IVA 6.10

Intelligent Video Analysis

BOSCH

en Software manual

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1 Using the Help

The online Help provides you with information about this program directly on your screen. You can also find this information in the manual.
To find out more about how to do something in this program, access the Help.

1.1 Finding information

To find information in the Help:

1. On the **Help** menu, click **Online Help...**.
   The dialog box for the Help is displayed.
2. If the pane to the left is not visible, click the **Show** button.
3. In the Help window, do the following:

   Contents

   Display the table of contents for the Online Help. Click each book to display pages that link to topics, and click each page to display the corresponding topic in the right-hand pane.

   Index

   Search for specific words or phrases or select from a list of index keywords. Double-click the keyword to display the corresponding topic in the right-hand pane.

   Search

   Locate words or phrases within the content of your topics. Type the word or phrase in the text field, press ENTER, and select the topic you want from the list of topics.

Notice!

Texts of the user interface are marked **bold**.

- The arrow invites you to click on the underlined text or to click an item in the application.

Related Topics

- Click to display a topic with information on the application window you currently use. This topic provides information on the application window controls.

1.2 Printing the Help

While using the Online Help, you can print topics and information right from the browser window.
To print a Help topic:

1. Right-click in the right pane and select **Print**.
   The **Print** dialog box opens.
2. Click **Print**. The topic is printed to the specified printer.

2 Introduction

2.1 About this manual

This manual is intended for persons responsible for configuring and managing a CCTV system. This manual describes how to configure the IVA program.
This document assumes that the reader is familiar with both the CCTV system and the other programs that are integrated into the system.

2.2 Conventions in this document

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**.

2.3 Additional documentation

After the program has been installed, this document is also available as online Help within the program.

Documentation for Bosch Security Systems products can be found as follows:

- Open any browser > enter www.boschsecurity.com > select your region and your country > start a search for your product > select the product in the search results to show the existing documents.

3 System Overview

3.1 Intelligent Video Analysis

IVA with the auxiliary function IVA Flow is an algorithm that detects certain properties and the behavior of objects in a scene monitored by a video camera and from this generates alarm events that, in turn, can be processed in a CCTV system.
Recording with activated IVA settings is required in order to be able to later search through the video material quickly and purposefully using this algorithm.
IVA makes it possible to capture and evaluate directional motion of objects in such a way that false alarms are prevented to a large extent.
IVA adapts automatically to changing environmental conditions and is therefore largely non-sensitive to perturbing influences such as rain and tree motion.

Notice!
The IVA Flow approach differs from the IVA object recognition. This function detects an optical flow formed by the movement of individual blocks. IVA Flow does not use a camera calibration.

3.2 Use cases

IVA is suitable for the following use cases:
- monitoring boundaries, fences and enclosures
- protection of pipelines, overland lines and car parks
- counting peoples from above (bird's eye view BEV people counter)
- detection of crowds and queues
- protection of museum exhibits from being touched or removed

etc.

3.3 Limitations of IVA

In certain environments the use of this type of motion detection system may not always be advisable; this is because motion may not always be detected or too much motion may be detected owing to disturbing factors, for example, insects on the lens or snowstorms.

Motion may be falsely detected as follows:
- Neon lights, flashing lights, night time lights, and reflected light (from a window or mirror, for example). The flickering of these lights can affect the detection.
- A reflective background
- Reflections on the ground
- Water as background
- Glass (glazed building frontages)
- Cones of light moving in darkness
- Inadequate lighting
- Badly illuminated corners
- Rapidly changing light conditions, for example, switching on/off a room illumination
- Long hard shadows
- Cameras mounted on masts swinging in the wind
- Moving leaves/branches that present a persistent fixed motion
- Crowded area (approximately more than 10 persons in field of view)

Examples:

- 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.
- Objects that always move uniformly (such as clouds) do not impair the detection of other objects and do not trigger false alarms.
- 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 it. For instance, a person walking in front of a hedge that is moving in the wind will very probably not be detected.
- If the image consists to a certain extent of nothing but moving objects, the motion of an individual object cannot be detected—for example, individuals in a large crowd or unsuitable camera test-setups (for example, on a desktop), where objects close to the camera (for example, a person sitting at the desktop) appear very large in the image. In this scenario, IVA Flow can detect uniform motion flows.

False detection in case of object classification:
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)
- Persons on a bike are classified as such
- No differentiation between bicycle and motorbike.
- Small objects with only a few pixel (for example, objects far away from the camera)

False detection in case of BEV people counting:

- No differentiation between persons and objects with similar size (for example, suitcases, strollers)
- People with bags could be detected as multiple persons
- Loitering people
- Children close to other persons
- Persons standing in a queue

Objects in motion with color properties
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 — the mudguards in red, for example, and the tires in black.
- The color properties of an object depend upon the lighting conditions. If the lighting conditions in a captured image change, then the captured color of the object will also change.
  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.

3.4 Limitations of IVA 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.
- Flow can be detected if the velocity and direction of an object is roughly constant for a configurable short period of time or distance **and** if the velocity is within some minimum and maximum limits. The minimum (maximum) required velocity corresponds to an object, which takes approximately 2 (8) seconds to travel from one side of the image scene to the opposite side.
- Objects that are smaller than 1% of the image area do not trigger flow detection.
- 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.
- Flow can be measured if objects have a minimum size (about 250 pixel) and enough appropriate texture
- The sensitive area must cover the direction of the movement that should be detected. Multiple sensitive areas must cohere as possible. Otherwise, no Flow can be detected in this direction.

3.5 License

IVA 6.10 is enabled on all cameras ex work. No license is needed.

Notice!

Upgrading earlier IVA versions

If you have already licensed an earlier version of IVA 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.

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.

4 Basics for IVA

This chapter describes basic information when using IVA.

4.1 Camera image

A camera image is that part of a area which is covered 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 center of an object is relevant for generating an alarm event. Some tasks allow you to make another selection.

4.3 Object triggers

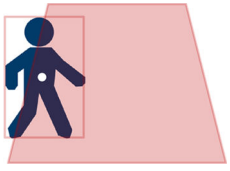
Object triggers allow you to select, when an object generates an alarm event. The basis for analysis is the virtual frame (bounding box) around an object.

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

The following object triggers are available:

– **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.

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

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

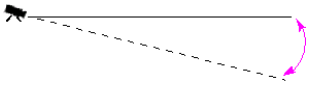
See also

- *Configuring the Object in field task, page 29*
- *Configuring the Loitering task, page 32*
- *Configuring the Condition change task, page 34*
- *Configuring the Removed object task, page 38*
- *Configuring the Idle object task, page 40*
- *Configuring the Entering field task, page 42*
- *Configuring the Leaving field task, page 43*
- *Configuring the Counter task, page 46*

4.4 Calibration

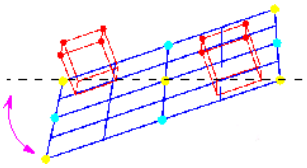
Camera calibration is necessary to detect objects correctly according to their size or speed. With camera calibration a link is made for each camera position between the size of the real-life situation and the dimensions as they appear on the camera image. For example, you tell the software that an object 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).

Tilt angle [°]



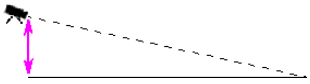
The angle between the horizontal and the camera. A tilt angle of 0° means that the camera is mounted parallel to the ground; a tilt angle of 90° means that the camera is mounted vertically in birds eye view perspective.
The flatter the tilt angle is set, the less accurate the estimate of object sizes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

Roll angle [°]



The angle between the roll axis and the horizontal plane.
The setting can deviate from the horizontal by up to 20 degrees.

Elevation [m]



The vertical distance from the camera to the ground plane of the captured image.
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. For cameras with a fixed lens this value is preset and need not be entered.

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

See also
- *Calibrating with calibration elements, page 50*
- *Calibrating with calibration plane, page 52*
- *Calibrating with self-calibration, page 54*

4.5 Object classification

Object classification is used to simplify the usage of IVA 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)

Notice!
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
- *Limitations of IVA, page 7*
- *Calibration, page 11*
- *Configuring the Object in field task, page 29*
- *Configuring the Crossing line task, page 31*
- *Configuring the Loitering task, page 32*
- *Configuring the Condition change task, page 34*
- *Configuring the Following route task, page 35*
- *Configuring the Removed object task, page 38*

- *Configuring the Idle object task, page 40*
- *Configuring the Entering field task, page 42*
- *Configuring the Leaving field task, page 43*
- *Configuring the tracking parameters, page 59*

4.6 Field

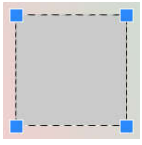
Fields are polygons that cover a certain area, for example an entrance or the open space in front of a barrier. These fields are created by you. Objects that move within a field can generate an alarm event.

See also

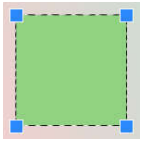
- *Configuring the Object in field task, page 29*
- *Configuring the Leaving field task, page 43*
- *Configuring the Entering field task, page 42*

4.6.1 Displaying fields in the camera image

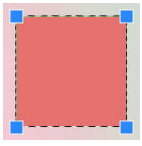
Fields are displayed as follows:



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

– *Configuring the Crossing line task, page 31*

4.7.1 Displaying lines in the camera image

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.

Lines are displayed as follows:

A line that is not being used in any tasks appears dimmed.

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.

4.7.2 Creating and editing a line

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

– Moving end points
– Moving lines

To create a new line:

▸ Click into the camera image. Each click creates a new node of the line.

To change the size of a line:

▸ Drag the end point of the line 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!

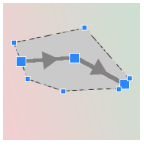
If a route is integrated into a task, you can select the direction in which movement along the route must trigger an alarm.

See also

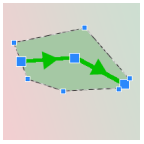
– *Configuring the Following route task, page 35*

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.
The 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 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. A double-click finishes the action.

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:

▸ Drag a node of the route and move it to the desired position.

To change the tolerance range:

▸ 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

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

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.

Notice!
The **Counter** task is the only exception. You can configure this task not to generate an alarm event but deliver the counts only.

See also
– *Configuring tasks (IVA), page 29*
– *Configuring tasks (IVA Flow), page 63*

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.

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

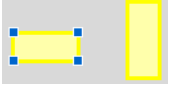
To delete a task:
▸ Select the task, then click **Delete**.

4.10 Conditions in tasks

You can precisely limit the properties 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.

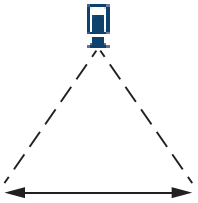


The ratio is the quotient of the vertical and horizontal extension of the object in the image captured by the camera. The actual aspect ratio can deviate from this.

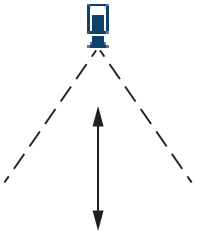
Persons captured directly from above always have the same aspect ratio in the image, irrespective of their actual size.
The aspect ratio of a person changes if the person falls down or stands up, for example. The aspect ratio of a vehicle changes if it changes its direction by 90°.

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.

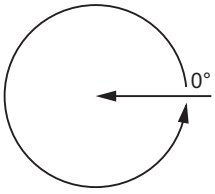


Object moves at a right angle to the camera:
speed is detected more accurately



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.

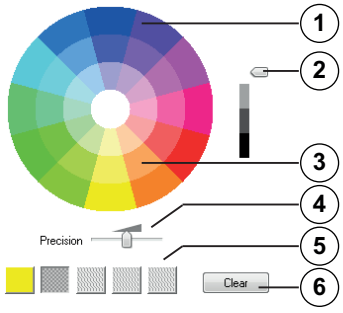
4.11 Color

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 in IVA 6.0 using the HSV color model.



1 Color cylinder
All colors can only be 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 displayed unshaded are the ones that are to be taken into account in the search for objects for the marked color (**5**), in consideration of the precision (**4**).

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 actually 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.

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.

6 **Clear**
Deletes a selected color.

4.12 Global settings

Global settings allow you to activate the **Face Detection** option.

See also

– *Configuring the global settings, page 58*

4.13 Sensitive Area

Sensitive area is that part of the camera image where motion can be detected.
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 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.

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-by 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.

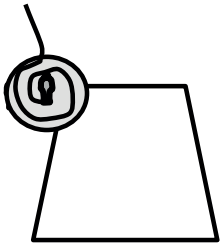
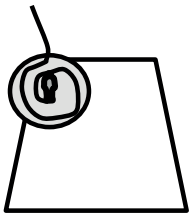
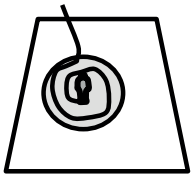
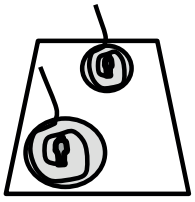
Notice!
Using IVA for a forensic search in recordings, motion analysis is only possible in the area that was previously marked as the sensitive area in the recording.

See also

– *Configuring the sensitive area, page 59*

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 61*

4.16 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 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 IVA 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 62*

4.17 Image information

Depending on the configuration of IVA, 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.

	Description
	Objects that generate an alarm event under the current settings appear on the camera image inside a **red** outline.
	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** (example: abandoned bag).
	The point at which an object is detected as having been removed is displayed inside a frame and marked with an **X** (example: theft).
	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. An object can only be selected if you have selected the **Object Properties** 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.

	Description
	Indicates that an object is detected as truck.
	Indicates that an object is detected as bike.

5 Basics for IVA Flow

This chapter describes basic information when using IVA Flow.

5.1 Tasks

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 IVA 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.

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.

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**.

5.2 Fields

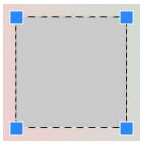
Fields are polygons that cover a certain area, for example an entrance or the open space in front of a barrier. These fields are created by you. Objects that move within a field can generate an alarm event.

See also

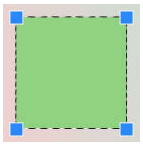
- *Configuring the Flow in field task, page 64*
- *Configuring the Counterflow in field task, page 65*

5.2.1 Displaying fields in the camera image

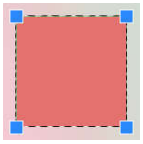
Fields are displayed as follows:



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 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 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 IVA 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 67*

5.4 Image information

The IVA Flow approach differs from the IVA object recognition. This function detects an optical flow formed by the movement of individual blocks. The camera does not need to be calibrated. Depending on the configuration of IVA Flow, additional overlays in the image can provide further information.

	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 Starting IVA and IVA Flow

You can start IVA and IVA Flow as follows:

– Use the Configuration Manager program.
  or
– Use the Web browser view of the device.

Notice!

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

See also

– *IVA and AUTODOME cameras, page 69*

6.1 Starting 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 analyse live images.
The system requirements and operation of Configuration Manager are described in the Configuration Manager manual.
To start IVA 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 IVA .
   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 ten profiles available for AUTODOME cameras. Each profile can be used for one preset.
4. Only AUTODOME cameras: In the **Scene** 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. 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
6. In the **Analysis type** list select the IVA or IVA Flow version.
   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. Configure IVA using the following tabs.
   - **Tasks**
   - **Metadata Generation**
   - **Metadata Inspection**

Notice!
If the IVA configuration of this camera is in use, no other users can configure IVA 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.

See also
- *Configuring IVA, page 29*
- *Configuring IVA Flow, page 63*

6.2 Starting using Web browser

You can also configure IVA using the Web browser view of the device.
To configure IVA 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 ten profiles available for AUTODOME cameras. Each profile can be used for one preset.
4. Only AUTODOME cameras: In the **Scene** 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. 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
6. In the **Analysis type** list select the IVA or IVA Flow version.
   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. Click **Configuration**.
   Configure IVA or IVA Flow using this window.

Notice!
If the IVA configuration of this camera is in use, no other users can configure IVA 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.

See also

- *Configuring IVA, page 29*
- *Configuring IVA Flow, page 63*

7 Configuring IVA

This chapter describes the configuration and different settings for IVA.

7.1 Configuring tasks (IVA)

in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and IVA > **Tasks** tab
in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and IVA > **Configuration** tab > **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 IVA Task Editor.
You can immediately recognize from the color of object outlines whether an object will trigger an alarm with the given settings.

7.1.1 Configuring the Detect any object task

in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and IVA > **Tasks** tab
in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and IVA > **Configuration** tab > **Tasks** tab

When you work with IVA 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**.

7.1.2 Configuring the Object in field task

in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and IVA > **Tasks** tab
in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and IVA > **Configuration** tab > **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.
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.

Filter by Object Class page

Limit the object classes that trigger an alarm.

- Select the desired check boxes (**Upright persons**, **Bikes**, **Cars**, **Trucks**).

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, page 10*
- *Object classification, page 12*
- *Field, page 13*
- *Tasks, page 15*
- *Conditions in tasks, page 16*

– *Color, page 17*

7.1.3 Configuring the Crossing line task

in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and IVA > **Tasks** tab

in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and IVA > **Configuration** tab > **Tasks** tab

This task generates an alarm event if an object crosses one or more virtual lines.

This task can be used for Intelligent Tracking.

Note: This feature is optimized for Forensic Search.

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. 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 remain on the other side of the line before it triggers 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.

Filter by Object Class page

Limit the object classes that trigger an alarm.

- Select the desired check boxes (**Upright persons**, **Bikes**, **Cars**, **Trucks**).

Define the Trigger page

This step is only displayed if at least two lines are used for this task.

1. Select whether an object must cross only one of the lines or all lines to trigger an alarm.
2. Select the **within the time span [s]:** check box and enter a minimum and a maximum time if an object must cross the lines within a pre-defined time span before it triggers an alarm.

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 classification, page 12*
- *Line, page 14*
- *Tasks, page 15*
- *Conditions in tasks, page 16*
- *Color, page 17*

7.1.4 Configuring the Loitering task

in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and IVA > **Tasks** tab

in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and IVA > **Configuration** tab > **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.

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.

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**, **Trucks**).

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, page 10*
- *Object classification, page 12*
- *Field, page 13*
- *Tasks, page 15*
- *Conditions in tasks, page 16*
- *Color, page 17*
- *Loitering, page 19*

7.1.5 Configuring the Condition change task

in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and IVA > **Tasks** tab

in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and IVA > **Configuration** tab > **Tasks** tab

This task generates an alarm event if the properties changes for a detected object within a specified time span:

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.

Filter by Object Class page

Limit the object classes that trigger an alarm.

- Select the desired check boxes (**Upright persons**, **Bikes**, **Cars**, **Trucks**).

See also

- *Object triggers, page 10*
- *Object classification, page 12*
- *Field, page 13*
- *Tasks, page 15*
- *Conditions in tasks, page 16*
- *Color, page 17*

7.1.6 Configuring the Following route task

in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and IVA > **Tasks** tab

in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and IVA > **Configuration** tab > **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. Select from the list field 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.

Filter by Object Class page
Limit the object classes that trigger an alarm.
- Select the desired check boxes (**Upright persons**, **Bikes**, **Cars**, **Trucks**).

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 classification, page 12*
– *Route, page 14*
– *Tasks, page 15*
– *Conditions in tasks, page 16*
– *Color, page 17*

7.1.7 Configuring the Tampering task

in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and IVA > **Tasks** tab

in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and IVA > **Configuration** tab > **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.

Scene too noisy

Tampering, for example noisy scene as a result of a strong interference signal in the vicinity of the video lines, should trigger an alarm.

Signal loss

An interruption of the video signal should trigger an alarm.

Reference check

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

7.1.8 Configuring the Removed object task

in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and IVA > **Tasks** tab

in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and IVA > **Configuration** tab > **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.

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.

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**, **Trucks**).

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 triggers, page 10*
- *Object classification, page 12*
- *Field, page 13*
- *Tasks, page 15*
- *Conditions in tasks, page 16*
- *Color, page 17*

7.1.9 Configuring the Idle object task

in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and IVA > **Tasks** tab

in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and IVA > **Configuration** tab > **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.

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**, **Trucks**).

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, page 10*
- *Object classification, page 12*
- *Field, page 13*
- *Tasks, page 15*
- *Conditions in tasks, page 16*
- *Color, page 17*

7.1.10 Configuring the Entering field task

in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and IVA > **Tasks** tab

in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and IVA > **Configuration** tab > **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.
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.

Filter by Object Class page

Limit the object classes that trigger an alarm.

- Select the desired check boxes (**Upright persons**, **Bikes**, **Cars**, **Trucks**).

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, page 10*
- *Object classification, page 12*
- *Field, page 13*
- *Tasks, page 15*
- *Conditions in tasks, page 16*
- *Color, page 17*

7.1.11 Configuring the Leaving field task

in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and IVA > **Tasks** tab

in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and IVA > **Configuration** tab > **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.
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.

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.

Filter by Object Class page

Limit the object classes that trigger an alarm.

▸ Select the desired check boxes (**Upright persons**, **Bikes**, **Cars**, **Trucks**).

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, page 10*
- *Object classification, page 12*
- *Field, page 13*
- *Tasks, page 15*
- *Conditions in tasks, page 16*
- *Color, page 17*

7.1.12 Configuring the Similarity search task

in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and IVA > **Tasks** tab

in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and IVA > **Configuration** tab > **Tasks** tab

This task generates an alarm event if an object is detected that is similar to a previously marked object.

Notice!

This task is typically used in the Bosch 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 16*

7.1.13 Configuring the Crowd detection task

in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and IVA > **Tasks** tab

in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and IVA > **Configuration** tab > **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 61*

7.1.14 Configuring the Counter task

in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and IVA > **Tasks** tab

in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and IVA > **Configuration** tab > **Tasks** tab

Notice!

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

Method 1: Counting objects entering a certain area

To select the task:

1. On the **Surveillance Tasks** page, click **New**.

2. On the **Create a Task** page, select **Counter**, then click **OK**.

Select the Counting Trigger page

▸ Click **Entering field**.

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.

Define the Counter Settings page

1. Select the **Alarm on maximum value** check box and enter a maximum value if an alarm event should be triggered if this value is reached.
2. Click **Restart counting** or **Stop upon reaching the maximum**.
   – **Restart counting**: The system restarts counting after the maximum value is reached.
   – **Stop upon reaching the maximum**: The system stops counting if the maximum value is reached.

Filter by Object Class page

Limit the object classes that trigger an alarm.

▸ Select the desired check boxes (**Upright persons**, **Bikes**, **Cars**, **Trucks**).

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.

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

Select the Counting Trigger page
- Click **Crossing lines**.

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 remain on the other side of the line before it triggers 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.

Define the Counter Properties page
1. Select the line.

2. In the **Counter name** box, enter the name, then select the direction (**In** or **Out**) for each line if necessary.
   Note: You can only enter a name for lines that are selected.
3. Select the **Alarm on maximum value** check box and enter a maximum value if an alarm event should be triggered if this value is reached.

Define the Counter Settings page

1. Select the **Alarm on maximum value** check box and enter a maximum value if an alarm event should be triggered if this value is reached.
2. Click **Restart counting** or **Stop upon reaching the maximum**.
   - **Restart counting**: The system restarts counting after the maximum value is reached.
   - **Stop upon reaching the maximum**: The system stops counting if the maximum value is reached.

Filter by Object Class page

Limit the object classes that trigger an alarm.

- Select the desired check boxes (**Upright persons**, **Bikes**, **Cars**, **Trucks**).

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 triggers, page 10*
- *Object classification, page 12*
- *Field, page 13*
- *Tasks, page 15*
- *Conditions in tasks, page 16*
- *Color, page 17*

7.2 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.

7.2.1 Calibrating with calibration elements

in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and IVA > **Metadata Generation** tab > **Calibration** tab

in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and IVA > **Configuration** tab > **Metadata Generation** tab > **Calibration** tab

The calibration is defined by placing several calibration elements (lines and angles) on the camera image and adjusting these step by step in relation to the actual situation.

Requirements:
- Scenes can consist of rectangular, parallel and curved structure and objects.
- Dimensions or distances and most of the camera parameters are known

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.

Examples:

To calibrate the camera using calibration elements:

1. On the **Camera Calibration** page, select the **Fixed** check boxes in each case, then enter all the values you know regarding the camera and its positioning, for example, **Tilt angle [°]**, **Roll angle [°]**, **Elevation [m]**, **Focal length [mm]**.
2. Place at at least two 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.

   Note: The number of required calibration elements is equal to the number of unspecified camera parameters plus one. At least one **Vertical line** and one **Line on ground** or one **Angle on ground** should have been created.
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.

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.

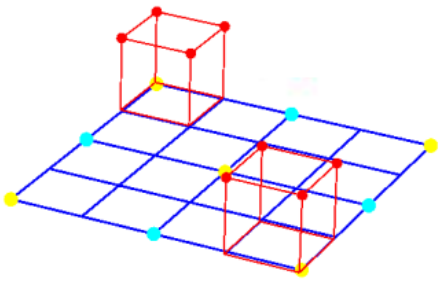
If the camera is installed at a relatively low height in a building, for example, this display is not required, because the entire area covered by the camera is below the horizon.
The ToolTip indicates the deviation of the elements you created from the suggested elements. The smaller this value is, the better the calibration.

See also
– *Calibration, page 11*

7.2.2 Calibrating with calibration plane

in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and IVA > **Metadata Generation** tab > **Calibration** tab
in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and IVA > **Configuration** tab > **Metadata Generation** tab > **Calibration** tab

The calibration is defined by placing a virtual calibration plane on the camera image and adjusting it step-by-step in relation to the actual situation.
The settings are graphically displayed on the camera image by the virtual calibration plane and two cubes.



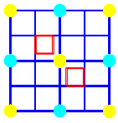
Virtual calibration plane
The virtual calibration plane appears as a blue grid and can be tilted, rotated and scaled.

Cubes
Two red cubes are displayed on the plane. The 4 red dots mark the upper side of the cube. In the default setting, the side length of one of these cubes is equivalent to 2 m – so the cube is about the same height as a person.

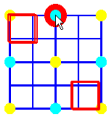
Requirements:
- Calibration method for experienced users.
- Some dimensions or distances must by known, for example, the size of a car.

To calibrate the camera using calibration plane:

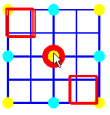
1. On the **Camera Calibration** page, click  . The calibration plane and two cubes are displayed.
2. Position the calibration plane on the camera image so that it matches the angle and perspective of one of the actual horizontal areas.
   A section of a street is a suitable reference area, especially if the sides of the street are marked.



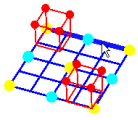
Start position:
At the beginning, the calibration plane is shown upright.



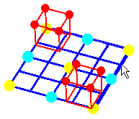
Scaling the calibration plane:
Drag the anchor point in the middle of a line inward or outward to make the calibration plane proportionally smaller or larger.



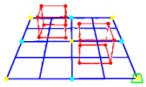
Moving the plane:
Drag the anchor point in the center of the calibration plane to its new location.



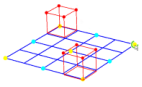
Tilting the calibration plane horizontally:
Drag one of the lines of the calibration plane that is horizontal in the start position and tilt the calibration plane horizontally. The tilt angle is changed.



Tilting the calibration plane vertically:
Drag one of the lines of the calibration plane that is vertical in the start position and tilt the plane vertically. The roll angle is changed.



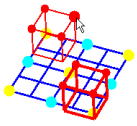
Changing the perspective:
Drag the lower corner of the calibration plane to the left or right. The perspective of the calibration plane is distorted.



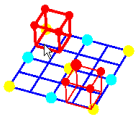
Rotating the calibration plane:
Drag the upper corner of the calibration plane in the direction you wish to rotate.

To adjust the position and size of the cubes:

1. Position one of the red cubes over an object with known size.
2. Adjust the cube to the size of this object. The second cube changes its size to suit the selected perspective.
   Note: If the cubes disappear from the camera image, click **Center Cubes**.



Scaling the cube:
Drag the upper corner of a cube to make the cube proportionally smaller or larger.
Note: The size of both cubes changes – both cubes always have the same size.



Moving the cube:
Drag an edge of a cube to its new location.

3. Enter the real size of this object in the **Size [m]** box
4. Place the second cube over another object with the same size, for example a second car which is further back in the image. This allows you to check whether the perspective is set correctly.

The more care you take over calibration, the more accurately the size, direction and speed of moving objects can be estimated.
The system must be recalibrated each time the camera position is changed.

To edit the calibration:
You can also change the settings for each parameter by entering the relevant values, for example, **Size [m]**, **Tilt angle [°]**, **Roll angle [°]**, **Elevation [m]**, **Focal length [mm]**.
To apply the calibration:

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

See also

– *Calibration, page 11*

7.2.3 Calibrating with self-calibration

in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and IVA > **Metadata Generation** tab > **Calibration** tab
in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and IVA > **Configuration** tab > **Metadata Generation** tab > **Calibration** tab

The self-calibration of cameras should help you to minimize the time to calibrate each camera manually.

Requirements:

– Scenes with rectangular and parallel structure and objects.
– Not suitable for scenes with curved structures.
– The size of an object in the scene must be known.

To calibrate the camera using self calibration:

- On the **Camera Calibration** page, click to start the self-calibration wizard. The **Lens Distortion Correction** page with the camera image is displayed.

Lens Distortion Correction page

1. Click **Estimate Lens Distortion** to adjust the distortion in the image.
2. Verify, whether the edges are distorted. If edges are still distorted several tools are available to edit the image so that the algorithm can minimize the lens distortion.
   Use the tools in the following steps to optimize the result.

Figure: The edges in the image are distorted. Clearly identifiable on the ceiling lamps and the marking lines on the ground. The image must be edited.

3. Improve the distortion with the **Lens distortion** tool. To do this, move the circle in a position with less distortion.
   Note:
   – Click If edges are straight, and go on with Next Step - **Camera Calibration** page.
   – Click **Reset** to undo all changes on this page.
4. Cut off interfering parts that create lines not being part of straight scene structure, for example, the camera display stamp or leafage of a tree.
   To do so, click and select the area in the camera image without the interfering parts.

Then click **Estimate Lens Distortion** and verify the result again. The program only adjusts the distortion in the selected area.

Figure: On the right image, the edges are straight. The ceiling lamps and the marking lines on the ground are not distorted.

Note: Click **Reset** to undo all changes on this page.

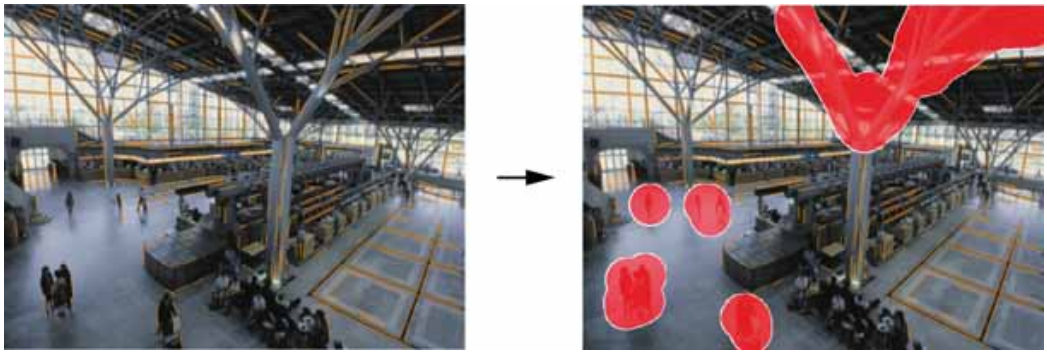
5. Increase or decrease the sensitivity of the detected lines in the camera image.
   To do this, move the **Line sensitivity** slider to the left to decrease the sensitivity or move the slider to the right to increase the sensitivity.
   Then click **Estimate Lens Distortion** and verify the result again. Repeat this procedure until the result is satisfying.
   Note:
   - If the image contrast is very low and only very few lines are detected that belong to rectangular and parallel scene structures, increase the line detection sensitivity to detect more straight lines.
   - If too many short lines are detected that do not belong to rectangular and parallel scene structures, decrease the line detection sensitivity.
   - Click **Reset** to undo all changes on this page.
6. Click  . The **Camera Calibration** page is displayed.

Camera Calibration page

1. Click **Estimate Camera Parameters** to start the self-calibration algorithm. When the algorithm has finished successfully, a cube is displayed in the camera image as calibration result. The dark-blue bordered side of the cube is the base and lies on the detected ground-plane of the scene.

Note: The cube was estimated from the main directions of detected straight structures in the image.

2. Verify, whether the edges of the cube are parallel to edges in the image or to straight structures in the image, for example walls or armoires.
   To do this, move the cube to straight structures in the image, and verify the parallelism of the edges. In the image for example, the pillar is almost parallel to the vertical edge of the cube. Or, the blue base lines of the cube are parallel to the marking lines on the ground.
   If edges are not parallel several tools are available to edit the detected lines in the image so that the algorithm can optimize the camera parameters.
   Use the tools in the following steps to optimize the result.
3. Remove detected lines that are not supporting rectangular or straight objects in the scene, e.g. moving persons or the leafage of a tree.
   To do this, click  , then remove the lines or areas in the camera image.



Note: To make removed areas sensitive again, right-click the removed areas.

4. Increase or decrease the sensitivity of the detected lines in the camera image.
   To do this, move the **Line sensitivity** slider to the left to decrease the sensitivity or move the slider to the right to increase the sensitivity.
   Then click **Estimate Camera Parameters** and verify the result again. Repeat this until the result is satisfying.
5. Add additional lines in the camera image that are not detected by the program. This lines should follow rectangular structures in the camera image, for example lines orientated to driving directions of parking lots.
   To do this, click  and place a line in the camera image.
   Then click **Estimate Camera Parameters** and verify the result again. Repeat this until the result is satisfying.
   Note:
   – To remove an additional line, click the icon, then right-click one of the line-endings.

– Click **Reset** to undo all changes on this page.

6. Cut off interfering parts, that create lines not being part of straight scene structure, for example, the camera display stamp or leafage of a tree.

   To do this, click  and select the area in the camera image without the interfering parts. Then click **Estimate Camera Parameters** and verify the result again. Repeat this until the result is satisfying.

   Note: Click **Reset** to undo all changes on this page.

7. Click  . The **Scale and Verification** page is displayed.

Scale and Verification page

1. Adjust the cube to the size where you can see all corners of the cube.
   To do this, beside **Cube scale factor**, move the slider to the left to reduce the size or move the slider to the right to increase the size.
2. Adjust one edge of the cube to the real size of an object.
   To do this, click the base of the cube and move one of the edges of the cube to an object with a known size, for example the width of a door, length of a desk or the height of an object.
   Adjust the size of the cube until the edge of the cube has the same size as the edge of the object with the known size.
   Note: To adjust the size of the cube, use the **Cube scale factor** slider or click a corner of the cube and change the size by dragging the corner.
3. Then enter the real size of the object in the **Real size [m]** box.
4. Verify the dimension of another object with a known size.
   To do this, right-click the camera image and draw a line, for example between two walls. Beside the line you can see the value calculated by the camera. If the value does not fit, improve the settings in the wizard.
   Note: Only distances on the ground-plane can be measured, not the height of an object.
5. Select the **Undistorted top view** check box to display the undistorted top view of the cube in the upper left corner of the camera image. Moving the box, changes the top view. You can use the cube as a loupe to verify the calibration.
6. Select the **BEV correction** check if you use the bird's eye view functionality.
7. Click **Accept**.

Applying the Calibration

1. Click **Apply** to save the calibration for this image.
2. Close the window to cancel the calibration and return to the last saved calibration.

See also

– *Calibration, page 11*

7.2.4 Configuring the global settings

in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and IVA > **Metadata Generation** tab > **Global Settings** tab

in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and IVA > **Configuration** tab > **Metadata Generation** tab > **Global Settings** tab

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

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

See also

– *Global settings, page 19*

7.2.5 Configuring the sensitive area

in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and IVA > **Metadata Generation** tab > **Sensitive Area** tab

in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and IVA > **Configuration** tab > **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.

To remove insensitive areas:

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

See also

– *Sensitive Area, page 19*

7.2.6 Configuring the tracking parameters

in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and IVA > **Metadata Generation** tab > **Tracking** tab

in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and IVA > **Configuration** tab > **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 enhanced tracking.
     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.

- **Ship tracking** (only for CPP6 cameras):
  Tracking that is optimized to detect an object above the water surface similar to watercrafts.
- **Museum mode**: (only for CPP4 cameras):
  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 cameras:
   In the **Min. object area [m²]** box, enter enter the minimum size for all objects that will generate an alarm event.
4. Select the **Noise suppression** check box, to improve the suppression of undesired 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 cameras:
   Move the **Sensitivity** slider to define the sensitivity.
   Note: As soon as a new object appears, IVA considers the travelled distance and the period the new object can be observed to decide, whether it is really an 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.

7.2.7 Configuring the idle/removed parameters

in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and IVA > **Metadata Generation** tab > **Idle/Removed** tab

in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and IVA > **Configuration** tab > **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 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 38*
- *Configuring the Idle object task, page 40*

7.2.8 Configuring the crowd fields

in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and IVA > **Metadata Generation** tab > **Crowd Fields** tab

in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and IVA > **Configuration** tab > **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
- *Crowd fields, page 20*

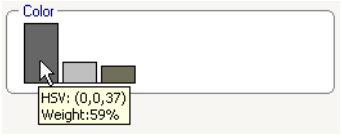
7.3 Metadata inspection - statistics

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 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 its 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 20*

8 Configuring IVA Flow

This chapter describes the configuration and different settings for IVA Flow.

8.1 Configuring tasks (IVA Flow)

in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and IVA Flow > **Tasks** tab
in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and IVA Flow > **Configuration** tab > **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 IVA Task 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.

8.1.1 Configuring the Detect any flow task

in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and IVA Flow > **Tasks** tab
in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and IVA Flow > **Configuration** tab > **Tasks** tab

When you work with IVA 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 64*

8.1.2 Configuring the Tampering task

in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and IVA Flow > **Tasks** tab
in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and IVA Flow > **Configuration** tab > **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.

Signal loss

An interruption of the video signal should trigger an alarm.

Reference check

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

8.1.3 Configuring the Crowd detection task

in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and IVA Flow > **Tasks** tab

in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and IVA > **Configuration** tab > **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 67*

8.1.4 Configuring the Flow in field task

in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and IVA Flow > **Tasks** tab

in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and IVA Flow > **Configuration** tab > **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 23*

8.1.5 Configuring the Counterflow in field task

in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and IVA Flow > **Tasks** tab
in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and IVA Flow > **Configuration** tab > **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 23*

8.2 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.

8.2.1 Configuring the sensitive area

in Configuration Manager: **VCA** tab > **Profile #1** or **Profile #2** and IVA Flow > **Metadata Generation** tab > **Sensitivity Settings** tab

in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and IVA Flow > **Configuration** tab > **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.: 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.
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 or in the camera image, select an insensitive area, then click **Remove**.

8.2.2 Configuring the crowd fields

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

in Web browser: **Alarm** > **VCA** > **Profile #1** or **Profile #**2 and IVA Flow > **Configuration** tab > **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**.

8.3 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 24*

9 IVA and AUTODOME cameras

If you implement IVA or IVA Flow with AUTODOME cameras, please note the following:

- There are ten different profiles available for configuring IVA.
  Each profile can be assigned to a different preset. Each preset can have its own IVA configuration.
  Define the camera positions for the individual presets before starting to configure IVA.
- Once you have assigned IVA profile to a preset, the AUTODOME camera is blocked to other users for approximately ten minutes.
- An IVA image data analysis is launched approximately two seconds after the AUTODOME camera has recalled a preset. It is irrelevant whether this is part of a tour or whether it is completed manually.
  When presets are recalled as part of a tour, the minimum dwell period for a preset should not be below ten seconds; it should be at least one minute.
- As soon as the AUTODOME camera is moved to a new position or the zoom, iris or focus settings are changed IVA is no longer active for this scene.
- As soon as a message from the AUTODOME camera is displayed on the camera image, IVA is no longer active for this preset. Recall this preset to reactivate IVA 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 IVA as an alarm input. Thus, for example, an event detected on preset 1 can cause the recall of another preset.

See also

- *Starting IVA and IVA Flow, page 26*

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