Start Configuration Manager.
2.   In the toolbar, click the **My Devices** tab, then select the device for which you wish to
       configure VCA.
       In the View area, click the **VCA** tab.
       The VCA start page is displayed and the camera image appears to the right.
3.   In the **Operating mode** list, select **Profile #1** or **Profile #2**.
       Note: To rename the profile, click 🖼.
       There are 16 profiles available for AUTODOME cameras. Each profile can be used for one
       preset.
4.   Only AUTODOME cameras: In the Pre-position list, select an entry.
       The camera positions for individual presets must be defined in advance. These presets
       may already be named individually.
       Only presets that are not yet linked to one of the profiles are available.
5.   In the **Scenario** list, select the desired pre-defined scenario, then click **Apply** to activate
       the selection.
       Note: A camera calibration is required for all scenarios.
       –   **Intrusion (one field)**
              Use this scenario for intrusion detection for medium distances.

- **Intrusion (two fields)**
  Use this scenario for intrusion detection for long distances, for example, along fences.
- **People counting**
  Use this scenario for counting people crossing lines.
- **Traffic incidents**
  Use this scenario for general traffic incidents, for example wrong way drivers, pedestrians on the road and slow and stopped vehicles.
- **Traffic wrong way**
  Use this scenario for vehicles driving the wrong way.

6. In the **Analysis type** list, select the respective VCA type.
    If you change the analysis type, the motion detection and tamper detection parameters revert to the default settings.
    As soon as the analysis becomes active, meta data is generated and, depending on the configuration, additional information is overlaid on top of the camera image — an object bounding box for example.

7. If necessary, select an **Aggregation time [s]** between 0 and 20 seconds.
    The aggregation time always starts when an alarm event occurs. It extends the alarm event by the value set. This prevents alarm events that occur in quick succession from triggering several alarms and successive events in a rapid sequence. No further alarm is triggered during the aggregation time. The post-alarm time set for alarm recordings only starts once the aggregation time has expired

8. Configure the VCA type using the following tabs.
    - **Tasks**
    - **Metadata Generation**
    - **Metadata Inspection**
    - **Tamper Detection**

---

i   **Notice!**
If the VCA configuration of this camera is in use, no other users can configure VCA of this camera at the same time. Only the first user is able to do this. Other users receive a message that configuration is not possible.

8.2   Starting VCA using Web browser

You can also start the VCA application using the Web browser view of the device.
To start VCA using the Web browser view:

1. Open the Web browser view of the device. To do this, in the address bar of the Web browser enter http://<IP address of the device>.

2. Click **Configuration** > **Alarm** > **VCA**.
    The VCA start page is displayed and the camera image appears to the right.

3. In the **VCA configuration** list, select **Profile #1** or **Profile #2**.
    Note: If necessary, click 🖊 to rename the profile.
    There are 16 profiles available for AUTODOME cameras. Each profile can be used for one preset.

4. Only AUTODOME cameras: In the Pre-position list, select an entry.
    The camera positions for individual presets must be defined in advance. These presets may already be named individually.
    Only presets that are not yet linked to one of the profiles are available.

---

5. In the **Scenario** list, select the desired pre-defined scenario, then click **Apply** to activate the selection.
    Note: A camera calibration is required for all scenarios.
    –   **Intrusion (one field)**
        Use this scenario for intrusion detection for medium distances.
    –   **Intrusion (two fields)**
        Use this scenario for intrusion detection for long distances, for example, along fences.
    –   **People counting**
        Use this scenario for counting people crossing lines.
    –   **Traffic incidents**
        Use this scenario for general traffic incidents, for example wrong way drivers, pedestrians on the road and slow and stopped vehicles.
    –   **Traffic wrong way**
        Use this scenario for vehicles driving the wrong way.
6. In the **Analysis type** list, select the respective VCA type.
    If you change the analysis type, the motion detection and tamper detection parameters revert to the default settings.
    As soon as the analysis becomes active, meta data is generated and, depending on the configuration, additional information is overlaid on top of the camera image — an object bounding box for example.
7. If necessary, select an **Aggregation time [s]** between 0 and 20 seconds.
    The aggregation time always starts when an alarm event occurs. It extends the alarm event by the value set. This prevents alarm events that occur in quick succession from triggering several alarms and successive events in a rapid sequence. No further alarm is triggered during the aggregation time. The post-alarm time set for alarm recordings only starts once the aggregation time has expired
8. If required, in the **Tamper detection** pane, enter your settings for tamper detection.
9. Click **Configuration**.
    Configure the VCA type using this window.

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Notice!
In the VCA configuration you can stop the video image by clicking the **Freeze** button.

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Notice!
If the VCA configuration of this camera is in use, no other users can configure VCA of this camera at the same time. Only the first user is able to do this. Other users receive a message that configuration is not possible.

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9   Saving and loading VCA configuration

The Configuration Manager program allows you to save and load a VCA configuration.

Saving and loading a VCA configuration using the Web browser is currently not possible.

Notice!

We recommend that you regularly save the configuration for backup purposes to an external drive.

Load your backup configuration file in case of data loss, for example.

Saving VCA configuration

To save the VCA configuration:

1.   In the Configuration Manager program, select the desired camera.
2.   Click the **VCA** tab, then click the **Main Operation** tab.
3.   Click **Save...**.
       The **Save As** dialog box is displayed.
4.   Select the desired folder.
5.   Click **Save** to save the configuration.

Loading VCA configuration

To load an existing VCA configuration:

1.   In the Configuration Manager program, select the desired camera.
2.   Click the **VCA** tab, then click the **Main Operation** tab.
3.   Click **Load...**.
       The **Open** dialog box is displayed.
4.   Select the desired backup, then click **Open.**
       The **VCA** dialog box is displayed.
5.   Select whether the entire VCA configuration is to be loaded, or only those parts marked by the selected check boxes in the dialog box.
6.   Click **OK** to load the configuration.

10   Configuring Intelligent and Essential Video Analytics

This chapter describes the configuration and settings for Intelligent Video Analytics and Essential Video Analytics.

10.1   Configuring tasks

■■■□ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and Intelligent Video Analytics or Essential Video Analytics > **Tasks** tab

■■■□ in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and Intelligent Video Analytics or Essential Video Analytics > **Configuration** button > **Tasks** tab

A task is always created or edited using a wizard. When you use the wizard to create or edit a task, you have access to the camera image and the commands, for example to create, edit or delete fields. Expert users can adapt tasks to their requirements using VCA Task Script Editor. You can immediately recognize from the color of object outlines whether an object will trigger an alarm with the given settings.

See also
–   *Tasks (Flow), page 46*

10.1.1   Configuring the Detect any object task

■■■□ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and Intelligent Video Analytics or Essential Video Analytics > **Tasks** tab

■■■□ in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and Intelligent Video Analytics or Essential Video Analytics > **Configuration** button > **Tasks** tab

When you work with Intelligent Video Analytics and Essential Video Analytics for the first time, the default task **Detect any object** is already available. This task detects all objects in the entire camera image. Initially, even the global settings are preset in such a way that no object is excluded.

This first preset task corresponds in the configuration to the task type **Object in field**.

10.1.2   Configuring the Object in field task

■■■□ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and Intelligent Video Analytics or Essential Video Analytics > **Tasks** tab

■■■□ in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and Intelligent Video Analytics or Essential Video Analytics > **Configuration** button > **Tasks** tab

This task generates an alarm event if an object moves within a certain area. The area is defined by a field in the camera image.

Note: This task can be used for Intelligent Tracking.

To select the task:
1.   On the **Surveillance Tasks** page, click **New**.
2.   On the **Create a Task** page, select **Object in field**, then click **OK**.

Define the Field page
1.   Select a field from the list or create a new one.
      To create a new field, click into the camera image to start with the first corner of the field, then click again for each corner. Finish the field by double-clicking.
      Note:
      –   You can also select **Whole screen** or edit an existing field.
      –   You can create and combine up to 3 fields.

2. In the **Debounce time [s]** box, enter the minimum time that an object must remain within the field before it triggers an alarm. To do this, select the field in the camera image first, then enter the value. If necessary, enter the time for each field.
Note: By entering a value, you can prevent the triggering of multiple alarm events by objects that are constantly moving toward and away from the boundary of the field.
3. In the **Intersection trigger** list, select the object trigger.
– **Object center**: An object generates an alarm if the center of the object is inside the sensitive area.
– **Edge of box**: An object generates an alarm if one of the edges of the virtual frame around the object is inside the sensitive area.
– **Complete box**: An object generates an alarm if the virtual frame around the object is completely inside the sensitive area.
– **Object base point:** An object generates an alarm if the base point of the object is inside the sensitive area.

Define the Trigger page
This page is only displayed when you have selected at least 2 fields in the **Define the Field** page.
You can select the trigger to generate an alarm if an object is in any field or in all fields in a defined order and time span.
To select the triggers:
1. Select one of the following **Raise an alarm** options:
– **if an alarm is in one of the fields**
This generates an alarm if an object is in any field.
or
– **if an object is in the last field and has crossed the previous fields**
This generates an alarm if an object has passed the previous fields and enters the last field.
2. Click the **within the time span [s]** check box, then enter the minimum and maximum time. This defines the period an object must enter the first field, passes the second field and enters the last field.

Filter by Object Class page
Limit the object classes that trigger an alarm.
▸ Select the desired check boxes (**Upright persons**, **Bikes**, **Cars** and **Trucks**, as well as Camera Trainer object classes if licensed).

Approximation page
Define approximations for the different object properties. You can adopt these values as the basis for the settings in the next step.
1. Click a moving object in the camera image. The values for object size, aspect ratio, speed and direction are displayed for the marked object. The colors of the object are also displayed.
Note: The properties of an object are always changing. You adopt the properties of the object at the time of clicking.
2. Click the **Apply values** check box if you want to use the properties of the marked object.
3. Move the **Precision** slider of each property to define how exactly they must correspond for an object to be detected.
The further to the right the slider is set, the more accurate the description of the property of the searched object that is to trigger an alarm. Slider set to the left, property is ignored and the value is not adopted in the next step.

Filter by Object Conditions page

Limit the properties of an object that triggers an alarm event. Objects that do not correspond to the properties specified here do not trigger an alarm event.

1. In the **Object Area [m²]** box, enter a minimum and a maximum value for the size.
2. In the **Aspect Ratio V/H** box, enter a minimum and a maximum value or select a rectangle in the camera image and change the size by dragging a node.
3. In the **Speed [km/h]** box, enter a minimum and a maximum value for the speed.
4. In the **Direction 1 [°]** / **Direction 2 [°]** boxes, enter a minimum and a maximum value (angle) to define the directions of a moving object. Only flows moving in these directions will trigger an alarm event.
    The directions are displayed as yellow circle segments in the camera image.
    You can also define the direction as follows:
    –   Place the pointer in the yellow circle segment, press and hold the mouse button, then turn the segment.
    –   Place the pointer over one of the edges of the yellow circle segment, press and hold the mouse button, then move the edge.

Filter by Object Colors page

Describe the color property of the searched object.

1. Move the slider to select the degree of brightness for the colors.
2. Select up to five 5 colors for the search. To do this, select a square, then click the desired color segment.
3. Move the **Precision** slider to determine how accurately the colors must match the object colors.
4. If necessary delete a selected color. To do this, select a square, then click **Clear**. If there are colors to the right of the deleted position, then they will move up automatically and receive a higher proportion of the object's color properties.

See also

10.1.3   Configuring the Crossing line task

▮━▮━▯ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and Intelligent Video Analytics or Essential Video Analytics > **Tasks** tab
▮━▮━▯ in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and Intelligent Video Analytics or Essential Video Analytics > **Configuration** button > **Tasks** tab
This task generates an alarm event if an object crosses one or more virtual lines.
Note: This task can be used for Intelligent Tracking.
To select the task:

1. On the **Surveillance Tasks** page, click **New**.
2. On the **Create a Task** page, select **Crossing line**, then click **OK**.

Define the Lines page

1. Select a line from the list or create a new one.
    To create a new line, click into the camera image to start with the beginning of the line, then click again for each direction change. Finish the line by double-clicking.
    Note: You can create and combine up to 3 lines.

2. In the **Debounce time [s]** box, enter the minimum time that an object must be observed first before crossing the line and then also after crossing the line to trigger an alarm. To do this, select the line in the camera image first, then enter the value. If necessary, enter the time for each line.
    Note: By entering a value, you can prevent the triggering of multiple alarm events by objects that are constantly moving onto and away from the line.
3. In the **Direction** list, select the direction an object must cross the line to trigger an alarm. To do this, select the line in the camera image first, then click one of the following:
    Forward: An object triggers an alarm if the line is crossed according to the direction of the arrow in the graphic display.
    Backward: An object triggers an alarm if the line is crossed against the direction.
    Any: An object triggers an alarm if the line is crossed independently of the direction.
    If necessary, enter the time for each line.
4. In the **Intersection trigger** list, select the object trigger.
–   **Object center**: An object generates an alarm if the center of the object crosses the line.
–   **Object base point:** An object generates an alarm if the base point of the object crosses the line.

Define the Trigger page
This page is only displayed if you have selected at least 2 lines in the **Define the Lines** page.
You can select the trigger to generate an alarm if an object crosses one of the lines or all lines in a defined order and time span.
To select the triggers:
1. Select one of the following **Raise an alarm** options:
    –   **if one of the lines is crossed**
        This generates an alarm if an object crosses any line.
        or
    –   **if all lines are crossed in the stated order**
        This generates an alarm if an object crosses all lines in a defined order.
2. Click the **within the time span [s]** check box, then enter the minimum and maximum time. This defines the period an object must cross all lines in a defined order.

Filter by Object Class page
Limit the object classes that trigger an alarm.
▸   Select the desired check boxes (**Upright persons**, **Bikes**, **Cars** and **Trucks**, as well as Camera Trainer object classes if licensed).

Approximation page
Define approximations for the different object properties. You can adopt these values as the basis for the settings in the next step.
1. Click a moving object in the camera image. The values for object size, aspect ratio, speed and direction are displayed for the marked object. The colors of the object are also displayed.
    Note: The properties of an object are always changing. You adopt the properties of the object at the time of clicking.
2. Click the **Apply values** check box if you want to use the properties of the marked object.
3. Move the **Precision** slider of each property to define how exactly they must correspond for an object to be detected.
    The further to the right the slider is set, the more accurate the description of the property of the searched object that is to trigger an alarm. Slider set to the left, property is ignored and the value is not adopted in the next step.

Filter by Object Conditions page

Limit the properties of an object that triggers an alarm event. Objects that do not correspond to the properties specified here do not trigger an alarm event.

1. In the **Object Area [m²]** box, enter a minimum and a maximum value for the size.
2. In the **Aspect Ratio V/H** box, enter a minimum and a maximum value or select a rectangle in the camera image and change the size by dragging a node.
3. In the **Speed [km/h]** box, enter a minimum and a maximum value for the speed.
4. In the **Direction 1 [°]** / **Direction 2 [°]** boxes, enter a minimum and a maximum value (angle) to define the directions of a moving object. Only flows moving in these directions will trigger an alarm event.
    The directions are displayed as yellow circle segments in the camera image.
    You can also define the direction as follows:
    –   Place the pointer in the yellow circle segment, press and hold the mouse button, then turn the segment.
    –   Place the pointer over one of the edges of the yellow circle segment, press and hold the mouse button, then move the edge.

Filter by Object Colors page

Describe the color property of the searched object.

1. Move the slider to select the degree of brightness for the colors.
2. Select up to five 5 colors for the search. To do this, select a square, then click the desired color segment.
3. Move the **Precision** slider to deternine how accurately the colors must match the object colors.
4. If necessary delete a selected color. To do this, select a square, then click **Clear**. If there are colors to the right of the deleted position, then they will move up automatically and receive a higher proportion of the object's color properties.

See also

–   *Object triggers based on lines, page 30*
–   *Object classification, page 32*
–   *Line, page 33*
–   *Tasks, page 35*
–   *Conditions in tasks, page 36*
–   *Color, page 38*

10.1.4   Configuring the Loitering task

■━■━□ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and Intelligent Video Analytics or Essential Video Analytics > **Tasks** tab

■━■━□ in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and Intelligent Video Analytics or Essential Video Analytics > **Configuration** button > **Tasks** tab

This task generates an alarm event if an object only moves slightly within a certain area for a specified period. The area is defined by a field in the camera image.

Note: This task can be used for Intelligent Tracking.

To select the task:

1. On the **Surveillance Tasks** page, click **New**.
2. On the **Create a Task** page, select **Loitering**, then click **OK**.

Define the Field page
1. Select a field from the list or create a new one.
   To create a new field, click into the camera image to start with the first corner of the field, then click again for each corner. Finish the field by double-clicking.
   Note: You can also select **Whole screen** or edit an existing field.
2. In the **Debounce time [s]** box, enter the minimum time that an object must remain within the field before it triggers an alarm. To do this, select the field in the camera image first, then enter the value. If necessary, enter the time for each field.
   Note: By entering a value, you can prevent the triggering of multiple alarm events by objects that are constantly moving toward and away from the boundary of the field.
3. In the **Intersection trigger** list, select the object trigger.
   – **Object center**: An object generates an alarm if the center of the object is inside the sensitive area.
   – **Edge of box**: An object generates an alarm if one of the edges of the virtual frame around the object is inside the sensitive area.
   – **Complete box**: An object generates an alarm if the virtual frame around the object is completely inside the sensitive area.
   – **Object base point:** An object generates an alarm if the base point of the object is inside the sensitive area.

Define the Trigger page
Define the virtual circle around the object and time span. An alarm event is generated if an object remains longer in this virtual circle.
1. In the **Radius [m]** box, enter the enter the loitering radius.
2. In the **Time [s]** box, enter the time in seconds.

Filter by Object Class page
Limit the object classes that trigger an alarm.
▸ Select the desired check boxes (**Upright persons**, **Bikes**, **Cars** and **Trucks**, as well as Camera Trainer object classes if licensed).

Approximation page
Define approximations for the different object properties. You can adopt these values as the basis for the settings in the next step.
1. Click a moving object in the camera image. The values for object size, aspect ratio, speed and direction are displayed for the marked object. The colors of the object are also displayed.
   Note: The properties of an object are always changing. You adopt the properties of the object at the time of clicking.
2. Click the **Apply values** check box if you want to use the properties of the marked object.
3. Move the **Precision** slider of each property to define how exactly they must correspond for an object to be detected.
   The further to the right the slider is set, the more accurate the description of the property of the searched object that is to trigger an alarm. Slider set to the left, property is ignored and the value is not adopted in the next step.

Filter by Object Conditions page
Limit the properties of an object that triggers an alarm event. Objects that do not correspond to the properties specified here do not trigger an alarm event.
1. In the **Object Area [m²]** box, enter a minimum and a maximum value for the size.
2. In the **Aspect Ratio V/H** box, enter a minimum and a maximum value or select a rectangle in the camera image and change the size by dragging a node.

3.   In the **Speed [km/h]** box, enter a minimum and a maximum value for the speed.
4.   In the **Direction 1 [°]** / **Direction 2 [°]** boxes, enter a minimum and a maximum value
      (angle) to define the directions of a moving object. Only flows moving in these directions
      will trigger an alarm event.
      The directions are displayed as yellow circle segments in the camera image.
      You can also define the direction as follows:
      –   Place the pointer in the yellow circle segment, press and hold the mouse button,
           then turn the segment.
      –   Place the pointer over one of the edges of the yellow circle segment, press and hold
           the mouse button, then move the edge.

Filter by Object Colors page
Describe the color property of the searched object.
1.   Move the slider to select the degree of brightness for the colors.
2.   Select up to five 5 colors for the search. To do this, select a square, then click the desired
      color segment.
3.   Move the **Precision** slider to deternine how accurately the colors must match the object
      colors.
4.   If necessary delete a selected color. To do this, select a square, then click **Clear**. If there
      are colors to the right of the deleted position, then they will move up automatically and
      receive a higher proportion of the object's color properties.

See also
–   *Object triggers based on fields, page 29*
–   *Object classification, page 32*
–   *Field, page 32*
–   *Tasks, page 35*
–   *Conditions in tasks, page 36*
–   *Color, page 38*
–   *Loitering, page 40*

10.1.5   **Configuring the Condition change task**
              ■━■━□ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and
              Intelligent Video Analytics or Essential Video Analytics > **Tasks** tab
              ■━■━□ in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and Intelligent Video Analytics
              or Essential Video Analytics > **Configuration** button > **Tasks** tab
              This task generates an alarm event if the properties changes for a detected object within a
              specified time span:
              Note: This task can be used for Intelligent Tracking.
              To select the task:
1.   On the **Surveillance Tasks** page, click **New**.
2.   On the **Create a Task** page, select **Condition change**, then click **OK**.

Filter by Object Conditions page
Define individual properties, such as the size, aspect ratio, speed and direction, that an object
must have in its initial state to be detected.
1.   In the **Object Area [m²]** box, enter a minimum and a maximum value for the size.
2.   In the **Aspect Ratio V/H** box, enter a minimum and a maximum value or select a rectangle
      in the camera image and change the size by dragging a node.
3.   In the **Speed [km/h]** box, enter a minimum and a maximum value for the speed.

4.   In the **Direction 1 [°] / Direction 2 [°]** boxes, enter a minimum and a maximum value (angle) to define the directions of a moving object. Only flows moving in these directions will trigger an alarm event.
The directions are displayed as yellow circle segments in the camera image.
You can also define the direction as follows:
–   Place the pointer in the yellow circle segment, press and hold the mouse button, then turn the segment.
–   Place the pointer over one of the edges of the yellow circle segment, press and hold the mouse button, then move the edge.

Specify the Transition page
Select the values that trigger an alarm when the initial state changes.
▸   Enter the values for **Object Area [m²]**, **Aspect Ratio V/H**, **Speed [km/h]**, **Direction 1 [°] / Direction 2 [°]**.

Define the Time Span page
Here you can limit the time span in which the conditions must change.
The time span will only be analyzed when you activate this option. If this option is not activated, respective changes in an object property will trigger an alarm event regardless of the length of time that has passed.
1.   Select the **Conditions must change within the time span [s]:** check box.
2.   Enter a minimum and maximum value in seconds.

Define the Field page
You can limit the detection to a specific area. The area is defined by a field in the camera image.
1.   Select a field from the list or create a new one.
To create a new field, click into the camera image to start with the first corner of the field, then click again for each corner. Finish the field by double-clicking.
Note: You can also select **Whole screen** or edit an existing field.
2.   In the **Debounce time [s]** box, enter the minimum time that an object must remain within the field before it triggers an alarm. To do this, select the field in the camera image first, then enter the value. If necessary, enter the time for each field.
Note: By entering a value, you can prevent the triggering of multiple alarm events by objects that are constantly moving toward and away from the boundary of the field.
3.   In the **Intersection trigger** list, select the object trigger.
–   **Object center**: An object generates an alarm if the center of the object is inside the sensitive area.
–   **Edge of box**: An object generates an alarm if one of the edges of the virtual frame around the object is inside the sensitive area.
–   **Complete box**: An object generates an alarm if the virtual frame around the object is completely inside the sensitive area.
–   **Object base point:** An object generates an alarm if the base point of the object is inside the sensitive area.

Filter by Object Class page
Limit the object classes that trigger an alarm.
▸   Select the desired check boxes (**Upright persons**, **Bikes**, **Cars** and **Trucks**, as well as Camera Trainer object classes if licensed).

See also
–   *Object triggers based on fields, page 29*
–   *Object classification, page 32*

- *Field, page 32*
- *Tasks, page 35*
- *Conditions in tasks, page 36*
- *Color, page 38*

10.1.6 Configuring the Following route task

■■■□ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and
Intelligent Video Analytics or Essential Video Analytics > **Tasks** tab
■■■□ in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and Intelligent Video Analytics
or Essential Video Analytics > **Configuration** button > **Tasks** tab
This task generates an alarm event if an object moves along a certain route. A route is
surrounded by a virtual tolerance area.
Note: This task can be used for Intelligent Tracking.

> **Notice!**
> This task is typically used in the Video Client program for forensic search. For example,
> persons who have taken a certain route are detected this way.

To select the task:
1. On the **Surveillance Tasks** page, click **New**.
2. On the **Create a Task** page, select **Following route**, then click **OK**.

Define the Route page
1. In the list, select one of the routes that have already been created or click a route in the
   camera image.
   Note: You can also create a new route or edit an existing one.
2. In the **Min. match [%]** box, enter the percentage of the total distance an object must
   move along the route to trigger an alarm.
   The value indicates the overall proportion of the route. An object must not necessarily
   cover this percentage of a section in a single stage in order to trigger an alarm event.
3. In the **Max. gap [%]** box, enter the value for the largest gap in percent of the total
   distance. This gap allows the object to leave and re-enter the route and generating an
   alarm event. The object can leave the route several times.
4. In the **Direction** list, select the direction an object must move to trigger an alarm.
   Forward: Triggers an alarm if an object follows the arrows of the route displayed in the
   camera image..
   Backward: Triggers an alarm if an object moves in the opposite direction of the arrows.
   Any: Triggers an alarm independently of the direction.
5. In the **Intersection trigger** list, select the object trigger.
   - **Object center**: An object generates an alarm if the center of the object is inside the route.
   - **Object base point:** An object generates an alarm if the base point of the object is inside
     the route.

Filter by Object Class page
Limit the object classes that trigger an alarm.
▸ Select the desired check boxes (**Upright persons**, **Bikes**, **Cars** and **Trucks**, as well as
   Camera Trainer object classes if licensed).

Approximation page
Define approximations for the different object properties. You can adopt these values as the
basis for the settings in the next step.

1. Click a moving object in the camera image. The values for object size, aspect ratio, speed and direction are displayed for the marked object. The colors of the object are also displayed.
   Note: The properties of an object are always changing. You adopt the properties of the object at the time of clicking.
2. Click the **Apply values** check box if you want to use the properties of the marked object.
3. Move the **Precision** slider of each property to define how exactly they must correspond for an object to be detected.
   The further to the right the slider is set, the more accurate the description of the property of the searched object that is to trigger an alarm. Slider set to the left, property is ignored and the value is not adopted in the next step.

Filter by Object Conditions page

Limit the properties of an object that triggers an alarm event. Objects that do not correspond to the properties specified here do not trigger an alarm event.

1. In the **Object Area [m²]** box, enter a minimum and a maximum value for the size.
2. In the **Aspect Ratio V/H** box, enter a minimum and a maximum value or select a rectangle in the camera image and change the size by dragging a node.
3. In the **Speed [km/h]** box, enter a minimum and a maximum value for the speed.
4. In the **Direction 1 [°]** / **Direction 2 [°]** boxes, enter a minimum and a maximum value (angle) to define the directions of a moving object. Only flows moving in these directions will trigger an alarm event.
   The directions are displayed as yellow circle segments in the camera image.
   You can also define the direction as follows:
   – Place the pointer in the yellow circle segment, press and hold the mouse button, then turn the segment.
   – Place the pointer over one of the edges of the yellow circle segment, press and hold the mouse button, then move the edge.

Filter by Object Colors page

Describe the color property of the searched object.

1. Move the slider to select the degree of brightness for the colors.
2. Select up to five 5 colors for the search. To do this, select a square, then click the desired color segment.
3. Move the **Precision** slider to determine how accurately the colors must match the object colors.
4. If necessary delete a selected color. To do this, select a square, then click **Clear**. If there are colors to the right of the deleted position, then they will move up automatically and receive a higher proportion of the object's color properties.

See also

– *Object classification, page 32*
– *Route, page 34*
– *Tasks, page 35*
– *Conditions in tasks, page 36*
– *Color, page 38*

10.1.7 Configuring the Tampering task

■-■-□ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and
Intelligent Video Analytics or Essential Video Analytics > **Tasks** tab

■■■□ in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and Intelligent Video Analytics or Essential Video Analytics > **Configuration** button > **Tasks** tab

This task generates an alarm event if it must be assumed that the video source (camera) has been tampered with.

Here, you can only activate the filter for the relevant events. You cannot alter the settings for tamper detection. Only the settings selected on the VCA start page can be activated here.

To select the task:

1. On the **Surveillance Tasks** page, click **New**.
2. On the **Create a Task** page, select **Tampering**, then click **OK**.

Define the Trigger page

One of the activated events must occur to trigger an alarm event.

▶ Select the corresponding event.

Global change

The global change, as set with the **Global change** slider on the standard configuration page, should trigger an alarm.

Scene too bright

Tampering associated with exposure to extreme light (for instance, shining a flashlight directly on the lens) should trigger an alarm. The average brightness of the scene provides a basis for recognition.

Scene too dark

Tampering associated with covering the lens should trigger an alarm. The average brightness of the scene provides a basis for recognition.

Reference check

A deviation from the reference image on the VCA start page should trigger an alarm.

10.1.8   Configuring the Removed object task

■■■□ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and Intelligent Video Analytics or Essential Video Analytics > **Tasks** tab

■■■□ in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and Intelligent Video Analytics or Essential Video Analytics > **Configuration** button > **Tasks** tab

This task generates an alarm event if an object is detected as removed in a certain area (for example, due to theft). The area is defined by a field in the camera image.

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i	**Notice!** For CPP6 cameras the idle and removed object detection is deactivated in areas with strong motion (bushes or trees that are moving in the wind, for example). If you want to detect idle or removed objects in this areas, under **Metadata Generation** > **Tracking**, deactivate the **Noise suppression** check box. This will also increase the amount of false alarms.

To select the task:

1. On the **Surveillance Tasks** page, click **New**.
2. On the **Create a Task** page, select **Removed object**, then click **OK**.

Define the Field page

1. Select a field from the list or create a new one.
   To create a new field, click into the camera image to start with the first corner of the field, then click again for each corner. Finish the field by double-clicking.
   Note: You can also select **Whole screen** or edit an existing field.
2. In the **Intersection trigger** list, select the object trigger.

– **Object center**: An object generates an alarm if the center of the object is inside the sensitive area.

– **Edge of box**: An object generates an alarm if one of the edges of the virtual frame around the object is inside the sensitive area.
– **Complete box**: An object generates an alarm if the virtual frame around the object is completely inside the sensitive area.
– **Object base point:** An object generates an alarm if the base point of the object is inside the sensitive area.

Filter by Object Type page

Select the type of removed objects that should trigger an alarm event.

1. Select the object type.
   – **All removed objects**: Generates an alarm for all objects that are removed in the sensitive area of the camera image (all started and taken objects).
     Note: An object is assumed to have been removed if changes are detected in the background following motion within an image.
   – **Only started objects**: Generates an alarm event as soon as an idle object (a car, for example) in the sensitive area starts moving.
   – **Only taken objects**: Generates an alarm event as soon as an idle object (a suitcase, for example) in the sensitive area is being taken away by a tracked moving object (a person, for example).
     Note: The time span the object must remain removed is displayed in the **Taken objects** box.

Filter by Object Class page

Limit the object classes that trigger an alarm.

▸ Select the desired check boxes (**Upright persons**, **Bikes**, **Cars** and **Trucks**, as well as Camera Trainer object classes if licensed).

Approximation page

Define approximations for the different object properties. You can adopt these values as the basis for the settings in the next step.

1. Click a moving object in the camera image. The values for object size, aspect ratio, speed and direction are displayed for the marked object. The colors of the object are also displayed.
   Note: The properties of an object are always changing. You adopt the properties of the object at the time of clicking.
2. Click the **Apply values** check box if you want to use the properties of the marked object.
3. Move the **Precision** slider of each property to define how exactly they must correspond for an object to be detected.
   The further to the right the slider is set, the more accurate the description of the property of the searched object that is to trigger an alarm. Slider set to the left, property is ignored and the value is not adopted in the next step.

Filter by Object Conditions page

Limit the properties of an object that triggers an alarm event. Objects that do not correspond to the properties specified here do not trigger an alarm event.

1. In the **Object Area [m²]** box, enter a minimum and a maximum value for the size.
2. In the **Aspect Ratio V/H** box, enter a minimum and a maximum value or select a rectangle in the camera image and change the size by dragging a node.
3. In the **Speed [km/h]** box, enter a minimum and a maximum value for the speed.

4. In the **Direction 1 [°]** / **Direction 2 [°]** boxes, enter a minimum and a maximum value (angle) to define the directions of a moving object. Only flows moving in these directions will trigger an alarm event.
The directions are displayed as yellow circle segments in the camera image.
You can also define the direction as follows:
   – Place the pointer in the yellow circle segment, press and hold the mouse button, then turn the segment.
   – Place the pointer over one of the edges of the yellow circle segment, press and hold the mouse button, then move the edge.

Filter by Object Colors page
Describe the color property of the searched object.
1. Move the slider to select the degree of brightness for the colors.
2. Select up to five 5 colors for the search. To do this, select a square, then click the desired color segment.
3. Move the **Precision** slider to deternine how accurately the colors must match the object colors.
4. If necessary delete a selected color. To do this, select a square, then click **Clear**. If there are colors to the right of the deleted position, then they will move up automatically and receive a higher proportion of the object's color properties.

See also
– *Object triggers based on fields, page 29*
– *Object classification, page 32*
– *Field, page 32*
– *Tasks, page 35*
– *Conditions in tasks, page 36*
– *Color, page 38*

10.1.9   Configuring the Idle object task

▉■━■━▢ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and Intelligent Video Analytics or Essential Video Analytics > **Tasks** tab
▉■━■━▢ in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and Intelligent Video Analytics or Essential Video Analytics > **Configuration** button > **Tasks** tab
This task generates an alarm event if an object is detected as idle or inserted in a certain area (for example, a piece of luggage without an owner). The area is highlighted by a field in the camera image.

Notice!

For CPP6 cameras the idle and removed object detection is deactivated in areas with strong motion (bushes or trees that are moving in the wind, for example). If you want to detect idle or removed objects in this areas, under **Metadata Generation** > **Tracking**, deactivate the **Noise suppression** check box. This will also increase the amount of false alarms.

To select the task:
1. On the **Surveillance Tasks** page, click **New**.
2. On the **Create a Task** page, select **Idle object**, then click **OK**.

Define the Field page
1. Select a field from the list or create a new one.
   To create a new field, click into the camera image to start with the first corner of the field, then click again for each corner. Finish the field by double-clicking.
   Note: You can also select **Whole screen** or edit an existing field.
2. In the **Intersection trigger** list, select the object trigger.
   – **Object center**: An object generates an alarm if the center of the object is inside the sensitive area.
   – **Edge of box**: An object generates an alarm if one of the edges of the virtual frame around the object is inside the sensitive area.
   – **Complete box**: An object generates an alarm if the virtual frame around the object is completely inside the sensitive area.
   – **Object base point:** An object generates an alarm if the base point of the object is inside the sensitive area.

Filter by Object Type page
Select the type of idle objects that should trigger an alarm event.
1. Select the object type.
   – **All idle objects**: Generates an alarm for all objects that remain idle in the sensitive area of the camera image (all stopped and placed objects).
   – **Only stopped objects**: Generates an alarm event if a tracked and moving object (a car, for example) stops in the sensitive area.
     Note: The time span the object must remain idle is displayed in the **Stopped objects** box.
   – **Only placed objects**: Generates an alarm event if a tracked object (a person, for example) places an object (a suitcase, for example) in the sensitive area of the camera image.
     Note: The time span the object must remain idle is displayed in the **Placed objects** box.

Filter by Object Class page
Limit the object classes that trigger an alarm.
▸ Select the desired check boxes (**Upright persons**, **Bikes**, **Cars** and **Trucks**, as well as Camera Trainer object classes if licensed).

Approximation page
Define approximations for the different object properties. You can adopt these values as the basis for the settings in the next step.
1. Click a moving object in the camera image. The values for object size, aspect ratio, speed and direction are displayed for the marked object. The colors of the object are also displayed.
   Note: The properties of an object are always changing. You adopt the properties of the object at the time of clicking.
2. Click the **Apply values** check box if you want to use the properties of the marked object.
3. Move the **Precision** slider of each property to define how exactly they must correspond for an object to be detected.
   The further to the right the slider is set, the more accurate the description of the property of the searched object that is to trigger an alarm. Slider set to the left, property is ignored and the value is not adopted in the next step.

Filter by Object Conditions page

Limit the properties of an object that triggers an alarm event. Objects that do not correspond to the properties specified here do not trigger an alarm event.

1. In the **Object Area [m²]** box, enter a minimum and a maximum value for the size.
2. In the **Aspect Ratio V/H** box, enter a minimum and a maximum value or select a rectangle in the camera image and change the size by dragging a node.
3. In the **Speed [km/h]** box, enter a minimum and a maximum value for the speed.
4. In the **Direction 1 [°]** / **Direction 2 [°]** boxes, enter a minimum and a maximum value (angle) to define the directions of a moving object. Only flows moving in these directions will trigger an alarm event.
    The directions are displayed as yellow circle segments in the camera image.
    You can also define the direction as follows:
    –   Place the pointer in the yellow circle segment, press and hold the mouse button, then turn the segment.
    –   Place the pointer over one of the edges of the yellow circle segment, press and hold the mouse button, then move the edge.

Filter by Object Colors page

Describe the color property of the searched object.

1. Move the slider to select the degree of brightness for the colors.
2. Select up to five 5 colors for the search. To do this, select a square, then click the desired color segment.
3. Move the **Precision** slider to deternine how accurately the colors must match the object colors.
4. If necessary delete a selected color. To do this, select a square, then click **Clear**. If there are colors to the right of the deleted position, then they will move up automatically and receive a higher proportion of the object's color properties.

See also

10.1.10   Configuring the Entering field task

▆▬▆▬▭ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and Intelligent Video Analytics or Essential Video Analytics > **Tasks** tab

▆▬▆▬▭ in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and Intelligent Video Analytics or Essential Video Analytics > **Configuration** button > **Tasks** tab

This task generates an alarm event if an object that was previously detected outside a field crosses the field boundary to enter the field.

Note: This task can be used for Intelligent Tracking.

To select the task:

1. On the **Surveillance Tasks** page, click **New**.
2. On the **Create a Task** page, select **Entering field**, then click **OK**.

Define the Field page
1. Select a field from the list or create a new one.
   To create a new field, click into the camera image to start with the first corner of the field, then click again for each corner. Finish the field by double-clicking.
   Note:
   – You can also select **Whole screen** or edit an existing field.
   – You can create and combine up to 3 fields.
2. In the **Debounce time [s]** box, enter the minimum time that an object must remain within the field before it triggers an alarm. To do this, select the field in the camera image first, then enter the value. If necessary, enter the time for each field.
   Note: By entering a value, you can prevent the triggering of multiple alarm events by objects that are constantly moving toward and away from the boundary of the field.
3. In the **Intersection trigger** list, select the object trigger.
– **Object center**: An object generates an alarm if the center of the object is inside the sensitive area.
– **Edge of box**: An object generates an alarm if one of the edges of the virtual frame around the object is inside the sensitive area.
– **Complete box**: An object generates an alarm if the virtual frame around the object is completely inside the sensitive area.
– **Object base point:** An object generates an alarm if the base point of the object is inside the sensitive area.

Define the Trigger page
This page is only displayed when you have selected at least 2 fields in the **Define the Field** page.
You can select the trigger to generate an alarm if an object enters any field or all fields in a defined order and time span.
To select the triggers:
1. Select one of the following **Raise an alarm** options:
   – **if one of the fields is entered**
     This generates an alarm if an object enters any field.
     or
   – **if all fields are entered in the stated order**
     This generates an alarm if an object enters all fields in a defined order.
2. Click the **within the time span [s]** check box, then enter the minimum and maximum time. This defines the period an object must enter all fields in a defined order.

Filter by Object Class page
Limit the object classes that trigger an alarm.
▶ Select the desired check boxes (**Upright persons**, **Bikes**, **Cars** and **Trucks**, as well as Camera Trainer object classes if licensed).

Approximation page
Define approximations for the different object properties. You can adopt these values as the basis for the settings in the next step.
1. Click a moving object in the camera image. The values for object size, aspect ratio, speed and direction are displayed for the marked object. The colors of the object are also displayed.
   Note: The properties of an object are always changing. You adopt the properties of the object at the time of clicking.
2. Click the **Apply values** check box if you want to use the properties of the marked object.

3.   Move the **Precision** slider of each property to define how exactly they must correspond
     for an object to be detected.
     The further to the right the slider is set, the more accurate the description of the property
     of the searched object that is to trigger an alarm. Slider set to the left, property is
     ignored and the value is not adopted in the next step.

Filter by Object Conditions page

Limit the properties of an object that triggers an alarm event. Objects that do not correspond
to the properties specified here do not trigger an alarm event.

1.   In the **Object Area [m²]** box, enter a minimum and a maximum value for the size.
2.   In the **Aspect Ratio V/H** box, enter a minimum and a maximum value or select a rectangle
     in the camera image and change the size by dragging a node.
3.   In the **Speed [km/h]** box, enter a minimum and a maximum value for the speed.
4.   In the **Direction 1 [°]** / **Direction 2 [°]** boxes, enter a minimum and a maximum value
     (angle) to define the directions of a moving object. Only flows moving in these directions
     will trigger an alarm event.
     The directions are displayed as yellow circle segments in the camera image.
     You can also define the direction as follows:
     –   Place the pointer in the yellow circle segment, press and hold the mouse button,
          then turn the segment.
     –   Place the pointer over one of the edges of the yellow circle segment, press and hold
          the mouse button, then move the edge.

Filter by Object Colors page

Describe the color property of the searched object.

1.   Move the slider to select the degree of brightness for the colors.
2.   Select up to five 5 colors for the search. To do this, select a square, then click the desired
     color segment.
3.   Move the **Precision** slider to deternine how accurately the colors must match the object
     colors.
4.   If necessary delete a selected color. To do this, select a square, then click **Clear**. If there
     are colors to the right of the deleted position, then they will move up automatically and
     receive a higher proportion of the object's color properties.

See also

–   *Object triggers based on fields, page 29*
–   *Object classification, page 32*
–   *Field, page 32*
–   *Tasks, page 35*
–   *Conditions in tasks, page 36*
–   *Color, page 38*

10.1.11   Configuring the Leaving field task

▰▰▰▱ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and
Intelligent Video Analytics or Essential Video Analytics > **Tasks** tab
▰▰▰▱ in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and Intelligent Video Analytics
or Essential Video Analytics > **Configuration** button > **Tasks** tab
This task generates an alarm event if an object that was previously detected inside a field
crosses the field boundary to leave the field.
Note: This task can be used for Intelligent Tracking.
To select the task:

1.   On the **Surveillance Tasks** page, click **New**.
2.   On the **Create a Task** page, select **Leaving field**, then click **OK**.

Define the Field page

1.   Select a field from the list or create a new one.
     To create a new field, click into the camera image to start with the first corner of the
     field, then click again for each corner. Finish the field by double-clicking.
     Note:
     –   You can also select **Whole screen** or edit an existing field.
     –   You can create and combine up to 3 fields.
2.   In the **Debounce time [s]** box, enter the minimum time that an object must remain within
     the field before it triggers an alarm. To do this, select the field in the camera image first,
     then enter the value. If necessary, enter the time for each field.
     Note: By entering a value, you can prevent the triggering of multiple alarm events by
     objects that are constantly moving toward and away from the boundary of the field.
3.   In the **Intersection trigger** list, select the object trigger.
–   **Object center**: An object generates an alarm if the center of the object is inside the
     sensitive area.
–   **Edge of box**: An object generates an alarm if one of the edges of the virtual frame around
     the object is inside the sensitive area.
–   **Complete box**: An object generates an alarm if the virtual frame around the object is
     completely inside the sensitive area.
–   **Object base point:** An object generates an alarm if the base point of the object is inside
     the sensitive area.

Notice!

When configuring the **Leaving field** task, note that the alarm is generated as soon as the
object is no longer in the field. Thus the different object triggers behave as follows:
The object trigger **Edge of box** generates an alarm event if no edge of the object is any longer
within the field and thus the object is completely outside the field.
The object trigger **Complete box** generates an alarm event as soon as any part of the virtual
frame around the object is outside the field.

Define the Trigger page

This page is only displayed when you have selected at least 2 fields in the **Define the Field**
page.
You can select the trigger to generate an alarm if an object leaves any field or all fields in a
defined order and time span.
To select the triggers:

1.   Select one of the following **Raise an alarm** options:
     –   **if one of the fields is left**
         This generates an alarm if an object leaves any field.
         or
     –   **if all fields are left in the stated order**
         This generates an alarm if an object leaves all fields in a defined order.
2.   Click the **within the time span [s]** check box, then enter the minimum and maximum
     time. This defines the period an object must leave all fields in a defined order.

Filter by Object Class page

Limit the object classes that trigger an alarm.

▸   Select the desired check boxes (**Upright persons**, **Bikes**, **Cars** and **Trucks**, as well as
     Camera Trainer object classes if licensed).

Approximation page

Define approximations for the different object properties. You can adopt these values as the basis for the settings in the next step.

1. Click a moving object in the camera image. The values for object size, aspect ratio, speed and direction are displayed for the marked object. The colors of the object are also displayed.
   Note: The properties of an object are always changing. You adopt the properties of the object at the time of clicking.
2. Click the **Apply values** check box if you want to use the properties of the marked object.
3. Move the **Precision** slider of each property to define how exactly they must correspond for an object to be detected.
   The further to the right the slider is set, the more accurate the description of the property of the searched object that is to trigger an alarm. Slider set to the left, property is ignored and the value is not adopted in the next step.

Filter by Object Conditions page

Limit the properties of an object that triggers an alarm event. Objects that do not correspond to the properties specified here do not trigger an alarm event.

1. In the **Object Area [m²]** box, enter a minimum and a maximum value for the size.
2. In the **Aspect Ratio V/H** box, enter a minimum and a maximum value or select a rectangle in the camera image and change the size by dragging a node.
3. In the **Speed [km/h]** box, enter a minimum and a maximum value for the speed.
4. In the **Direction 1 [°]** / **Direction 2 [°]** boxes, enter a minimum and a maximum value (angle) to define the directions of a moving object. Only flows moving in these directions will trigger an alarm event.
   The directions are displayed as yellow circle segments in the camera image.
   You can also define the direction as follows:
   – Place the pointer in the yellow circle segment, press and hold the mouse button, then turn the segment.
   – Place the pointer over one of the edges of the yellow circle segment, press and hold the mouse button, then move the edge.

Filter by Object Colors page

Describe the color property of the searched object.

1. Move the slider to select the degree of brightness for the colors.
2. Select up to five 5 colors for the search. To do this, select a square, then click the desired color segment.
3. Move the **Precision** slider to deternine how accurately the colors must match the object colors.
4. If necessary delete a selected color. To do this, select a square, then click **Clear**. If there are colors to the right of the deleted position, then they will move up automatically and receive a higher proportion of the object's color properties.

See also

10.1.12   Configuring the Similarity search task

■—■—■—□ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and
Intelligent Video Analytics or Essential Video Analytics > **Tasks** tab
■—■—■—□ in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and Intelligent Video Analytics
or Essential Video Analytics > **Configuration** button > **Tasks** tab
This task generates an alarm event if an object is detected that is similar to a previously
marked object.
Note: This task can be used for Intelligent Tracking.

> **Notice!**
>
> This task is typically used in the Video Client program for forensic search. For example,
> persons who are similar to a certain person are detected this way.

To select the task:
1.   On the **Surveillance Tasks** page, click **New**.
2.   On the **Create a Task** page, select **Similarity search**, then click **OK**.

Approximation page
1.   Click a moving object in the camera image. The values for object size, aspect ratio, speed
      and direction are displayed for the marked object. The colors of the object are also
      displayed. The object is marked with a yellow triangle.
      Note: The properties of an object are always changing. You adopt the properties of the
      object at the time of clicking.
2.   Move the **Precision** slider of each property to define how exactly they must correspond
      for an object to be detected.
      The further to the right the slider is set, the more accurate the description of the property
      of the searched object that is to trigger an alarm. Slider set to the left, property is
      ignored and the value is not adopted in the next step.

See also
–   *Conditions in tasks, page 36*

10.1.13   Configuring the Crowd detection task

■—■—■—□ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and
Intelligent Video Analytics or Essential Video Analytics > **Tasks** tab
■—■—■—□ in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and Intelligent Video Analytics
or Essential Video Analytics > **Configuration** button > **Tasks** tab
This task generates an alarm event if a number of objects are located within a certain area.
The area is defined by a crowd field in the camera image.
To use the **Crowd detection** functionality, first create a reference image of the background
without people present on the standard VCA configuration page. The reference image must
depict the current background captured by the camera. Create a new reference picture if the
background has changed.
To select the task:
1.   On the **Surveillance Tasks** page, click **New**.
2.   On the **Create a Task** page, select **Crowd detection**, then click **OK**.

Filter by Crowd Field Properties page
1.   In the **Select a crowd field:** list, select one of the crowd fields that have already been
      created.
      Note: You cannot create or edit a crowd field here.

2. Move the **Crowd density** slider to define how dense a crowd must be to be detected as a crowd.
   The equivalent on the scale is different according to the settings and conditions of each system. Determine a meaningful threshold value for triggering an alarm for your setup by testing.

3. In the **Debounce time [s]** box, enter the minimum time that a crowd must be detected within the field before it triggers an alarm.

4. In the **Smoothing time [s]** box, enter the minimum time after which an alarm is triggered if the average crowd density over this period exceeds the value set by the **Crowd density** slider.

See also
– *Configuring the crowd fields, page 87*

10.1.14 Configuring the Counter task

◼️—◼️—◻️ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and Intelligent Video Analytics or Essential Video Analytics > **Tasks** tab

◼️—◼️—◻️ in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and Intelligent Video Analytics or Essential Video Analytics > **Configuration** button > **Tasks** tab

This task allows you to count people crossing one or several lines.

> **ℹ️** **Notice!**
> To count people, use a BEV camera perspective for best performance. Calibrate the camera and set the **3D people tracking** mode.

To select the task:
1. On the **Surveillance Tasks** page, click **New**.
2. On the **Create a Task** page, select **Counter**, then click **OK**.

Define the Lines page
1. From the list, select one of the lines that have already been created or click a line in the camera image.
   Note: You can also create a new line or edit an existing one.
2. Select a second and a third line, if necessary.
3. In the **Debounce time [s]** box, enter the minimum time that an object must be observed first before crossing the line and then also after crossing the line to trigger an alarm. To do this, select the line in the camera image first, then enter the value. If necessary, enter the time for each line.
   Note: By entering a value, you can prevent the triggering of multiple alarm events by objects that are constantly moving onto and away from the line.
4. In the **Direction** list, select the direction an object must cross the line to trigger an alarm. To do this, select the line in the camera image first, then click one of the following:
   Forward: An object triggers an alarm if the line is crossed according to the direction of the arrow in the graphic display.
   Backward: An object triggers an alarm if the line is crossed against the direction.
   Any: An object triggers an alarm if the line is crossed independently of the direction.
   If necessary, enter the time for each line.
5. In the **Intersection trigger** list, select the object trigger.
– **Object center**: An object generates an alarm if the center of the object crosses the line.

- **Object base point:** An object generates an alarm if the base point of the object crosses the line.

Define the Counter Limit and Alarm page

1. In the **Limit** box enter a maximum value.
2. Click **Restart counting** or **Stop counting**.
   - **Restart counting**: The system restarts counting after the maximum value is reached.
   - **Stop counting**: The system stops counting if the maximum value is reached.
3. Select the **Alarm on overflow** check box to trigger an alarm event if the limit is reached.

Filter by Object Class page

Limit the object classes that trigger an alarm.

▸ Select the desired check boxes (**Upright persons**, **Bikes**, **Cars** and **Trucks**, as well as Camera Trainer object classes if licensed).

Approximation page

Define approximations for the different object properties. You can adopt these values as the basis for the settings in the next step.

1. Click a moving object in the camera image. The values for object size, aspect ratio, speed and direction are displayed for the marked object. The colors of the object are also displayed.
   Note: The properties of an object are always changing. You adopt the properties of the object at the time of clicking.
2. Click the **Apply values** check box if you want to use the properties of the marked object.
3. Move the **Precision** slider of each property to define how exactly they must correspond for an object to be detected.
   The further to the right the slider is set, the more accurate the description of the property of the searched object that is to trigger an alarm. Slider set to the left, property is ignored and the value is not adopted in the next step.

Filter by Object Conditions page

Limit the properties of an object that triggers an alarm event. Objects that do not correspond to the properties specified here do not trigger an alarm event.

1. In the **Object Area [m²]** box, enter a minimum and a maximum value for the size.
2. In the **Aspect Ratio V/H** box, enter a minimum and a maximum value or select a rectangle in the camera image and change the size by dragging a node.
3. In the **Speed [km/h]** box, enter a minimum and a maximum value for the speed.
4. In the **Direction 1 [°]** / **Direction 2 [°]** boxes, enter a minimum and a maximum value (angle) to define the directions of a moving object. Only flows moving in these directions will trigger an alarm event.
   The directions are displayed as yellow circle segments in the camera image.
   You can also define the direction as follows:
   - Place the pointer in the yellow circle segment, press and hold the mouse button, then turn the segment.
   - Place the pointer over one of the edges of the yellow circle segment, press and hold the mouse button, then move the edge.

Filter by Object Colors page

Describe the color property of the searched object.

1. Move the slider to select the degree of brightness for the colors.
2. Select up to five 5 colors for the search. To do this, select a square, then click the desired color segment.

3. Move the **Precision** slider to deternine how accurately the colors must match the object colors.
4. If necessary delete a selected color. To do this, select a square, then click **Clear**. If there are colors to the right of the deleted position, then they will move up automatically and receive a higher proportion of the object's color properties.

See also
–   *Object triggers based on lines, page 30*
–   *Object classification, page 32*
–   *Field, page 32*
–   *Tasks, page 35*
–   *Conditions in tasks, page 36*
–   *Color, page 38*

10.1.15   Configuring the Occupancy task

▰▰▰▱ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and Intelligent Video Analytics or Essential Video Analytics > **Tasks** tab

▰▰▰▱ in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and Intelligent Video Analytics or Essential Video Analytics > **Configuration** button > **Tasks** tab

This task generates an alarm event if a certain number of objects are inside a field. In addition, this task sets up a counter with the current number of objects in the field.

i	**Notice!** This task is useful for Queue Management.

To select the task:
1. On the **Surveillance Tasks** page, click **New**.
2. On the **Create a Task** page, select **Occupancy**, then click **OK**.

Define the Field page
1. Select a field from the list or create a new one.
    To create a new field, click into the camera image to start with the first corner of the field, then click again for each corner. Finish the field by double-clicking.
    Note: You can also select **Whole screen** or edit an existing field.
2. In the **Debounce time [s]** box, enter the minimum time that an object must remain within the field before it triggers an alarm. To do this, select the field in the camera image first, then enter the value. If necessary, enter the time for each field.
    Note: By entering a value, you can prevent the triggering of multiple alarm events by objects that are constantly moving toward and away from the boundary of the field.
3. In the **Intersection trigger** list, select the object trigger.
–   **Object center**: An object generates an alarm if the center of the object is inside the sensitive area.
–   **Edge of box**: An object generates an alarm if one of the edges of the virtual frame around the object is inside the sensitive area.
–   **Complete box**: An object generates an alarm if the virtual frame around the object is completely inside the sensitive area.
–   **Object base point:** An object generates an alarm if the base point of the object is inside the sensitive area.

Occupancy alarm page
1.   Select the **Alarm on overcrowding** check box if the system must generate an alarm event because to many objects are inside a field.
2.   In the **Critical value** box, enter the number of objects that must be at least inside a field before generating an alarm.
3.   Select **Alarm on missing objects** check box if the system must generate an alarm event because there are not enough objects inside a field.
4.   In the **Critical value** box, enter the number of objects that that must be inside a field before generating an alarm.
5.   Select the **Delay the alarm** check box and in the **Debounce time [s]** box, enter the minimum time for the delay.

Filter by Object Class page
Limit the object classes that trigger an alarm.
▸   Select the desired check boxes (**Upright persons**, **Bikes**, **Cars** and **Trucks**, as well as Camera Trainer object classes if licensed).

Approximation page
Define approximations for the different object properties. You can adopt these values as the basis for the settings in the next step.
1.   Click a moving object in the camera image. The values for object size, aspect ratio, speed and direction are displayed for the marked object. The colors of the object are also displayed.
      Note: The properties of an object are always changing. You adopt the properties of the object at the time of clicking.
2.   Click the **Apply values** check box if you want to use the properties of the marked object.
3.   Move the **Precision** slider of each property to define how exactly they must correspond for an object to be detected.
      The further to the right the slider is set, the more accurate the description of the property of the searched object that is to trigger an alarm. Slider set to the left, property is ignored and the value is not adopted in the next step.

Filter by Object Conditions page
Limit the properties of an object that triggers an alarm event. Objects that do not correspond to the properties specified here do not trigger an alarm event.
1.   In the **Object Area [m²]** box, enter a minimum and a maximum value for the size.
2.   In the **Aspect Ratio V/H** box, enter a minimum and a maximum value or select a rectangle in the camera image and change the size by dragging a node.
3.   In the **Speed [km/h]** box, enter a minimum and a maximum value for the speed.
4.   In the **Direction 1 [°]** / **Direction 2 [°]** boxes, enter a minimum and a maximum value (angle) to define the directions of a moving object. Only flows moving in these directions will trigger an alarm event.
      The directions are displayed as yellow circle segments in the camera image.
      You can also define the direction as follows:
      –   Place the pointer in the yellow circle segment, press and hold the mouse button, then turn the segment.
      –   Place the pointer over one of the edges of the yellow circle segment, press and hold the mouse button, then move the edge.

Filter by Object Colors page
Describe the color property of the searched object.
1.   Move the slider to select the degree of brightness for the colors.

2.   Select up to five 5 colors for the search. To do this, select a square, then click the desired color segment.

3.   Move the **Precision** slider to deternine how accurately the colors must match the object colors.

4.   If necessary delete a selected color. To do this, select a square, then click **Clear**. If there are colors to the right of the deleted position, then they will move up automatically and receive a higher proportion of the object's color properties.

See also
–   *Object triggers based on lines, page 30*
–   *Object classification, page 32*
–   *Field, page 32*
–   *Conditions in tasks, page 36*
–   *Color, page 38*

10.2   Metadata generation

Notice!
This tab provides access to basic settings that you can adapt for performance optimization. The settings and values defined here are valid for all tasks.

10.2.1   Calibrating the camera
◼◼◼▭ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and Intelligent Video Analytics or Essential Video Analytics > **Metadata Generation** tab > **Calibration** tab
◼◼◼▭ in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and Intelligent Video Analytics or Essential Video Analytics > **Configuration** button > **Metadata Generation** tab > **Calibration** tab

Notice!
This page is not available on panoramic cameras. In case of a panoramic camera, calibrate the camera under **Installer Menu** > **Positioning**.

Bosch IP cameras support you in calibrating the camera by providing all information known by the camera itself.

A camera is calibrated by assuming that the ground is horizontal and completely flat, and then teaching the camera its position and field of view in relation to the ground plane. Camera sensor size and focal length of the lens determine how wide and far the camera can basically see with sufficient resolution. Elevation above ground plane, together with the relative camera angles to the ground plane (tilt and roll angle) then determines the actual field of view of the camera. In CPP7 cameras an additional sensor determines the camera angles.

Therefore, the following camera values - needed for calibration - are set automatically for the different camera types:

Camera values		
Tilt / roll angle	**Focal length**	**Sensor size**
Automatically set for: – AUTODOME cameras – MIC cameras	Automatically set for: – AUTODOME cameras – MIC cameras	Automatically set for all Bosch IP cameras.

Camera values		
Tilt / roll angle	**Focal length**	**Sensor size**
− CPP7 cameras	− FLEXIDOME cameras	

For AUTODOME, MIC, FLEXIDOME and CPP7 cameras, only the height of the camera above the ground must be set manually. If needed, you can manually overwrite of the tilt and roll angle and the focal length.

Notice!
Set the camera to its final position and the lens to its zoom factor before calibrating the camera. Any changes in the camera position or the focal length of the lens will not be updated during the VCA configuration pages are open.
For the device web page: Close the VCA configuration and open it again to obtain the values that are set automatically by the camera.
In Configuration Manager: Change to pages others then **Tasks**, **Metadata Generation** or **Metadata Inspection**, and then open **Metadata Generation** > **Calibration** again.

Opening the Calibration page with default configuration active or camera not calibrated
In the default configuration, the camera is not calibrated. If the **Use camera values** check box is activated, all values are displayed that are set automatically. They are fixed and changing them is deactivated. Enter all missing values, press **Apply**, and then save the configuration.

Opening the Calibration page if camera is already calibrated and the Use camera values check box is activated
The camera values that are set automatically are displayed with updated values, though the old calibration is still active. Press **Cancel** to obtain the values which are used or press **Apply** to adjust the calibration to the updated values. Save the configuration.

Opening the Calibration page if camera is already calibrated and the Use camera values check box is deactivated
The values that are configured manually by the user are displayed. To obtain values that are set automatically, select the **Use camera values** check box, press **Apply**, and then save the configuration.

Notice!
Calibration status (camera calibrated / not calibrated) is shown on the **Global Settings** page.

To overwrite the automatically set values:
▸ Clear the **Use camera values** check box. Enter the new values, then select the **Fixed** check box.

To determine non-automatically set values:
1. For each value (tilt angle, roll angle, elevation, focal length) where the value is known (e.g. by measuring the elevation of the camera above the ground, or reading the focal length from the lens), select the **Fixed** check box and enter its value.
2. For any values that are still unknown, place a calibration elements on the camera image. Use these calibration elements to trace individual outlines of the displayed environment in the camera image and define the position and size of these lines and angles.

- Click to place a vertical line across the image.
  A vertical line corresponds to a line that is perpendicular to the ground plane, such as a door frame, edge of a building or a lamp post.

- Click to place a line across the ground in the image.
  A line on ground corresponds to a line that is on the ground plane, such as a road marking.

- Click to place an angle on the ground in the image.
  The angle on ground represents an angle lying on the horizontal ground plane, such as the corner of a carpet or parking bay markings.

3. Adjust the calibration elements to the situation:
   - Enter the real size of a line or angle. To do this, select the line or angle, then enter the size in the **Size [m]** box.
     Example: You have placed a line on ground across the lower side of an automobile. You know that the automobile is 4 m long. Enter 4 m as the length of the line.
   - Adjust the position or length of a line or angle. To do this, drag the line or angle as a whole, or its end points individually, to the desired position in the camera image.
   - Remove a line or angle. To do this, select the line or angle, then click **Remove Element**.

   Note:
   Blue lines indicate calibration elements added by you.
   White lines represent the element as it should be positioned on the camera image based on the current calibration results or the determined calibration data.

4. Click **Adapt Elements** to adapt the calibration elements to the calibration results or the calibration data.

5. Click **Calibrate**.
   Note: Calibration is carried out automatically when the calibration elements are moved.

6. Click **Apply** to save the calibration for this image.

Notice!

If the distance to the camera (geolocation) is not relevant, it is enough to determine height and focal length in relation to each other. This allows a simple calibration by marking 2-3 persons - each with a vertical line - and setting their size. 1,80 m (71 in.) for all is sufficient. Use at least one person in the front and one person in the background of the image for best results.

To verify calibration:
You can verify calibration by inserting calibration elements next to objects with known dimensions.

1. Click **Verify**.
   The button changes the labeling to **Calibrate**.

2. Place elements on the camera image, as described previously.
   The dimensions of the element are displayed underneath the buttons as they are determined by the calibration. These dimensions should correspond to reality, which means that a line that is 1 m long on the captured image will be displayed as 1 m in length.

3. Click **Calibrate** to switch back to calibration mode.

Horizon

If the values correspond, areas on the camera image have a colored background:

– **blue**: This area corresponds to the sky. The bottom line of the blue area represents the horizon. Objects that are detected in the blue area cannot be filtered correctly by size or speed.

– **yellow**: Objects that are smaller than 2 m and are in the area underneath the horizon cannot be detected as they are too small. If you wish to detect objects in this area, you must choose a different camera location.

If the camera is installed at a relatively low height in a building, for example, this display is not required, because the entire area covered by the camera is below the horizon.

The ToolTip indicates the deviation of the elements you created from the suggested elements. The smaller this value is, the better the calibration.

See also

– *Calibration, page 30*

10.2.2   Configuring the global settings

◼◼◻ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and Intelligent Video Analytics or Essential Video Analytics > **Metadata Generation** tab > **Global Settings** tab

◼◼◻ in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and Intelligent Video Analytics or Essential Video Analytics > **Configuration** button > **Metadata Generation** tab > **Global Settings** tab

This page allows you to enable the **Face Detection** functionality.

▸   Select the **Face detection** check box, if you want to store faces for recognition.

See also

– *Global settings, page 39*

10.2.3   Configuring the sensitive area

◼◼◻ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and Intelligent Video Analytics or Essential Video Analytics > **Metadata Generation** tab > **Sensitive Area** tab

◼◼◻ in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and Intelligent Video Analytics or Essential Video Analytics > **Configuration** button > **Metadata Generation** tab > **Sensitive Area** tab

This page allows you to define insensitive areas.

> **i**   **Notice!**
> The insensitive areas (**VCA Masks**) do not apply for crowd density estimation.

To define insensitive areas:

1. On the **VCA Masking** page, click **Add**. An insensitive area is added to the camera image. **Note:** You can also define an insensitive area directly in the camera image. To do this, click into the camera image. Each click creates a new corner of the insensitive area. A double-click closes the insensitive area.

2. In the camera image, adjust the position and size of the insensitive area if necessary.

To remove insensitive areas:

▶ On the **VCA Masking** page, select an insensitive area from the list or in the camera image, then click **Remove**.

See also
– *Sensitive area, page 39*

10.2.4 Configuring the tracking parameters

■■–■–□ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and Intelligent Video Analytics or Essential Video Analytics > **Metadata Generation** tab > **Tracking** tab

■■–■–□ in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and Intelligent Video Analytics or Essential Video Analytics > **Configuration** button > **Metadata Generation** tab > **Tracking** tab

This page allows you to define the tracking mode and the object detection settings.

To configure the tracking parameters:

1. On the **Tracking Parameters** page, select the tracking type.
   – **Standard tracking**: Standard tracking of moving regions in the image plane. A calibration is not required. Can be used if the scene consists of multiple floors, a staircase, for example. Objects are separated if possible and shapes are automatically smoothed.
   – **3D tracking**:
     Three-dimensional tracking of objects on the ground plane. Objects are separated if possible. Object shapes are automatically smoothed and for upright persons a 3D shape model is fitted.
     This improves detection and tracking in scenes with one main ground plane. A scene that consists of multiple floors or a staircase, for example, is not suitable for **3D tracking** mode.
     Note:
     3D tracking only take effect after calibrating the camera. Calibration is required to detect and track objects on the ground plane and to classify objects by their real size. Do not use **3D tracking** if camera height is below 2,50 m (recommended for optimal results: above 3 m).
   – **3D people tracking**:
     All objects are interpreted as persons and separated accordingly. 3D person shapes are fitted onto the persons. This feature is optimized for detecting and tracking people from above and in closed areas.
     Note:
     3D people tracking only take effect after calibrating the camera. Calibration is required to detect and track objects on the ground plane and to classify objects by their real size.
     If **3D people tracking** mode is selected, the aspect ratio of a person does not change even if the person falls down or stands up. In **3D people tracking** mode the person shape remains in upright position.
   – **Ship tracking** (only for CPP6 and CPP7 cameras):
     Tracking that is optimized to detect an object above the water surface similar to watercrafts.
   – **Museum mode**:
     Tracking that is optimized to detect any motion close to a museum exhibit and then generating an alarm event, for example, if a person is to close to exhibits or is touching a painting. No separation of objects is available.
     Note: Use **Museum mode** in combination with the intersection trigger **Edge of box**.

2. Only for CPP4 cameras:
    In the **Object Area [m²]** box, enter the minimum size for all objects that will generate an alarm event. Objects that are smaller than the specified size will be ignored. Make sure that the value is not too large, to avoid that relevant objects are unintentionally eliminated from alarm generation.
    Note: The value is graphically displayed in the camera image by a yellow-framed square. Drag one of the blue nodes to adjust the value. The yellow square can be moved in the camera image to cover objects being used for size comparison.
3. Only for CPP6 and CPP7 cameras:
    In the **Min. object area [m²]** box, enter the minimum size for all objects that will generate an alarm event.
4. In the **Noise suppression** list, select the desired entry (**Off**, **Medium**, **Strong**) to improve the suppression of unwanted alarms.
    For example, alarms that are caused by:
    –   Bushes or trees that are moving in the wind.
    –   Any stationary object that moves slightly in camera's line of sight.
    –   Low contrast shadows, reflections and illumination changes.
5. Only for CPP6 and CPP7 cameras:
    Move the **Sensitivity** slider to define the sensitivity.
    Note: As soon as a new object appears, video analytics considers the travelled distance and the period the new object can be observed to decide, whether it is a real object and must be added to the metadata, or whether it is only a disturbance. This decision may be delayed if noise suppression is activated and a part of the image is classified as being noisy.
    Decrease the sensitivity if too many false objects occur, or increase the sensitivity if objects are missed or detected too late.

10.2.5   Configuring the idle/removed parameters

■■■□ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and Intelligent Video Analytics or Essential Video Analytics > **Metadata Generation** tab > **Idle/ Removed** tab

■■■□ in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and Intelligent Video Analytics or Essential Video Analytics > **Configuration** button > **Metadata Generation** tab > **Idle/ Removed** tab

This page allows you to define the parameters of idle and removed objects.
To configure the parameters:
1. Under **Tracked Objects**, in the **Debounce time [s] (only stopped objects)** box, enter the time span a tracked and moving object must remain idle in order to be classified as stopped. Note that the tracking of this object then stops.
2. Select the **Generate 'started/stopped' metadata** check box to generate metadata as follows:
    Started objects: Generates metadata as soon as an idle object (a car, for example) in the sensitive area starts moving.
    Stopped objects: Generates metadata if a tracked and moving object (a car, for example) stops in the sensitive area for the defined debounce time.
3. Select the **Generate 'placed/taken' metadata** check box to generate metadata as follows:
    Placed objects: Generates metadata if an object (a suitcase, for example) is being placed in the sensitive area by a tracked moving object (a person, for example) for the defined debounce time.

Taken objects: Generates metadata if an idle object (a suitcase, for example) in the sensitive area is being taken away by a tracked moving object (a person, for example) after the defined debounce time.

4. In the **Debounce time [s]** box, enter the time span in seconds for which an object must remain idle in order to be classed as such.

5. Only for CPP6 and CPP7 cameras:
   In the **Object area [m²]** box, enter the minimum and maximum size for all objects that will generate an alarm event. Objects that are smaller or larger than the specified sizes will be ignored. Make sure that the range between the minimum and maximum size is not too small, to avoid that relevant objects are unintentionally eliminated from alarm generation.
   Note: The values are graphically displayed in the camera image by two yellow-framed squares. Drag one of the blue nodes to adjust the values. The yellow squares can be moved in the camera image to cover objects being used for size comparison.

See also
– *Configuring the Removed object task, page 67*
– *Configuring the Idle object task, page 69*

10.2.6 Configuring the crowd fields

▰━▰━▱ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and Intelligent Video Analytics or Essential Video Analytics > **Metadata Generation** tab > **Crowd Fields** tab

▰━▰━▱ in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and Intelligent Video Analytics or Essential Video Analytics > **Configuration** button > **Metadata Generation** tab > **Crowd Fields** tab

This page allows you to define crowd fields.
To define crowd fields:

1. On the **Crowd Field Settings** page, click **Add**. A crowd field is added to the camera image.
   Note: You can also define a crowd field directly in the camera image. To do this, click into the camera image. Each click creates a new corner of the crowd field. A double-click closes the crowd field.

2. In the camera image, adjust the position and size of the crowd field if necessary.

To remove crowd fields:

▸ On the **Crowd Field Settings** page or in the camera image, select a crowd field, then click **Remove**.

See also
– *Configuring the Crowd detection task, page 76*
– *Crowd fields, page 41*

10.3 Metadata inspection - statistics

The values that are displayed allow you to estimate which minimum and maximum values you must enter for the creation of a task to ensure the desired objects are detected.
To display the statistics:

▸ Click an object in the camera image.
   The object is marked with a yellow flag and the object properties are displayed.
   The lines indicate the percentage of objects for which the respective value was detected.
   The higher the line, the more objects matched the particular criterion.

The x-axis of the histograms (for example, area and speed) automatically adapts.
The histograms distinguish between objects that trigger an alarm (red line) and those that do not (blue line).
Blue lines: Set of objects with no alarm
Red lines: Set of objects with alarm

Note:

– If a marked object leaves the sensitive area, the properties can no longer be monitored. This also applies to objects that do not move for a longer period of time. The value display no longer changes if this is the case. If necessary, click another object.
– The progression graph displays the change in values of each property during the previous 30 seconds.
– The properties of a moving object are always changing. An automobile does not always drive at a constant speed. A person sits down and stands up or changes the direction.
– Colors cannot be detected for very small objects.
– The color of an object depends on the lighting of the image, for example. Different colors are detected under a floodlight than in the shade.
– The color properties of the marked object are displayed using color columns that are arranged according to their weighting. The further to the left a column is, the higher the proportion of the object's color property.
– The color columns are also updated once every second. It changes when the color property of the marked object changes.
– Colors that appear as less than 5% are not displayed.
– Pause the pointer on a color columns, to display a ToolTip with values for hue, saturation and value (HSV), as well as the weighting of the color.
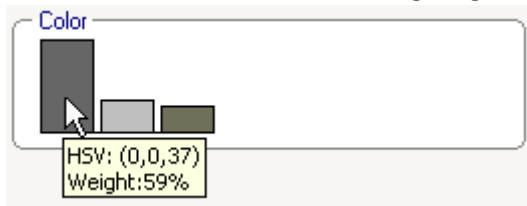
To restart the statistics:

▸   Click **Reset**.

See also

–   *Metadata inspection - statistics, page 41*

11   Configuring the Camera Trainer module

◼━◼━◻ in Configuration Manager: Select the camera > **VCA** tab > Camera Trainer tab

11.1   Configuring the detector

To configure the detector:

1. Enter the detector name. To do this, double-click the name box (for example,
    Detector 1), and then type a meaningful name.
    Note:
    x **:** Deletes the detector.
    + : Adds a new detector
    🔲 Detector color code and detector number (used as classification flag when displaying
    Intelligent Video Analytics and Essential Video Analytics metadata that include scene-
    specific objects)
2. Click the **Pause** 🔲 icon.
    Note: You can only define the monitored area (ROI) and the samples in **Pause** mode.
3. Click **Edit ROI**, to define the monitored area (ROI).
    Note: The button label changes to .**Edit samples**. Clicking **Edit samples** allows you to edit
    the samples.
4. Place a rectangle around the respective area in the camera image.
    To do this, click the camera image and adjust size and position of the automatically
    inserted rectangle. The rectangle is displayed with blue boundary lines.
    To adjust the position: Place the pointer in a rectangle, press and hold the mouse button,
    then move the rectangle to the desired position.
    To adjust the size: Place the pointer over a boundary line or over one of the corners of
    the rectangle, press and hold the mouse button, then move the rectangle or corner to the
    desired position.
    Note: We recommend that you define the region of interest as small as possible. The
    smaller the region of interest, the less samples you need, and the better the detector. A
    smaller region of interest improves the detector results due to less background and less
    perspective changes in the field of view.
5. Click **Edit Samples** to define the objects.
    Note:
    –   The number of needed samples depends on the scene. Different illumination,
         different seasons, more structure, different objects, a large region of interest and a
         large field of view need more samples.
    –   To define the samples, use objects with significant outlines in consistent areas and
         least amount of potential occlusions, for example, the windshield of a parked car
         instead of the entire car.
    –   The button label changes to **Edit ROI**. Clicking **Edit ROI** allows you to edit the
         monitored area (ROI).
6. Place a rectangle around the positive sample (object) in the camera image.
    To do this, click the camera image and adjust size and position of the automatically
    inserted rectangle. The rectangle around a sample is displayed with green boundary lines.
    To adjust the position: Place the pointer in a rectangle, press and hold the mouse button,
    then move the rectangle to the desired position.
    To adjust the size: Place the pointer over a boundary line or over one of the corners of
    the rectangle, press and hold the mouse button, then move the rectangle or corner to the
    desired position.
    Note:

– You can only resize the first sample. All other added samples use the same size and aspect ratio. If resizing is necessary after you have added a second sample, click **Reset**, then redefine the detector.

– To add additional samples (after the first), click the center of the desired area to place a positive sample automatically. Shift+click creates a negative sample.

– Due to the lower resolution of the Camera Trainer module, the displayed position and size of the region of interest and samples can differ to its position and size drawn using the mouse. The nearest possible position is set automatically by the system.

– Double-click the sample to change a positive sample to a negative sample.

7. Verify that the positive samples are correct. If not, right-click any incorrect samples, then click **Remove** or **Convert** on the shortcut menu.
    Note: The **Convert** command converts a positive sample to a negative sample.

8. Click **Add negatives** to automatically add negative samples. All negative samples are displayed as rectangles with red boundary lines.
    Note:

    – The **Add negatives** function can be performed several times. New samples will be added if there is sufficient space.

    – You can also manually place rectangles on negative samples by Shift+click.

9. Verify that the negative samples are correct. If not, right-click the rectangle, then click **Remove** or **Convert** on the shortcut menu.
    Note:

    – The **Convert** command converts a negative sample to a positive sample.

    – Double-click the sample also changes a negative sample to a positive sample.

10. Click **Learn**. The samples are used to train the detector and will be added to the **Samples** list.
    Therefore, if you delete an already stored sample, but a rectangle is still around that region in the camera image, another sample with same content will be stored.
    Note: Be careful when changing the **Samples** group. Each time you click **Learn**, the samples in the camera image and the already evaluated samples - stored in memory - will be evaluated again.

11. Click the **Samples** group to display and manage the positive and negative samples.
    To delete a sample: Click a sample, then press the Delete key.
    To copy a sample: Drag a sample from the **Positive samples** area to the **Negative samples** area or vice versa.
    To save or load a sample: Drag a sample from the **Positive samples** area or the **Negative samples** area to Windows Explorer or vice versa.
    Note: Copying a sample from Windows Explorer to the Camera Trainer samples area is only possible if the sample has the correct size of the detector.

12. Optional: Click **Condense** to delete similar samples.
    Note: You can use this function optionally if you have many samples and you want to delete the similar ones. This is not necessary if you remain within the limit of 1024 positive and 1024 negative samples.

13. Repeat the preceding steps to improve the process.
    Note: We recommend not to change the region of interest. Use the detector's feedback to verify and adjust the samples.

> **Notice!**
> After configuring the detector you must set the respective **Alarm** and **Counter** tasks.

See also
– *Configuring tasks, page 57*

11.2   Mouse actions

Use the mouse actions for selecting, deleting, resizing, and moving the sample and for changing positive to negative samples. Selected samples are displayed with dashed boundary lines.

To select samples:
One sample
‣   Click the sample.
Multiple samples
‣   Hold down the CTRL key and then click each sample.
or
‣   Hold down the CTRL key and draw a rectangle around the samples using the pointer. The rectangle is displayed in grey.

To cancel the selection of a sample:
‣   Select a new sample to deselect the other sample.

To move a ROI or sample:
‣   Place the pointer in a rectangle, press and hold the mouse button, then move the rectangle to the desired position:

To change the size of a ROI or sample:
Note: You can only resize the first sample. If resizing is necessary after you have added a second sample, click **Reset**, then redefine the detector.
‣   Place the pointer over a boundary line of the rectangle, press and hold the mouse button, then move the rectangle to the desired position.
or
‣   Place the pointer over one of the corners of the rectangle, press and hold the mouse button, then move the corner to the desired position.

To add positive samples:
‣   Click anywhere in the ROI rectangle to place an additional sample.

To remove samples:
One sample
‣   Select the sample, right-click anywhere in the camera image, then click **Remove**.
or
‣   Select the sample, then press the DEL key.
All samples
‣   Right-click anywhere in the camera image, then click **Remove All**.

To change the sample status:

▸ Double-click the sample to change a negative sample to a positive sample and vice versa.

or

▸ Select the sample, right-click anywhere in the camera image, then click **Toggle**.

or

▸ Click anywhere in the camera image, then select **Mark All as Negative** or **Mark All as Positive**.
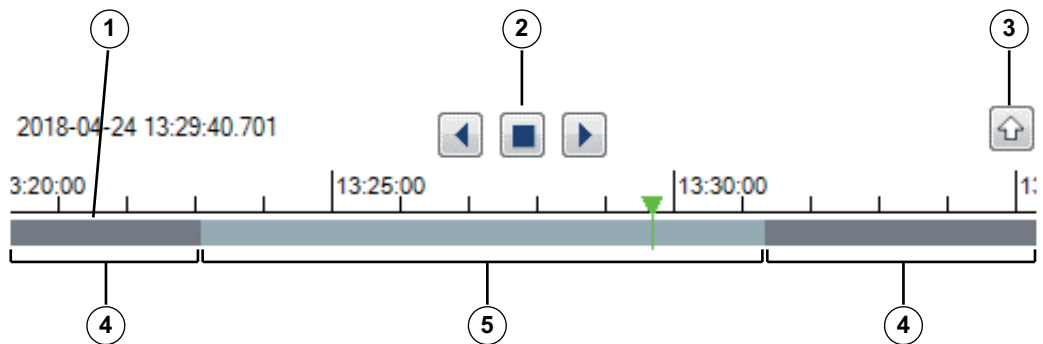
11.3 Timeline description

You can use the Live mode and Recording mode to train your computer.

Live mode
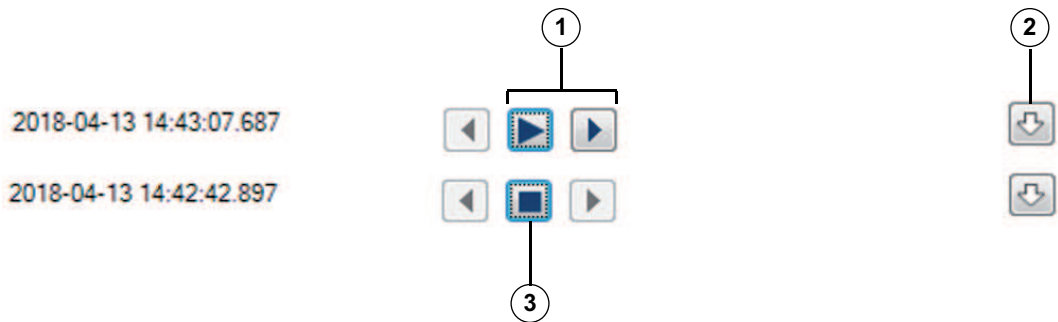
1	Loads current image (Start/Stop/Next) **Note:** Training is only possible in Pause mode.	2	Button to display timeline (if available).
3	Play mode: The saved detector results are displayed.		

Recording mode

1	Timeline: Rotate the wheel button to zoom in or zoom out.	2	Training is only possible in **Pause** mode. **Play** mode: Detector is currently in training. Unlike the live view, the last learned detector results are shown; whether or not uploaded into the camera.
3	Timeline is visible. Recording from camera's SD card.	4	No recording available.

| 5 | Available recording.
 .▭ = Current position of the displayed recording. | | |

12 Configuring Intelligent Video Analytics Flow

This chapter describes the configuration and different settings for Intelligent Video Analytics Flow.

12.1 Configuring tasks

■■■□ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and Intelligent Video Analytics Flow > **Tasks** tab

■■■□ in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and Intelligent Video Analytics Flow > **Configuration** button > **Tasks** tab

A task is always created or edited using a wizard. When you use the wizard to create or edit a task, you have access to the camera image and the commands, for example to create, edit or delete fields. Expert users can adapt tasks to their requirements using VCA Task Script Editor. You can immediately recognize from the color of object outlines whether an object will trigger an alarm with the given settings.

Notice!

Before defining tasks, specify the sensitive area and the motion detection parameters.

See also

– *Tasks (Flow), page 46*

12.1.1 Configuring the Detect any flow task

■■■□ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and Intelligent Video Analytics Flow > **Tasks** tab

■■■□ in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and Intelligent Video Analytics Flow > **Configuration** button > **Tasks** tab

When you work with Intelligent Video Analytics Flow for the first time, the default task **Detect any flow** is already available. This task detects all flows in the entire camera image. Initially, even the global settings are preset in such a way that no object is excluded.

This first preset task corresponds in the configuration to the task type **Flow in field**.

See also

– *Configuring the Flow in field task, page 95*

12.1.2 Configuring the Tampering task

■■■□ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and Intelligent Video Analytics Flow > **Tasks** tab

■■■□ in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and Intelligent Video Analytics Flow > **Configuration** button > **Tasks** tab

This task generates an alarm event if it must be assumed that the video source (camera) has been tampered with.

Here, you can only activate the filter for the relevant events. You cannot alter the settings for tamper detection. Only the settings selected on the VCA start page can be activated here.

To select the task:

1. On the **Surveillance Tasks** page, click **New**.
2. On the **Create a Task** page, select **Tampering**, then click **OK**.

Define the Trigger page

One of the activated events must occur to trigger an alarm event.

▸   Select the corresponding event.

Scene too bright

Tampering associated with exposure to extreme light (for instance, shining a flashlight directly on the lens) should trigger an alarm. The average brightness of the scene provides a basis for recognition.

Scene too dark

Tampering associated with covering the lens should trigger an alarm. The average brightness of the scene provides a basis for recognition.

Reference check

A deviation from the reference image on the VCA start page should trigger an alarm.

12.1.3   Configuring the Crowd detection task

■━■━❑ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and Intelligent Video Analytics Flow > **Tasks** tab

■━■━❑ in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and Intelligent Video Analytics or Essential Video Analytics > **Configuration** button > **Tasks** tab

This task generates an alarm event if a number of objects are located within a certain area. The area is defined by a crowd field in the camera image.

To use the **Crowd detection** functionality, first create a reference image of the background without people present on the standard VCA configuration page. The reference image must depict the current background captured by the camera. Create a new reference picture if the background has changed.

To select the task:

1.   On the **Surveillance Tasks** page, click **New**.
2.   On the **Create a Task** page, select **Crowd detection**, then click **OK**.

Filter by Crowd Field Properties page

1.   In the **Select a crowd field:** list, select one of the crowd fields that have already been created.
      Note: You cannot create or edit a crowd field here.
2.   Move the **Crowd density** slider to define how dense a crowd must be to be detected as a crowd.
      The equivalent on the scale is different according to the settings and conditions of each system. Determine a meaningful threshold value for triggering an alarm for your setup by testing.
3.   In the **Debounce time [s]** box, enter the minimum time that a crowd must be detected within the field before it triggers an alarm.
4.   In the **Smoothing time [s]** box, enter the minimum time after which an alarm is triggered if the average crowd density over this period exceeds the value set by the **Crowd density** slider.

See also

–   *Configuring the crowd fields, page 98*

12.1.4   Configuring the Flow in field task

■━■━❑ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and Intelligent Video Analytics Flow > **Tasks** tab

■━■━❑ in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and Intelligent Video Analytics Flow > **Configuration** button > **Tasks** tab

This task generates an alarm event if a flow (overall movement) is detected within a certain area. The area is defined by a field in the camera image.

To select the task:

1. On the **Surveillance Tasks** page, click **New**.
▸   On the **Create a Task** page, select **Flow in field**, then click **OK**.

Define the Field page

1. Select a field from the list or create a new one.
    To create a new field, click into the camera image to start with the first corner of the
    field, then click again for each corner. Finish the field by double-clicking.
    Note: You can also select **Whole screen** or edit an existing field.
2. In the **Debounce time [s]** box, enter the minimum time a flow must be detected within
    the field before an alarm event will be triggered.

Filter by Flow Properties page

Limit the properties of a flow that triggers an alarm event. Flows that do not correspond to
the properties specified here do not trigger an alarm event.

1. Select the **Direction 1 [°]** / **Direction 2 [°]** check boxes.
2. In the **Direction 1 [°]** / **Direction 2 [°]** boxes, enter a minimum and a maximum value
    (angle) to define the directions. Only flows moving in these directions will trigger an
    alarm event.
    The directions are displayed as yellow circle segments in the camera image.
    You can also define the direction as follows:
    –   Place the pointer in the yellow circle segment, press and hold the mouse button,
        then turn the segment.
    –   Place the pointer over one of the edges of the yellow circle segment, press and hold
        the mouse button, then move the edge.
3. Select the **Activity [% of area]** check box if you wish to filter flows that should trigger an
    alarm event based on their activity.
    In this context, an activity is the percentage of the monitored area in which a flow is
    detected.
4. In the **Activity [% of area]** boxes, enter a minimum and a maximum value for the activity.
    The selected values are displayed on the camera image during input by a respectively high
    number of yellow dots. The number of arrows indicating the detected flow is directly
    proportional to the activity in the area.
5. Select the **Speed** check box, if you wish to filter flows that should trigger an alarm event
    based on their speed.
6. Select the lowest and highest speed.
    The selected speeds are indicated by two moving dots on the camera image.
    Note: You can move or rotate this field using the pointer. Place it over an area with a
    flow. This will enable you to align the flow speed with the selected settings.

See also

–   *Fields, page 46*

12.1.5   Configuring the Counterflow in field task

■—■—■—□ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and Intelligent Video
Analytics Flow > **Tasks** tab

■—■—■—□ in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and Intelligent Video Analytics
Flow > **Configuration** button > **Tasks** tab

This task generates an alarm event if a flow moving against a main flow is detected within a
certain area.

To select the task:

1. On the **Surveillance Tasks** page, click **New**.
▶ On the **Create a Task** page, select **Counterflow in field**, then click **OK**.

Define the Field page
1. Select a field from the list or create a new one.
   To create a new field, click into the camera image to start with the first corner of the field, then click again for each corner. Finish the field by double-clicking.
   Note: You can also select **Whole screen** or edit an existing field.
2. In the **Debounce time [s]** box, enter the minimum time a flow must be detected within the field before an alarm event will be triggered.

Filter by Counterflow Properties page
1. In the **Angle of tolerance for counterflow [°]:** box, enter the value for the maximum deviation of the counterflow against the main flow. Angles between 0° and 180° are valid.
   Note:
   The general direction of motion is automatically recognized as the main flow. Only flows moving in the opposite direction - taking into account the deviation - will trigger an alarm event.
   By selecting 0°, the direction of motion is restricted in such a way that any counterflow will not be detected, while selecting 180° will ensure that every movement is detected.
2. In the **Adaption time window [s]:** box, enter the period during which there must be activity for a main flow to be detected. As soon as a main flow is detected as such, the counterflow will also be detected.
3. Select the **Activity [% of area]** check box if you wish to filter flows that should trigger an alarm event based on their activity.
   In this context, an activity is the percentage of the monitored area in which a flow is detected.
4. In the **Activity [% of area]** boxes, enter a minimum and a maximum value for the activity.
   The selected values are displayed on the camera image during input by a respectively high number of yellow dots. The number of arrows indicating the detected flow is directly proportional to the activity in the area.
5. Select the **Speed** check box, if you wish to filter flows that should trigger an alarm event based on their speed.
6. Select the lowest and highest speed.
   The selected speeds are indicated by two moving dots on the camera image.
   Note: You can move or rotate this field using the pointer. Place it over an area with a flow. This will enable you to align the flow speed with the selected settings.

See also
– *Fields, page 46*

12.2　Metadata generation

Notice!
This tab provides access to basic settings that you can adapt for performance optimization. The settings and values defined here are valid for all tasks.

12.2.1　Configuring the sensitive area
■■■□ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and Intelligent Video Analytics Flow > **Metadata Generation** tab > **Sensitivity Settings** tab

in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and Intelligent Video Analytics Flow > **Configuration** button > **Metadata Generation** tab > **Sensitivity Settings** tab

This page allows you to define insensitive areas.

To define insensitive areas:

1. On the **VCA Masking** page, click **Add**. An insensitive area is added to the camera image.
    Note: You can also define an insensitive area directly in the camera image. To do this, click into the camera image. Each click creates a new corner of the insensitive area. A double-click closes the insensitive area.
2. In the camera image, adjust the position and size of the insensitive area if necessary.
3. Move the **Tracking sensitivity** slider and set the sensitivity:
    Min.: This setting is useful in simple environments in which objects move in a straight line and are not hidden during their motion through the area concerned.
    Max.: Even minor activities are detected. This setting is useful if the camera has a small tilt angle and in environments in which objects are often hidden. However, this setting may mean that camera noises (especially in low-visibility conditions) are also detected as motion.
4. Select the **Min. tracking duration [s]** check box and enter the period for an object to be detected. Select the check box to detect slow objects.
5. Select the **Min. tracking distance** check box and enter the distance an object must cover to be detected. Select the check box to detect quick objects.

To remove insensitive areas:

▸   On the **VCA Masking** page, select an insensitive area from the list or in the camera image, then click **Remove**.

See also

–   *Sensitive area, page 47*

12.2.2   Configuring the crowd fields

in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and Intelligent Video Analytics Flow > **Metadata Generation** tab > **Crowd Fields** tab

in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and Intelligent Video Analytics Flow > **Configuration** button > **Metadata Generation** tab > **Crowd Fields** tab

This page allows you to define crowd fields.

To define crowd fields:

1. On the **Crowd Field Settings** page, click **Add**. A crowd field is added to the camera image.
    Note: You can also define a crowd field directly in the camera image. To do this, click into the camera image. Each click creates a new corner of the crowd field. A double-click closes the crowd field.
2. In the camera image, adjust the position and size of the crowd field if necessary.

To remove crowd fields:

▸   On the **Crowd Field Settings** page or in the camera image, select a crowd field, then click **Remove**.

12.3   Metadata inspection - statistics

The values that are displayed allows you to estimate which minimum and maximum values you must enter for the creation of a task to ensure the desired flow is detected.

Furthermore, the values help you to check and refine the filter criteria for flows

To display the statistics:

▸ Click an object in the camera image.
   The lines indicate the percentage of flows for which the respective value was detected.
   The higher the line, the more flows matched the particular criterion. The histograms
   distinguish between flows that trigger an alarm (red line) and those that do not (blue
   line).
   Blue lines: Set of flows with no alarm
   Red lines: Set of flows with alarm
To restart the statistics:
▸ Click **Reset**.

See also

–   *Metadata inspection - statistics, page 48*

13 Configuring MOTION+

This chapter describes the configuration and different settings for MOTION+.

13.1 Configuring tasks - general

■■■□ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and MOTION+ > **Tasks** tab

■■■□ in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and MOTION+ > **Configuration** button > **Tasks** tab

A task is always created or edited using a wizard. When you use the wizard to create or edit a task, you have access to the camera image and the commands, for example to create, edit or delete fields. Expert users can adapt tasks to their requirements using VCA Task Script Editor. You can immediately recognize from the color of object outlines whether an object will trigger an alarm with the given settings.

13.1.1 Configuring the Detect any motion task

■■■□ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and MOTION+ > **Tasks** tab

■■■□ in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and MOTION+ > **Configuration** button > **Tasks** tab

When you work with MOTION+ for the first time, the default task **Detect any motion** is already available. This task detects all moving objects in the entire camera image. Initially, even the global settings are preset in such a way that no object is excluded.

This first preset task corresponds in the configuration to the task type **Motion in field**.

13.1.2 Configuring the Motion in field task

■■■□ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and MOTION+ > **Tasks** tab

■■■□ in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and MOTION+ > **Configuration** button > **Tasks** tab

This task generates an alarm event if an object moves within a certain area. The area is defined by a field in the camera image.

To select the task:

1. On the **Surveillance Tasks** page, click **New**.
2. On the **Create a Task** page, select **Motion in field** , then click **OK**.
3. In the **Task name:** box, enter the name of the task.

Define the Field page

1. Select a field from the list or create a new one.
   To create a new field, click into the camera image to start with the first corner of the field, then click again for each corner. Finish the field by double-clicking.
   Note: You can also select **Whole screen** or edit an existing field.
2. In the **Debounce time [s]** box, enter the minimum time that an object must remain within the field before it triggers an alarm. To do this, select the field in the camera image first, then enter the value. If necessary, enter the time for each field.
   Note: By entering a value, you can prevent the triggering of multiple alarm events by objects that are constantly moving toward and away from the boundary of the field.

Filter by Motion Properties page
1. Select the **Activity [% of area]** check box if you wish to filter motion that should trigger an alarm event based on their activity. This allows you to set a minimum amount of independent and possibly unconnected detection blocks in the field that have to indicate changes.
   In this context, an activity is the percentage of the monitored area of the camera in which motion is detected.
2. In the **Activity [% of area]** boxes, enter a minimum and a maximum value for the activity. The selected values are displayed in the monitored area of the camera image during input by a respectively high number of yellow dots
3. Select the **Size of cell cluster [% of whole screen]** check box if you wish to filter motion that should trigger an alarm event based on their size.
4. In the **Size of cell cluster [% of whole screen]** boxes, enter the minimum and maximum size of the cell clusters in percentage based on the whole screen.
   The minimum value is displayed in the camera image during the input by a yellow shaded rectangle, the maximum value by a yellow frame.

See also
– *Field, page 49*

13.2   Metadata generation

i	**Notice!** This tab provides access to basic settings that you can adapt for performance optimization. The settings and values defined here are valid for all tasks.

13.2.1   Configuring the sensitive area

▮▬▮▬▯ in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and Intelligent Video Analytics or Essential Video Analytics > **Metadata Generation** tab > **Sensitive Area** tab

▮▬▮▬▯ in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and Intelligent Video Analytics or Essential Video Analytics > **Configuration** button > **Metadata Generation** tab > **Sensitive Area** tab

This page allows you to define insensitive areas.
To define insensitive areas:
1. On the **VCA Masking** page, click **Add**. An insensitive area is added to the camera image.
   Note: You can also define an insensitive area directly in the camera image. To do this, click into the camera image. Each click creates a new corner of the insensitive area. A double-click closes the insensitive area.
2. In the camera image, adjust the position and size of the insensitive area if necessary.
3. Move the **Sensitivity** slider and set the sensitivity:
   Min.: Even minor activities are detected. This setting is useful if the camera has a small tilt angle and in environments in which objects are often hidden. However, this setting may mean that camera noises (especially in low-visibility conditions) are also detected as motion.
   Max.: This setting is useful in simple environments in which objects move in a straight line and are not hidden during their motion through the area concerned.

To remove insensitive areas:
▸ On the **VCA Masking** page, select an insensitive area from the list or in the camera image, then click **Remove**.

See also

– *Sensitive Area, page 50*

13.3 Metadata inspection

The values that are displayed allow you to estimate which minimum and maximum values you must enter for the creation of a task to ensure the desired objects are detected.

See also

– *Metadata inspection - statistics, page 51*

14   Configuring Tamper detection

■─■─■─□ in Configuration Manager: **VCA** tab > **Tamper Detection** tab
■─■─■─□ in Web browser: **Alarm** > **VCA**

This functionality allows you to detect tampering of cameras and video cables by means of various options. Run a series of tests at different times of the day and night to ensure that the video sensor is operating as intended.

To configure tamper detection:

1.   Click **Reference** to save the currently visible video image as a reference.
2.   Click **Mask...**. The reference image is displayed in a new pane.
3.   Click **Add mask**. A black square (mask) is displayed as default.
      Note: The area inside the mask is excluded from monitoring.
4.   Define the areas that are excluded from monitoring.
      To do this, edit the mask and drag it to the correct position in the reference image.
      –   To change the mask size:
           Select the mask, and then drag the line or the corners (nodes) of the mask to the desired position in the camera image.
      –   To move the mask:
           Select the mask, and then drag the field as a whole to the desired position in the camera image.
      –   To insert a corner (node):
           Select the mask, and then double-click a line.
      –   To delete a corner (node):
           Select the mask, and then double-click a corner.
      –   To delete a mask:
           Select the mask, and then click **Delete mask**.
5.   Select the **Reference check** check box to activate the on-going check. The stored reference image with the excluded areas is displayed below the current video image.
6.   Move the **Sensitivity** slider to the left to decrease the sensitivity or move the slider to the right to increase the sensitivity.
      Note: The basic sensitivity of the tamper detection can be adjusted for the environmental conditions to which the camera is subject. The algorithm reacts to the differences between the reference image and the current video image. The darker the observation area, the higher the value that must be selected.
7.   Move the **Trigger delay [s]** slider to the left to decrease the delay or move the slider to the right to increase the delay.
      Note: Set delayed alarm triggering here. The alarm is only triggered after a set time interval in seconds has elapsed and then only if the triggering condition still exists. If the original condition has been restored before this time interval elapses, the alarm is not triggered. This avoids false alarms triggered by short-term changes, for example, cleaning activities in the direct field of vision of the camera.
8.   Select the **Disappearing edges** or **Appearing edges** option to specify the reference check once again.
      –   **Disappearing edges**
           The area selected in the reference image should contain a prominent structure. If this structure is concealed or moved, the reference check triggers an alarm. If the selected area is too homogenous, so that concealing and moving the structure would not trigger an alarm, then an alarm is triggered immediately to indicate the inadequate reference image.
      –   **Appearing edges**

Select this option if the selected area of the reference image includes a largely homogenous surface. If structures appear in this area, then an alarm is triggered.

9. Select the **Global change** check box if a global change in the video image, as set with the **Global change** slider, should trigger an alarm.

10. Move the **Global change** slider to set how large the global change in the video image must be for an alarm to be triggered. This setting is independent of the sensor fields selected under **Mask...**. Set a high value if fewer sensor fields need to change to trigger an alarm. With a low value, it is necessary for changes to occur simultaneously in a large number of sensor fields to trigger an alarm.

11. Select the **Scene too bright** check box if too bright light conditions should trigger an alarm.

12. Move **Threshold** the slider to the desired position. The value is displayed to the right of the slider.

13. Select the **Scene too dark** check box if you want to detect camera covering, for example.

14. Move **Threshold** the slider to the desired position. The value is displayed to the right of the slider.

15   Using AUTODOME and MIC cameras

If you implement Intelligent Video Analytics or Intelligent Video Analytics Flow with AUTODOME and MIC cameras, please note the following:

–   There are 16 different VCA profiles available for configuring Intelligent Video Analytics.
–   Each profile can be assigned to a different preset. Each preset can have its own Intelligent Video Analytics configuration.
     Define the camera positions for the individual presets before starting to configure Intelligent Video Analytics.
–   The Camera Trainer module is available for scene-specific object detection on each VCA profile.
–   Once you have assigned the Intelligent Video Analytics profile to a preset, the AUTODOME camera is blocked to other users for approximately ten minutes.
–   An Intelligent Video Analytics image data analysis is launched approximately two seconds after the AUTODOME camera has called up a preset. The reason of the call up, as part of a tour or manually initiated, is irrelevant.
     When presets are called up as part of a tour, the minimum dwell period for a preset should be at least 1 minute.
–   As soon as the AUTODOME camera is moved to a new position or the zoom, iris or focus settings are changed, Intelligent Video Analytics is no longer active for this scene.
–   As soon as a message from the AUTODOME camera is displayed on the camera image, Intelligent Video Analytics is no longer active for this preset. Recall this preset to reactivate Intelligent Video Analytics for this scene.
–   Use the **Inactivity** function to ensure that the camera automatically recalls a preset when it becomes inactive. This is particularly important for AUTODOME cameras where the images are not viewed immediately. For more information, refer to the camera documentation.
–   Some of the AUTODOME cameras will enable you to reuse an alarm event triggered by Intelligent Video Analytics as an alarm input. Thus, for example, an event detected on preset 1 can cause the recall of another preset.

Glossary

camera calibration

Teaching a camera about its field of view and perspective to obtain 3D metric information from a 2D camera image.

condition

A restriction of an alarm or statistic task to objects of certain properties, for example, object type, area, speed and direction.

elevation

The vertical distance from the camera to the ground plane of the captured image. Typically the heigth of the mounted camera above the ground.

Essential Video Analytics

Capability of automatically detecting moving objects and tracking them over time. Suitable for reliable video analytics for small and medium business, large retail stores, commercial buildings, and warehouses.

field

A polygon created by the user that specifies a certain area within a camera image, for example, an entrance or the open space in front of a barrier.

focal length

The distance from the optical center of the lens to the image of an object located at an infinite distance from the lens. Long focal lengths give a small field of view (e.g. telephoto effect), while short focal lengths give a wide angle view.

geolocation

Position of tracked objects in map coordinates.

Intelligent Video Analytics

Capability of automatically detecting moving objects and tracking them over time. Suitable for mission-critical, long-distance intrusion detection in extreme weather conditions or other high-performance video analytics.

line

A thin mark within a camera image created by the user that contains a starting point and endpoint. A line can consist of several segments.

loitering

The process of an object staying in a certain area for a specified period of time. The object can either standing still or moving around.

metadata

Information in data stream that describe the content of the analyzed scene, especially the location and properties of all tracked objects.

MOTION+

Algorithem that detects and analysis changes in video images by comparing the current image with older images.

object

Typically people or vehicles moving within the area seen by the camera.

object classification

Assignment of object types (person, car, bike, truck or unknown) to tracked objects.

roll angle

The angle between the roll axis and the horizontal plane.

route

A path within a camera image that an object must follow more or less closely to trigger an alarm.

sensitive area

That part of the camera image where motion can be detected.

task

The description of spatial, temporal and other object properties that need to be met to trigger an alarm or to update a statistic.

tilt angle

The angle between the horizontal and the camera.

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