



IVA 5.5

Intelligent Video Analysis



BOSCH

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1 Introduction

1.1 About this Manual

This manual is intended for persons who will configure and/or operate IVA 5.5 or IVA 5.5 Flow. The manual describes how to operate IVA 5.5 and IVA 5.5 Flow.

1.2 Conventions in this Manual

In this manual, the following symbols and notations are used to draw attention to special situations:

**CAUTION!**

Security instructions where non-compliance can result in loss of data are marked with this symbol.

**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 or commands, are written in **bold**.

1.3 Intelligent Video Analysis

Bosch IVA 5.5 (Intelligent Video Analysis) with the auxiliary function IVA 5.5 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 5.5 settings is required in order to be able to later search through the video material quickly and purposefully using this algorithm.

IVA 5.5 makes it possible to capture and evaluate directional movement of objects in such a way that false alarms are prevented to a large extent.

IVA 5.5 adapts automatically to changing environmental conditions and is therefore largely non-sensitive to perturbing influences such as rain and tree movement.

Specifically when used for a forensic search, IVA 5.5 allows moving objects to be filtered according to their color. Using the IVA 5.5 algorithm, extensive video material can be specifically searched for objects with particular color properties.

New IVA 5.5 Functions

- Counter
- BEV people counter
(Bird's eye view people counter)
- Enhanced calibration
- Improved reference image check configuration

2 Requirements

2.1 Setup

The easiest way to set up IVA 5.5 and IVA 5.5 Flow is using the Configuration Manager program. This must be installed on a Windows PC that can communicate with the respective device over a network.

Operational requirements for the Configuration Manager program can be found in the documentation supplied.

Configuration Manager does not have to be licensed.

No additional programs are required to analyze live images.

Alternatively, you can also configure IVA 5.5 and IVA 5.5 Flow using the Web browser view of the device.

IVA 5.5-Compatible Senders and Cameras

IVA 5.5 is available for all products that support H.264.

2.2 Forensic Search in Recordings

The functionality of IVA 5.5 is also used in forensic searches for objects in recordings. Moving objects can be detected by their behavior (for example, direction, speed, sudden appearance or disappearance) and according to their properties (for example, size or color). You will need the Bosch Video Client program for this.

You obtain the current version of the Bosch Video Client program from the download area on our website.

To use the advanced forensic search, IVA 5.5 must be activated and configured before recording was started. A following search is based on the recorded object and event data. For Forensic Search new IVA-Tasks can be created at any time using the IVA-Task-Editor, as each IVA-Task may evaluate the recorded object and event data differently.



NOTICE!

Objects can be detected both in live images and in recordings, only in the area marked as sensitive.

2.3 License

When you purchase IVA 5.5, you will be provided with an authorization number via e-mail. Using this number and the installation code that you will find in the Web browser view of the device, you can generate the activation key on the **Bosch Software License Manager** Internet platform.

This key is then entered in the Web browser view of the device. Thereafter you can use IVA 5.5.

Note:

There are also cameras available with IVA enabled. These cameras must not be activated on the **Bosch Software License Manager**.

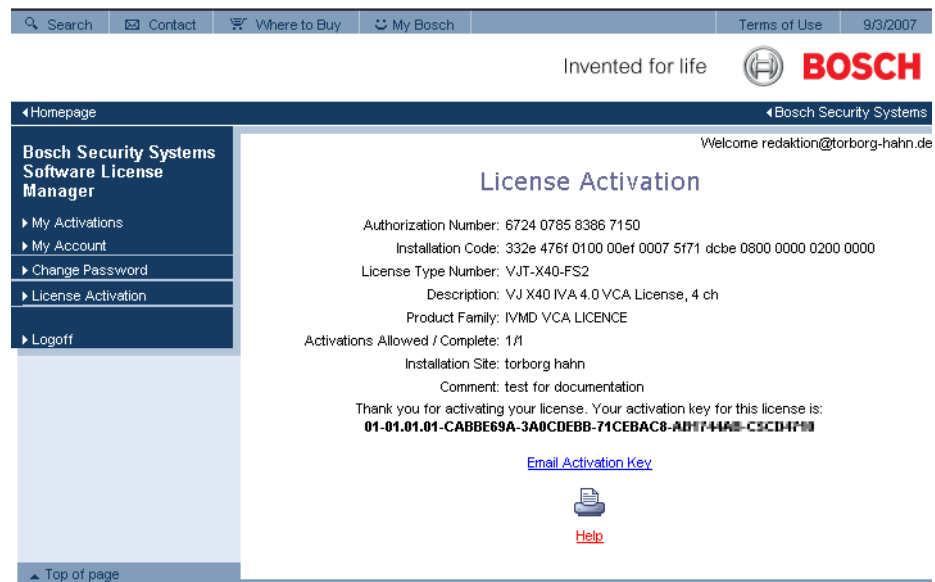
Making a note of the installation code

1. Open the Web browser view of the device for which you would like to license IVA 5.5.
2. Select **SETTINGS > Advanced Mode > Service > Licenses**.

Make a note of the installation code – the copy-and-paste function is supported.

Requesting Activation Keys

3. Open the following Website from any PC:
https://activation.boschsecurity.com/
The Bosch Security Systems Software License Manager user interface will appear. The page appears in English only.
4. If you already have an account, log in.
You can create a new account if you wish. The benefit of an account is that you can list all of your previous license activations.
Once you have logged in, the welcome dialog will appear.
You can also continue the process without logging in.
Next, you will see the **License Activation** screen.
5. Enter the authorization number that you received when you purchased IVA 5.5.
6. Then click the check mark next to the input window.
7. The next step is to enter the installation code along with brief information about the installation location. You may also add a comment.
This information will assist you later in assigning the activation key to the device.
8. Click **Submit**.
The activation key is displayed.



You can copy the key to the clipboard.

You can have the key e-mailed to you. To do this, click the **Email Activation Key** link. You will see a dialog box in which you can enter two e-mail addresses for recipients.

You can print the page.

Entering Activation Keys

9. Open the Web browser view of the device again.
 10. Select **SETTINGS > Advanced Mode > Service > Licenses** again.
 11. Enter the activation key – the copy-and-paste function is supported.
 12. Click **Set** to save the activation key. A window tells you that licensing was successful.
 13. Close the window.
- IVA 5.5 is now activated. The activation key can no longer be seen.

Upgrading IVA 4.5

If you have already licensed IVA 4.5 for the device, you simply need to upgrade the firmware of the device to version 5.5 or higher. The license for IVA 4.5 is then automatically changed to an IVA 5.5 license. A new license key is not required for upgrading. No fee will be charged.

You obtain the current firmware from your customer service or from the download area on our Internet site.

You can update the firmware directly via the Web browser view of the device or by using Configuration Manager. For detailed information on this process, please see the appropriate documentation.

2.4 Use cases/limitations

2.4.1 Use cases

IVA 5.5 is suitable for the following use cases:

- monitoring boundaries, fences and enclosures
 - protection of pipelines, overland lines and car parks
 - counting peoples from above (BEV people counter)
- etc.

2.4.2 Limitations

In certain environments the use of this type of motion detection system may not always be advisable; this is because movements may not always be detected or too many movements may be detected owing to virtual movements.

Movements may be falsely detected if there is:

- 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
- 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 5.5 Flow can detect uniform movement flows.

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

Note:

- If you are analyzing movement in live images, the computing power of the device (video server or camera) is challenged.
- During motion analysis in recordings, the computing power of the device, on which IVA 5.5 is used via Bosch Video Client, is challenged.

If you are specifically looking for moving objects 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 movement 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 Configuration

IVA 5.5 and IVA 5.5 Flow are set up using the Configuration Manager program or via the Web browser view of the device.

You must move the camera to the required position first in each case. When using VG4 AutoDome, the individual presets must be specified before configuring IVA 5.5 for each preset.

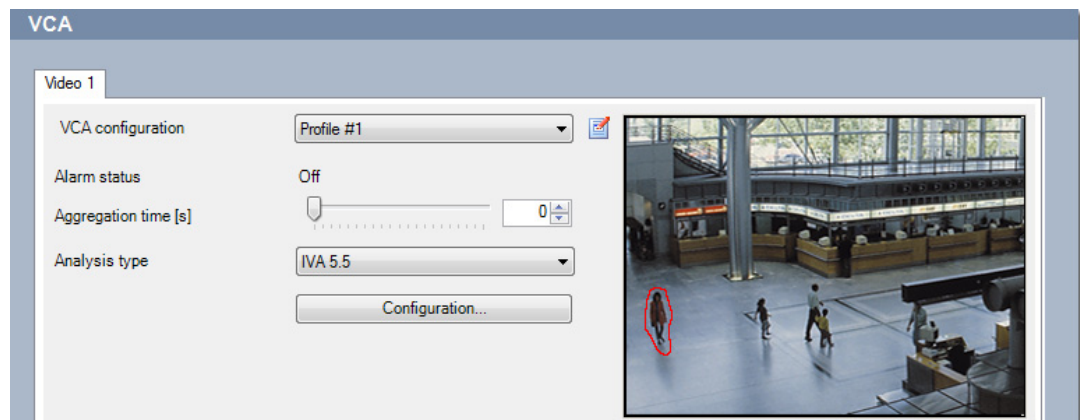
All of the settings you make relate to the selected camera position. This means that you must reconfigure IVA 5.5 for this camera whenever you change the camera's direction or position. For more details, also refer to: *Section 6 IVA and VG4 AutoDome, page 71.*


3.1 Configuration with Configuration Manager

Configuration Manager can be installed on any Windows PC.

The system requirements and operation of Configuration Manager are described in the Configuration Manager Installation and Operating Manual. You can access the online Help for Configuration Manager by selecting **Help > Online Help...** when you are in Configuration Manager.

1. Start Configuration Manager.
2. Ensure that the **File > Advanced Mode** option is activated.
3. From the **Devices** main tab, select the device for which you wish to configure IVA 5.5.
or
from the **Cameras** main tab, select the camera for which you would like to configure IVA 5.5.
4. In the display area, click the **VCA** tab to switch to Video Content Analysis. The VCA start page is displayed.



5. The camera image appears on the right. You see an individual image that is refreshed at regular intervals.
6. Under **VCA configuration**, select either **Profile 1** or **Profile 2**.
If necessary, change the name of a profile by clicking .
There are ten profiles available for VG4 AutoDome. Each profile can be used for one preset.
7. **Only VG4 AutoDome:** Under **Domescene**, select an entry from the list.
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.

8. 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.
9. Select **IVA 5.5** or **IVA 5.5 Flow** as **Analysis type**.
If you change the analysis type, the motion detection and tamper detection parameters revert to the default settings.
As soon as the analysis becomes active, meta data is generated and, depending on the configuration, additional information is overlaid on top of the camera image – an object bounding box for example.
10. Click **Configuration...**
The **IVA Wizard** window opens. IVA 5.5 or IVA 5.5 Flow is configured using this window. Please see the following for details on the configuration options:
 - *Section 4 IVA 5.5, page 13*
 - *Section 5 IVA 5.5 Flow, page 60*

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

Alarm status

This field shows whether IVA 5.5 has generated an alarm event with the current settings.

3.2 Configuration Using Web Browser

You can also configure IVA 5.5 using the Web browser view of the device.

1. Open the Web browser view of the device.
2. Select **SETTINGS > Advanced Mode > Alarm > VCA** to switch to Video Content Analysis.
The camera image appears on the right.
3. Under **VCA configuration**, select either **Profile 1** or **Profile 2**.

If necessary, change the name of a profile by clicking .

There are ten profiles available for VG4 AutoDome. Each profile can be used for one preset.

4. **Only VG4 AutoDome:** Under **Domescene**, select an entry from the list.
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. Select **IVA 5.5** or **IVA 5.5 Flow** as **Analysis type**.
If you change the analysis type, the motion detection and tamper detection parameters revert to the default settings.
As soon as the analysis becomes active, meta data is generated and, depending on the configuration, additional information is overlaid on top of the camera image – an object bounding box for example.
6. Click **Configuration...**
The **Settings** window opens. IVA 5.5 or IVA 5.5 Flow is configured using this window. Please see the following for details on the configuration options:
 - *Section 4 IVA 5.5, page 13*
 - *Section 5 IVA 5.5 Flow, page 60*

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

Alarm status

This field shows whether IVA 5.5 has generated an alarm event with the current settings.

4

IVA 5.5

This chapter describes the program, configuration and different settings for IVA 5.5.

4.1

The Basics

A fixed camera views a selected area. This area is displayed in the Configuration Manager program as a single, constantly refreshed image. In the Web browser view of the device you will see a live video preview.

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.

It is always the center of an object that is relevant for generating an alarm event.

Sensitive area

The scene that is captured by a camera often includes disturbing objects (moving flags for example) or areas that are irrelevant for alarm event generation (such as sky). You can reduce the size of the area that is actually analyzed for motion.

This will make motion detection for the remaining – sensitive – area correspondingly faster and more effective.



NOTICE!

Please note that when using IVA 5.5 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.

Calibration

If you wish to detect objects correctly according to their size or speed, a link must be 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 must tell the software that an object that appears on the camera image with a height of 50 pixels is around 2 m high in reality. The camera angle is used to compute object speeds.

For more information, please see *Section 4.7.1 Calibration, page 44*.



NOTICE!

To display units of measurement according to the Anglo-American measurement system see *Section 7 Display of Units of Measurement, page 72*.

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 lead to the generation of an alarm event.

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.

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!**

You can create up to 16 fields, 16 lines, 8 routes, and 16 counter. The total sum of these items cannot be greater than 16. If this limit is reached, no additional items can be created.

Color

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.

Task

Tasks are the central control element in the IVA 5.5 setup. The aim of a task is to generate an alarm event in precisely defined situations.

A task can be created using a wizard. Expert users can adapt tasks created in this way to individual requirements using additions in the script.

Tasks can be activated or deactivated at any time.

You can define up to eight tasks.

Wizard

To make it easier to create and edit tasks, certain tasks have wizards that guide you through the creation of a task in a few steps. During this process, you are asked to define all of the parameters required for the task.

Filter Hierarchy

IVA 5.5 offers a series of filter options so you can adapt the analysis to your requirements. You exclude certain objects or areas from the analysis in order

- to avoid false alarms
and
- not to increase the computing power of the device unnecessarily.

Here is a schematic overview of the various options for restricting the number of alarm-triggering objects.

Configuration > Global Settings

Objects that are smaller than the minimum size setting or larger than the maximum size setting are ignored. Idle or removed objects are only detected if the relevant option is activated in this case.

Configuration > Sensitive Area

Objects outside the sensitive area are basically ignored. Retrospective searches for movements in recordings can only be carried out within this area.

Parameter of a task

You can specify additional specific parameters for each task, in order to define objects and their behavior so that unwanted alarm events are avoided.

When setting up a task, each step represents a further filter.

4.2 Object Outlines and Other Image Information

Depending on the configuration of IVA 5.5, 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. However, because the camera image on the VCA page of Configuration Manager is not live video feed, the outline does not always exactly surround the object in this case.

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).

An orange outline also appears around objects that will trigger an alarm event, but only if a relevant search has been carried out beforehand.



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.



A blue head symbol attached to an object's outline signals that the object's face has been detected

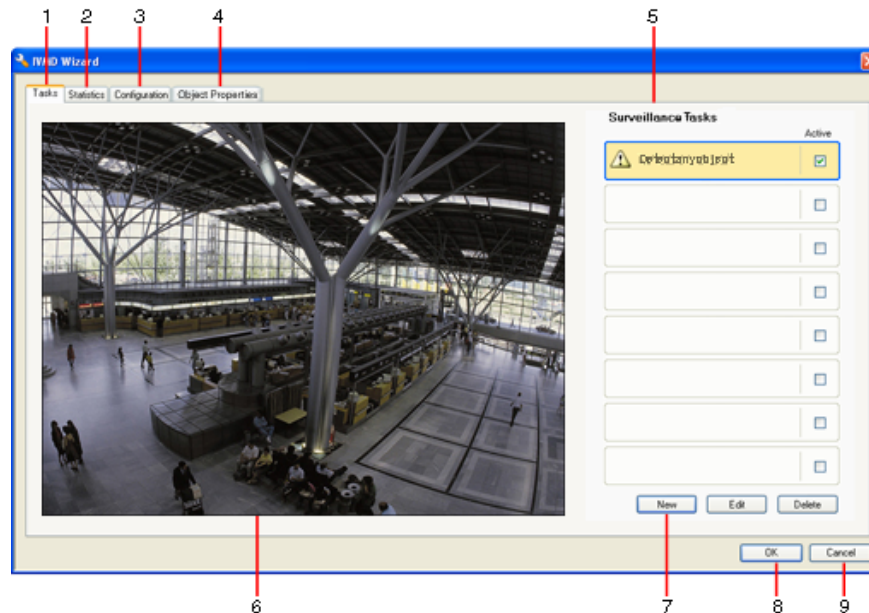
4.3 IVA 5.5 User Interface

The following descriptions and screenshots relate to the user interface as it appears in Configuration Manager.

In the Web browser view all tabs are combined in a dialog box. The preview on the **VCA** configuration page is used as the camera image.

The configuration options are identical.

- To open the online Help for IVA 5.5 click the area you are interested in and press **F1**.



1 Tasks

When this tab is selected, you can see all the defined tasks. You have the option to create new tasks and to edit or delete existing ones.

2 Statistics

When this tab is selected, the statistics for the individual fields are displayed. The statistics help in defining tasks and thresholds.

3 Configuration

When this tab is selected, you can access the following settings:

- **Calibration**
- **Global Settings**
- **Sensitive Area**
- **Tracking**
- **Crowd Fields**

4 Object Properties

The properties are displayed here for a marked object.

Object properties include:

- **Object area [m²]**
- **Aspect ratio v/h**
- **Speed [km/h]**
- **Direction [°]**
- **Color**

Changes to the object properties can be monitored here. In doing so, it is possible to detect whether an object has become faster, for example. Where possible, the displayed properties can also be used to check the calibration.

An object is marked by clicking in an object outline in the camera image, while this tab is displayed. The marked object is indicated by a yellow flag. Only one object can be marked at a time.

5 Depending on the tab selected, the following are displayed here:

- an overview of the defined tasks
- statistics on a selected field
- tabs that provide access to all configuration settings
- the properties of a marked object

6 Camera image

The camera image is displayed irrespective of the tab selected.

If the **Tasks** tab is selected, the popup menu in the camera window, for example, enables fields, lines and routes to be created and changed.

7 In this area, all the buttons are displayed that are required for work in the selected tab.

8 OK

This saves the settings for IVA 5.5 and closes the window.

Incomplete settings are not saved.


9 Cancel

The IVA Wizard is closed.

Any changes that were made after the IVA Wizard was launched and not saved to the device will be lost.

CAUTION!



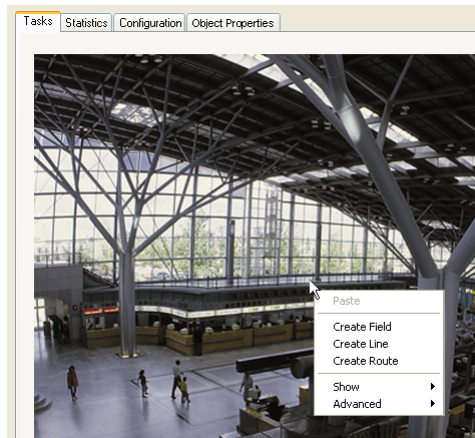
Settings are only saved permanently when you click  in Configuration Manager or click **Save configuration** in the Web browser view.

Saving the changes only in the **IVA Wizard** with **OK**, discards the changes after turning off and turning on the computer.

4.3.1 Popup Menu in the Camera Image

The popup menu in the camera image allows you to create, edit and delete fields, lines and routes. It gives you access to display options. You can also start the IVA Task Editor.

- ▶ Right-click in the camera image in order to display the popup menu.



Depending on whether you click an object or free space, various commands are available. If the **Statistics** tab is selected, then no popup menu is available.

Overview of commands:

- **Cut**
If an item (field, line, route) is clicked, it is cut and copied to the clipboard using this command. You can also use the command to delete items.
Items integrated into a task cannot be cut or deleted.
- **Copy**
If an item (field, line, route) is clicked, it is copied to the clipboard using this command.
- **Paste**
An item (field, line, route) that has been copied to the clipboard is inserted using this command.
- **Create Field**
Creates a new field. The field can then be edited.
- **Create Line**
Creates a new line. The starting point is the point where you clicked. You set the end point by clicking at the desired position again. The line can then be edited.
- **Create Route**
Creates a new route. The starting point is the point where you clicked. Click other points in the camera image in order to specify the course of the route. Double-click to mark the end point. The route can then be edited.

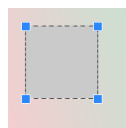
- **Show**
From the submenu, select the items to be displayed in the camera image:
 - **Sensitive Area**
The area marked as sensitive is shaded in yellow.
 - **Object Outlines**
Objects that are detected as moving are highlighted with a yellow outline. A red line indicates an object that has triggered an alarm event.
 - **Object Bounding Boxes**
The object bounding box is the rectangle enclosing the object.
 - **Items**
Hide fields, lines and routes where necessary.
 - **Trajectories**
Hide the green line tracing the path of objects where necessary.
 - **Head Detection Flag**
Objects that are detected by head detection can be marked as such.
- **Insert Node**
This menu option is only active if you have clicked a field frame or a route. This inserts a new node at this position.
Nodes can be repositioned as required using the mouse.
- **Delete Node**
If you have clicked a node, it is deleted using this command.
- **Advanced > IVA Task Editor**
The IVA Task Editor shows all items, tasks and connectives in script form. This option is only designed for users who are familiar with the IVA Task Script Language (see *Section 4.3.2 The IVA Task Editor, page 21*).

Editing a Field

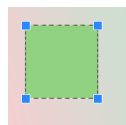
A field can be edited at any time. This includes:

- Inserting or deleting nodes
- Moving nodes
- Moving fields

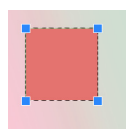
To change the form of the field, place the mouse cursor on a node or a line and move it while holding down the mouse button. To move the field, place the mouse cursor in the field and drag it while holding down the mouse button.



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.

Editing a Line

A line can be edited at any time. This includes:

- Moving end points
- Moving lines

To change the line, place the mouse cursor on an end point and move it while holding down the mouse button. To move the line, place the mouse cursor on the line and move it while holding down the mouse button. 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.



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.

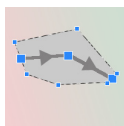
Editing a Route

A route can be edited at any time. This includes:

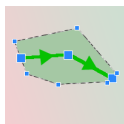
- Inserting or deleting nodes
- Moving nodes
- Changing the tolerance range
- Moving routes

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 change the course of the route, place the mouse cursor on a node and move it while holding down the mouse button. To change the tolerance range, place the mouse cursor on the marking next to a node and move it while holding down the mouse button. To move the route, place the mouse cursor on the route and move it while holding down the mouse button. If a route is integrated into a task, you can select the direction in which movement along the route must trigger an alarm.



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.

4.3.2 The IVA Task Editor

The IVA Task Editor offers access in script form to the total configuration of the Video Content Analysis you have created. All items (fields, lines, routes) and all tasks are displayed using the IVA Task Script Language.




NOTICE!

Only change the script if you are familiar with the scripting language

IVA Task Script Language. You can find the relevant documentation in the download area of our website.

Creating a Backup with the IVA Task Editor


1. Select **Advanced > IVA Task Editor** in the camera image popup menu.
2. Right-click in the script window of the IVA Task Editor.
You will see the popup menu.
3. Select **Save As...**
4. Select a storage location and a name for the file.
The file is saved in text format with the extension **.iva**.
5. Click  in Configuration Manager to save the VCA configuration to the device. The task is permanently saved and will be used even if the device is turned off and on.

Recreating the Saved Configuration

1. If necessary, first create a backup of the current configuration.
2. Right-click in the script window of the IVA Task Editor.
You will see the popup menu.
3. Select **Load...**
4. Select a file.
The VCA configuration stored in this file is recreated.



CAUTION!

When a saved configuration is loaded, the existing configuration is overwritten. The procedure cannot be reversed once the configuration has been saved to the device by clicking .

4.4 Tasks

This tab is displayed when you click **Configuration...** in Configuration Manager in the **VCA** tab. Before you define tasks, you should have performed the following steps:

- *Section 4.7.1 Calibration, page 44*
The speed, size and direction of movement of objects can only be correctly defined when IVA 5.5 is calibrated. **Enhanced tracking** and **BEV people counting** only take effect after calibrating the camera. If the camera is not well calibrated then the tracking may deliver wrong or no results.
- *Section 4.7.2 Global Settings, page 54*
Among other things, objects can be generally excluded from the detection on the basis of their size.
- *Section 4.7.3 Sensitive Area, page 56*
Movements can only be detected and analyzed within the sensitive area.
- *Section 4.7.4 Tracking, page 57*
- *Section 4.7.5 Crowd Fields, page 58*
Numbers of objects are only detected within a crowd field.

Each of these settings can be changed at any time.

Overview

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

Examples of typical events:

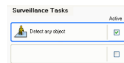
- An object moves within a defined area.
- An object crosses one or more lines, for example an automobile drives into a parking space.
- An object stops in certain areas without any target-specific movement (loitering).
- An object moves along a defined route.
- A piece of luggage is set down (idle object).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

Some of the tasks, such as head detection and the identification of similar objects are primarily used for forensic searches on recordings.

The result of a task is 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.

To edit a task, you must first highlight it. To do this, click the task. A highlighted task is outlined in blue.

To create and edit a task, you are guided step-by-step through the necessary settings. You can define up to eight tasks.



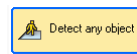
You can see the task list on the right-hand side of the window.

Select a task and then click the name of the task directly in order to change it.



A task can be **Active**, i.e. an alarm event is generated. A task that is not active does not generate an alarm event.

Click the box next to the name of the task in order to activate it. An active task is indicated by a checkmark.



A task has an orange background if an alarm event is currently being triggered by this task.



A symbol in front of the task name indicates the type of task. The symbol corresponds to the symbol of the wizard that created the task.

New

Click here to create a new task. Instead of the task list, the window for selecting a wizard is displayed.

Edit

Click here to edit a selected task. The wizard that was displayed for the creation of the task is reopened. You can change individual parameters.

Delete

Click here to delete a selected task.

4.5 Creating/Editing a Task

A task is always created or edited using a wizard.

The following wizards are available:

- *Section 4.5.2 Object in field, page 24*
An object moves within a defined field.
- *Section 4.5.3 Crossing line, page 30*
An object crosses one or more lines, for example an automobile drives into a parking space.
- *Section 4.5.4 Loitering, page 32*
An object stops in a defined field without any target-specific movement.
- *Section 4.5.5 Condition change, page 33*
An object changes its state, for example, a person slips and falls.
- *Section 4.5.6 Following route, page 34*
An object moves along a defined path.
- *Section 4.5.7 Tampering, page 35*
The camera is tampered with.
- *Section 4.5.8 Removed object, page 36*
A previously idle object disappears, for example, in the event of theft.
- *Section 4.5.9 Idle object, page 37*
A previously moving object is at rest, for example, a piece of luggage is set down.
- *Section 4.5.10 Entering field, page 37*
An object enters a defined field.
- *Section 4.5.11 Leaving field, page 38*
An object leaves a defined field.
- *Section 4.5.12 Similarity search, page 39*
An object is detected that is similar to a previously detected object.
- *Section 4.5.13 Crowd detection, page 40*
A crowd density is estimated. The reference image is used for comparison.
- *Section 4.5.14 Counter, page 41*
A number of objects crossing lines or entering fields are detected.
- *Section 4.5.15 BEV people counter (Bird's eye view people counter), page 42*
A number of persons crossing lines or entering fields are detected from above.

When you use the wizard to create or edit a task, you have access to the camera image and the popup menu. This means that you can create, edit or delete fields, lines or routes.

In Configuration Manager, the camera image with the popup menu is directly integrated into the IVA 5.5 window. When configuring in the Web browser view, you use the preview on the **VCA** configuration page.

You can immediately recognize from the color of object outlines whether an object will trigger an alarm with the given settings.

1. Click **Next** to go to the next step of the wizard.
2. Click **Previous** to go to the previous step of the wizard.
3. If you want to skip any further steps, click **Finish**. The presets are adopted for any unedited steps.

You can change any settings again at any time.

4.5.1

Default Task

When you work with IVA 5.5 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**.

4.5.2

Object in field

■ ■ □ Alarm tab > VCA tab > Configuration > Tasks tab > select **Object in field** > OK



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.

First Step - Define the Field

1. Select one of the fields.

To do this, use the list field or click a field in the camera image.

You can also create a new field, edit an existing one or select **Whole screen**.

2. **Debounce time [s]**

If a value other than **0** (zero) is selected, the alarm event will not be generated until the object has moved or been within the field for the specified period at least.

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.

Next Step - Approximation

You can impose 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 object is marked with a yellow flag. The properties of the marked object are displayed in the wizard.

The properties of an object are always changing. You adopt the properties of the object at the time of clicking.

The values for object size, aspect ratio, speed and direction are displayed for the marked object. The colors of the object are also displayed in proportional sequence.

2. If you want to use the properties of the marked object, activate the **Apply values** option.

3. For each of the properties, select how exactly they must correspond for an object to be detected as an object with these properties.

The **Precision** slide control sets the accuracy progressively.



- Slide control set to the left:
Property is ignored.
The value is not adopted in the next step.
- Slide control set almost to the left:
Property is considered, correspondence can be very inaccurate.
- Slide control set to the right:
Property is considered, correspondence must be very accurate.

The further to the right the slide control is set, the more accurate the description of the property of the searched object that is to trigger an alarm.

For the **Object Area [m²]**, **Aspect Ratio V/H**, **Speed [km/h]** and **Direction** settings, the range of the displayed minimum and maximum values in the next step will be smaller the further to the right the slide control is set.

All adopted values can still be manually changed in the next step.

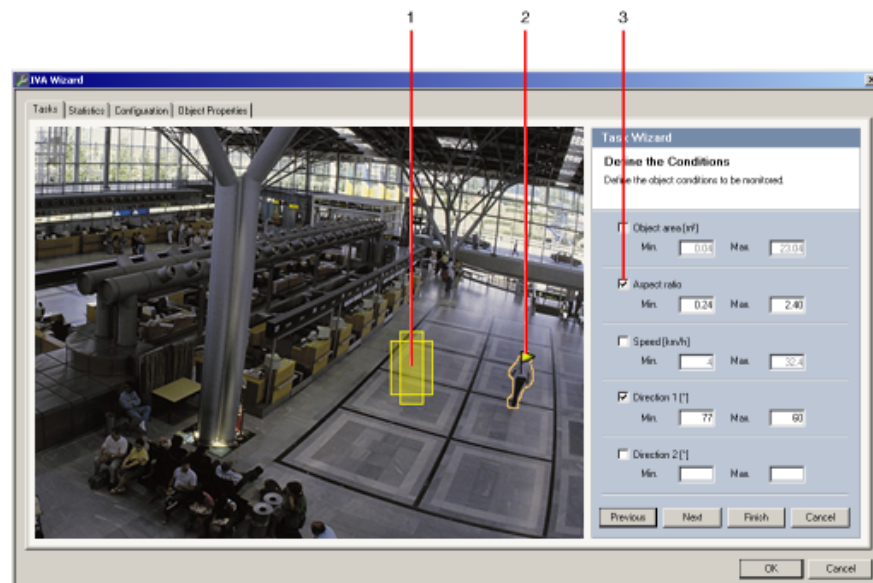
Next Step - Define the Conditions

Here you can precisely 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.

A property is used to search for an object if you activate the relevant option.

Options that have adopted the values from the previous step are automatically activated.

After an option has been activated, graphical support is provided in the camera image, which visualizes the object description. You can change the values for limiting the object properties in the camera image using the graphics, or also by entering the corresponding numeric values.



1 Visualization of the property

In this example, the visualization of the aspect ratio is displayed.

2 Marked object

The marked object whose properties are described is marked with a yellow flag.

3 Property activated

In this example, the **Aspect Ratio V/H** property is used to describe an object.

**NOTICE!**

You can switch to the **Object Properties** tab at any time. There you will find information on how the properties of the marked object change.

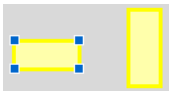
Object Area [m²]

Only objects whose size (the area covered) corresponds to the entered values generate an alarm event.

- ▶ Enter a minimum and a maximum value for the size.

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.

You can change the values by

- entering the figures in the fields
- or
- highlighting a rectangle in the camera image and dragging it to a node while holding down the mouse button.

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°.

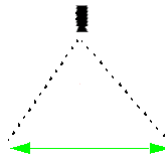
Speed [km/h]

Only objects moving at a speed that corresponds to the entered values generate an alarm event.

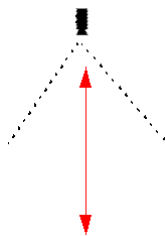
- ▶ Enter a minimum and a maximum value for the speed.

**NOTICE!**

The speed of a movement at a right angle to the camera can be determined much more accurately than the speed of a movement directly toward or away from the camera.

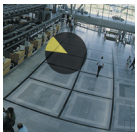


Object moves at a right angle to the camera:
speed is detected more accurately

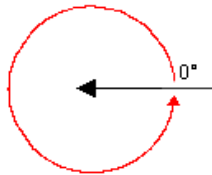


Object moves in camera's line of sight:
speed is detected less accurately

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 movement 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.

You can change the values by

- entering the figures in the fields
- moving the yellow circle segment while holding down the mouse button in order to redefine the direction of movement
- or
- placing the mouse cursor over one of the edges of the circle segment and moving it while holding down the mouse button in order to change the direction tolerance.



NOTICE!

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

Next Step - Define the Color

In this step, you describe the color property of the searched object.

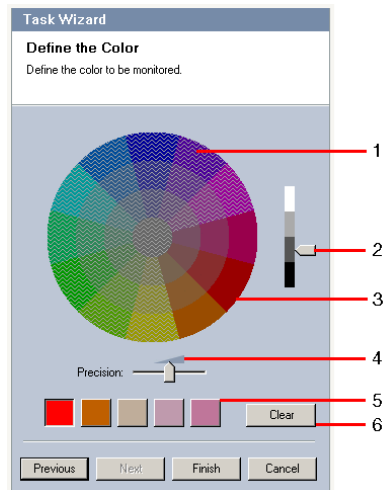
Colors are described in IVA 5.5 using the HSV color model.

- **H** - Hue
The hue is the color that is reflected from an object. The hue is measured as a position on the color wheel and is given as a value between 0° and 360°.
- **S** - Saturation
The saturation is the intensity of the color. It describes the percentage of gray in relation to the hue and is measured as a percentage value between 0% (gray) and 100% (full saturation).
- **V** - Value
The value is the relative degree of brightness or darkness of the color and is measured as a percentage value between 0% (black) and 100% (white).

In this step, select the colors that describe the searched object, and determine how accurately the colors must match the object colors.

Note:

This option is not available for VOT-320V.



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 Value**

Use this slide control to select the degree of brightness for the colors. The number of colors to be taken into account is displayed according to the other settings. The display shows a higher or lower section of the color cylinder according to the slide control setting.
- 3 Colors**

You can manually adopt colors from the color cylinder for the search. To do this, set the value first and then click the desired color segment using the mouse. Empty color squares are populated from left to right using the selected colors. You can change the colors by selecting a square and clicking another color from the color cylinder.
- 4 Precision**

The precision is set progressively.

 - Slide control set to the left:
Color is ignored.
 - Slide control set almost to the left:
Color is considered, correspondence can be very inaccurate.
 - Slide control set to the right:
Color is considered, correspondence must be very accurate.

The setting applies to all defined colors.
- 5** You can determine up to five hues that are displayed in the squares below the color wheel. The further left the selected color is arranged in the squares, the higher its proportion of the object's color properties.

If you have set the color properties of an object to accept in the **Approximation** window, then these colors are automatically displayed here. Some of the color fields may be grayed out. This means that in the marked object, fewer than five colors have been detected.
- 6 Clear color**

You can delete a color, for example if the hue relates to an object's background. Simply highlight the color and click **Delete**. If there are colors on the right of the deleted position, then they will move up automatically and receive a higher proportion of the object's color properties.

Final Step - Define the Head Detection Conditions

In this step, you define whether an alarm should be triggered according to whether or not detected objects have a head. This enables you to set the surveillance to focus on people or exclude them completely.

The **Head Detection** functionality is only available on the following conditions:

- Only in Forensic Search on recorded meta data.
- Only for BVC replay and search client.
- In BVC, the **Head Detection** check box in the Configuration Manager must be selected.

Prerequisite

If you have not yet activated **Head Detection** under **Global Settings**, you will receive a message to that effect. You will then be given the option to change this setting directly. To save on computing power, do not set the maximum values under **Global Settings** any higher than required for the task.

Use head detection filter

1. Activate this option if you wish to filter objects based on head detection.
2. Select one of the options:
 - **Limit to objects where no head has been detected**
Alarm events are only triggered for objects on which no head is detected.
 - **Limit to objects with a largest head width between**
Triggers an alarm event for objects on which a head of the specified size has been detected. The alarm event is generated during the period in which the object is within the detection area.

To determine the size of the heads, two head outlines representing the minimum and maximum head size are displayed in the camera image.

The outlines can be repositioned. The positioning of the outlines on the area of the image does not affect alarm generation.

Adjust the size of the outlines with the mouse or enter numbers between 8 (**Min.**) and 33 (**Max.**).

4.5.3

Crossing line

■ ■ □ Alarm tab > VCA tab > Configuration > Tasks tab > select **Crossing line** > OK



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

Note:

This feature is optimized for Forensic Search.

First Step - Define the Lines

1. Select from the list field one of the lines that have already been created or click a line in the camera image.
You can now also create a new line or edit an existing one.
2. Select a second and a third line, if necessary.
3. **Debounce time [s]**
If a value other than **0** (zero) is selected, the alarm event will not be generated until the object has been on the other side of the line for the specified period at least.
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.
This entry always relates to the line currently highlighted in this dialog box. Where necessary, this entry must be repeated for each line.
4. **Direction**
Select for the highlighted line whether the alarm should be triggered if the line is crossed according to the direction of the arrow in the graphic display (**Forward**), against this direction (**Backward**) or independently of the direction (**Any**).
The display of the direction is adapted accordingly in the camera image.



NOTICE!

The change in the alarm-triggering direction is adopted for all tasks using this line.

Next Step - Define the Trigger

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

Here, you specify whether the corresponding crossings generate an alarm event independently of one another or whether the lines must be crossed in a pre-defined sequence and, if necessary, at a defined time interval.

1. Activate the required option.
2. Enter a minimum and a maximum value if an alarm event should only be triggered if the crossing is within a pre-defined time span.

Next Step - Approximation

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

These settings are described here: *Section 4.5.2 Object in field - Next Step - Approximation.*

Next Step - Define the Conditions

You limit the number of objects that trigger an alarm event by precisely defining properties such as size, aspect ratio, speed and direction.

These settings are described here: *Section 4.5.2 Object in field - Next Step - Define the Conditions.*

Note: Approximations cannot be used for the **Crossing line** task.

Next Step - Define the Color

You limit the number of objects that trigger an alarm event by defining the color properties more precisely.

These settings are described here: *Section 4.5.2 Object in field - Next Step - Define the Color.*

Final Step - Define the Head Detection Conditions

In this step, you define whether an alarm should be triggered according to whether or not detected objects have a head. This enables you to set the surveillance to focus on people or exclude them completely.

These settings are described here: *Section 4.5.2 Object in field - Final Step - Define the Head Detection Conditions.*

The **Head Detection** functionality is only available on the following conditions:

- Only in Forensic Search on recorded meta data.
- Only for BVC replay and search client.
- In BVC, the **Head Detection** check box in the Configuration Manager must be selected.

4.5.4

Loitering

■ ■ □ Alarm tab > VCA tab > Configuration > Tasks tab > select **Loitering** > OK



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.

First Step - Define the Field

1. Select one of the fields.

To do this, use the list field or click a field in the camera image.

You can also create a new field, edit an existing one or select **Whole screen**.

2. **Debounce time [s]**

If a value other than **0** (zero) is selected, the alarm event will not be generated until the object has moved or been within the field for the specified period at least.

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.

Next Step - Define the Trigger

An alarm is generated if an object only moves within the tolerance area during a time span. As soon as an object is detected in the sensitive area, a virtual circle corresponding to the tolerance area is placed around the object. If the object does not leave this tolerance area during the specified time and the object remains in the monitored field, an alarm is triggered. If the object leaves the tolerance area during the specified time, a new virtual circle is defined around the current position and the measurement of time starts again.

- **Radius [m]**

Here you can specify the size of the circle that the object must not leave for it to be detected as loitering.

- **Time [s]**

This specifies the period of time in seconds during which the object must remain within the virtual circle.

Final Step - Define the Head Detection Conditions

In this step, you define whether an alarm should be triggered according to whether or not detected objects have a head. This enables you to set the surveillance to focus on people or exclude them completely.

These settings are described here: *Section 4.5.2 Object in field - Final Step - Define the Head Detection Conditions*.

The **Head Detection** functionality is only available on the following conditions:

- Only in Forensic Search on recorded meta data.
- Only for BVC replay and search client.
- In BVC, the **Head Detection** check box in the Configuration Manager must be selected.

4.5.5 Condition change

■ ■ □ Alarm tab > VCA tab > Configuration > Tasks tab > select **Condition change** > OK



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

- Size
- Aspect ratio
- Speed
- Direction



NOTICE!

Only activate the properties that should be analyzed for this task.

If you activate multiple properties, then all of these object properties must change for an alarm event to be triggered (logical connective = AND).

If an alarm is to be triggered when multiple properties are changed independently of one another, you must create one dedicated task for each of these properties.

First Step - Define the Initial Conditions

Define individual properties, such as the size, aspect ratio, speed and direction, that an object must have in its initial condition for it to be detected.

These settings are described here: *Section 4.5.2 Object in field - Next Step - Define the Conditions.*

Next Step - Define the Trigger

For the properties defined in the previous step, specify which values will trigger an alarm event.

These settings are described here: *Section 4.5.2 Object in field - Next Step - Define the Conditions.*

Next Step - Define the Time Span

Here you can limit the time span in which the change in the selected properties takes place.

1. Activate the option.
2. Enter a minimum and maximum value in seconds.

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.

Next Step - Define the Field

You can limit the detection of changes to a specific area. The area is defined by a field in the camera image.

1. Select one of the fields.
To do this, use the list field or click a field in the camera image.
You can also create a new field, edit an existing one or select **Whole screen**.
2. **Debounce time [s]**

If a value other than **0** (zero) is selected, the alarm event will not be generated until the object has moved or been within the field for the specified period at least.

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.

Final Step - Define the Head Detection Conditions

In this step, you define whether an alarm should be triggered according to whether or not detected objects have a head. This enables you to set the surveillance to focus on people or exclude them completely.

These settings are described here: *Section 4.5.2 Object in field - Final Step - Define the Head Detection Conditions.*

The **Head Detection** functionality is only available on the following conditions:

- Only in Forensic Search on recorded meta data.
- Only for BVC replay and search client.
- In BVC, the **Head Detection** check box in the Configuration Manager must be selected.

4.5.6

Following route

■ ■ □ Alarm tab > VCA tab > Configuration > Tasks tab > select **Following route** > OK



This task generates an alarm event if an object moves along a certain route. A route is surrounded by a virtual tolerance area.



NOTICE!

This task is typically used in the Bosch Video Client program for forensic searching. For example, persons who have taken a certain route are detected this way.

First Step - Define the Route

1. Select from the list field one of the routes that have already been created or click a route in the camera image.

You can now also create a new route or edit an existing one.

2. Define the properties of the selected route.

- **Min. match [%]**

Enter a value in percent here. An object must have moved along the route for this percentage of the total distance.

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.

- **Max. gap [%]**

Enter a value in percent here.

The value indicates the percentage of the largest gap in the total section.

If the object leaves the route for a section that corresponds to this percentage at the least, no more alarm events will be triggered.

- **Direction**

Select whether an alarm should be triggered if the route is followed according to the direction of the arrow in the graphic display (**Forward**), against this direction (**Backward**) or independently of the direction (**Any**).

The display of the direction is adapted accordingly in the camera image.



NOTICE!

The change in the alarm-triggering direction is adopted for all tasks using this route.

Next Step - Approximation

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

These settings are described here: *Section 4.5.2 Object in field - Next Step - Approximation.*

Next Step - Define the Conditions

You limit the number of objects that trigger an alarm event by precisely defining properties such as size, aspect ratio, speed and direction.

These settings are described here: *Section 4.5.2 Object in field - Next Step - Define the Conditions.*

Next Step - Define the Color

You limit the number of objects that trigger an alarm event by defining the color properties more precisely.

These settings are described here: *Section 4.5.2 Object in field - Next Step - Define the Color.*

Final Step - Define the Head Detection Conditions

In this step, you define whether an alarm should be triggered according to whether or not detected objects have a head. This enables you to set the surveillance to focus on people or exclude them completely.

These settings are described here: *Section 4.5.2 Object in field - Final Step - Define the Head Detection Conditions.*

The **Head Detection** functionality is only available on the following conditions:

- Only in Forensic Search on recorded meta data.
- Only for BVC replay and search client.
- In BVC, the **Head Detection** check box in the Configuration Manager must be selected.

4.5.7**Tampering**

■ ■ □ Alarm tab > VCA tab > Configuration > Tasks tab > select Tampering > OK



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.

Note:

This task is not available for VOT-320V.

Events that generates an alarm:

One of the activated events must occur (logical connective = OR) to generate an alarm event.

- **Global change**
Activate this function if the global change, as set with the **Global change** slide control on the standard configuration page, should trigger an alarm.
- **Scene too bright**
Activate this function if 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**
Activate this function if tampering associated with covering the lens (for instance, by spraying paint on it) should trigger an alarm. The average brightness of the scene provides a basis for recognition.

- **Scene too noisy**
Activate this function if tampering associated with EMC interference (noisy scene as the result of a strong interference signal in the vicinity of the video lines), as an example, should trigger an alarm.
- **Signal loss**
Activate this function if the interruption of the video signal should trigger an alarm.
- **Reference check**
Activate this function if a deviation from the reference image on the VCA start page should trigger an alarm.

4.5.8

Removed object

■ ■ □ Alarm tab > VCA tab > Configuration > Tasks tab > select **Removed object** > **OK**



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. It is assumed that an object has been removed if changes are detected in the background following movement within an image.

Note:

This task is not available for VOT-320V.

First Step - Define the Field

- ▶ Select one of the fields.
To do this, use the list field or click a field in the camera image.
You can also create a new field, edit an existing one or select **Whole screen**.

Next Step - Approximation

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

These settings are described here: *Section 4.5.2 Object in field - Next Step - Approximation.*

Next Step - Define the Conditions

You limit the number of objects that trigger an alarm event by precisely defining properties such as size, aspect ratio, speed and direction.

These settings are described here: *Section 4.5.2 Object in field - Next Step - Define the Conditions.*

Final Step - Define the Color

You limit the number of objects that trigger an alarm event by defining the color properties more precisely.

These settings are described here: *Section 4.5.2 Object in field - Next Step - Define the Color.*

Note:

The **Define the Color** function is not available for VOT-320V.

4.5.9 Idle object

■-■-□ Alarm tab > VCA tab > Configuration > Tasks tab > select **Idle object** > OK



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.

Note:

This task is not available for VOT-320V.

First Step - Define the Field

1. Select one of the fields.
To do this, use the list field or click a field in the camera image.
You can also create a new field, edit an existing one or select **Whole screen**.
2. **Debounce time [s]**
This entry is adopted from the global settings.

Next Step - Approximation

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

These settings are described here: *Section 4.5.2 Object in field - Next Step - Approximation*.

Next Step - Define the Conditions

You limit the number of objects that trigger an alarm event by precisely defining properties such as size, aspect ratio, speed and direction.

These settings are described here: *Section 4.5.2 Object in field - Next Step - Define the Conditions*.

Final Step - Define the Color

You limit the number of objects that trigger an alarm event by defining the color properties more precisely.

These settings are described here: *Section 4.5.2 Object in field - Next Step - Define the Color*.

4.5.10 Entering field

■-■-□ Alarm tab > VCA tab > Configuration > Tasks tab > select **Entering field** > OK



This task generates an alarm event if an object enters an area. The area is highlighted by a field in the camera image.

The alarm event is triggered if an object that was previously detected outside a field crosses the field boundary.

First Step - Define the Field

1. Select one of the fields.
To do this, use the list field or click a field in the camera image.
You can also create a new field, edit an existing one or select **Whole screen**.
2. **Debounce time [s]**
If a value other than **0** (zero) is selected, the alarm event will not be generated until the object has moved or been within the field for the specified period at least.
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.

Next Step - Approximation

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

These settings are described here: *Section 4.5.2 Object in field - Next Step - Approximation.*

Next Step - Define the Conditions

You limit the number of objects that trigger an alarm event by precisely defining properties such as size, aspect ratio, speed and direction.

These settings are described here: *Section 4.5.2 Object in field - Next Step - Define the Conditions.*

Next Step - Define the Color

You limit the number of objects that trigger an alarm event by defining the color properties more precisely.

These settings are described here: *Section 4.5.2 Object in field - Next Step - Define the Color.*

Final Step - Define the Head Detection Conditions

In this step, you define whether an alarm should be triggered according to whether or not detected objects have a head. This enables you to set the surveillance to focus on people or exclude them completely.

These settings are described here: *Section 4.5.2 Object in field - Final Step - Define the Head Detection Conditions.*

The **Head Detection** functionality is only available on the following conditions:

- Only in Forensic Search on recorded meta data.
- Only for BVC replay and search client.
- In BVC, the **Head Detection** check box in the Configuration Manager must be selected.

4.5.11**Leaving field**

■ ■ □ Alarm tab > VCA tab > **Configuration** > **Tasks** tab > select **Leaving field** > **OK**



This task generates an alarm event if an object leaves an area. The area is highlighted by a field in the camera image.

The alarm event is triggered if an object that was previously detected inside a field crosses the field boundary.

First Step - Define the Field

1. Select one of the fields.

To do this, use the list field or click a field in the camera image.

You can also create a new field, edit an existing one or select **Whole screen**.

2. **Debounce time [s]**

If a value other than **0** (zero) is selected, the alarm event will not be generated until the object has moved or been outside the field for the specified period at least.

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.

Next Step - Approximation

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

These settings are described here: *Section 4.5.2 Object in field - Next Step - Approximation.*

Next Step - Define the Conditions

You limit the number of objects that trigger an alarm event by precisely defining properties such as size, aspect ratio, speed and direction.

These settings are described here: *Section 4.5.2 Object in field - Next Step - Define the Conditions.*

Next Step - Define the Color

You limit the number of objects that trigger an alarm event by defining the color properties more precisely.

These settings are described here: *Section 4.5.2 Object in field - Next Step - Define the Color.*

Final Step - Define the Head Detection Conditions

In this step, you define whether an alarm should be triggered according to whether or not detected objects have a head. This enables you to set the surveillance to focus on people or exclude them completely.

These settings are described here: *Section 4.5.2 Object in field - Final Step - Define the Head Detection Conditions.*

The **Head Detection** functionality is only available on the following conditions:

- Only in Forensic Search on recorded meta data.
- Only for BVC replay and search client.
- In BVC, the **Head Detection** check box in the Configuration Manager must be selected.

4.5.12**Similarity search**

■□ Alarm tab > VCA tab > Configuration > Tasks tab > select **Similarity search** > OK



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 searching. For example, persons who are similar to a certain person are detected this way.

Approximation

1. Click a moving object in the camera image. The object is marked with a yellow flag. The properties of an object are always changing. You adopt the properties of the object at the time of clicking.
2. Specify the approximations for the different object properties.
3. For each of the properties, select how exactly they must correspond for an object to be detected as being similar to this object.

The **Precision** slide control sets the accuracy progressively.



- Slide control set to the left:
Property is ignored.
- Slide control set almost to the left:
Property is considered, correspondence can be very inaccurate.
- Slide control set to the right:
Property is considered, correspondence must be very accurate.

The further to the right the slide control is set, the more accurate the description of the property of the searched object that is to trigger an alarm.

4.5.13

Crowd detection

■ ■ □ Alarm tab > VCA tab > Configuration > Tasks tab > select **Crowd detection** > OK



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 function, first a reference picture of the background without people present must be created on the standard VCA configuration page. The reference picture must depict the current background captured by the camera. Create a new reference picture if the background has changed fairly significantly.

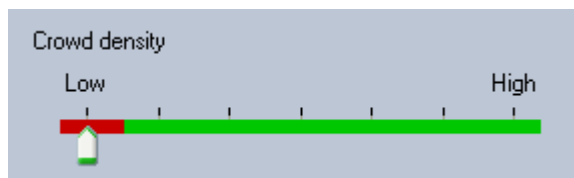
To show the **Crowd detection** functionality in BVC, define the **Crowd Fields** in the Configuration Manager before.

Note:

This task is not available for AutoDome and VOT-320V cameras.

Define the Crowd Field

1. Select one of the fields.
Use the list field in which all the crowd fields previously created in the **Configuration** tab, **Crowd Fields** sub-tab are shown. You cannot create or edit a crowd field here.
2. Select how dense a crowd must be so that it is detected as a crowd.
The **Crowd density** slide control sets the density progressively.



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. **Debounce time [s]**
If a value other than **0** (zero) is selected, the alarm event will not be generated until the crowd is detected within the field for at least the specified period.
4. **Smoothing time [s]**
If a value other than **0** (zero) is selected, the alarm event will not be generated until the crowd density averaged over the specified period is larger than the selected threshold value.

4.5.14

Counter



■ ■ □ Alarm tab > VCA tab > Configuration > Tasks tab > select Counter > OK

This task generates an alarm event if an object crosses one or more virtual lines or enters a certain area.

Method 1: Counting objects entering a certain area

1. Click **Entering field**.
2. Click **Next**. The **Define the Field** dialog box is displayed.
3. Select one of the fields.
To do this, use the list field or click a field in the camera image.
You can also create a new field, edit an existing one or select **Whole screen**.
4. **Debounce time [s]**
If a value other than **0** (zero) is selected, the alarm event will not be generated until the object has moved or been within the field for the specified period at least.
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.
5. Click **Next**. The **Define the Counter Settings** dialog box is displayed.
6. 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.
7. 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.

Note:

To reset an alarm, the IVA Task Editor must be used.

8. Click **Finish**.

Method 2: Counting objects crossing lines

1. Click **Crossing lines**.
2. Click **Next**. The **Define the Lines** dialog box is displayed.
3. Select from the list field one of the lines that have already been created or click a line in the camera image.
You can now also create a new line or edit an existing one.
4. Select a second and a third line, if necessary.

Note:

A green line indicates that the line is selected. A grey line indicates that the line is not selected.

5. **Debounce time [s]**
If a value other than **0** (zero) is selected, the alarm event will not be generated until the object has been on the other side of the line for the specified period at least.
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.
This entry always relates to the line currently highlighted in this dialog box. Where necessary, this entry must be repeated for each line.

6. Direction

Select for the highlighted line whether the alarm should be triggered if the line is crossed according to the direction of the arrow in the graphic display (**Forward**), against this direction (**Backward**) or independently of the direction (**Any**).

The display of the direction is adapted accordingly in the camera image.

- Click **Next**. The **Define the Counter Description** dialog box is displayed.



NOTICE!

The change in the alarm-triggering direction is adopted for all tasks using this line.

- Enter a counter name and the direction (**In** or **Out**) for each line.

Note: You can only enter a name for lines that are selected.

- Enter a name in the **Inside** box.

This counter calculates the difference between the other counters, for example, if you want to know how many people are inside a room.

Note:

The **Inside** box is displayed if one of the counters is set to **Out** direction.

- Click **Next**. The **Define the Counter Settings** dialog box is displayed.

- 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.

- Click **Finish**.

4.5.15

BEV people counter (Bird's eye view people counter)

■ ■ □ Alarm tab > VCA tab > Configuration > Tasks tab > select **BEV people counter** > **OK**

This task generates an alarm event if persons are crossing lines or entering fields.

Note:

This task is not available for VOT-320V.

Camera perspective requirements for BEV people counter:

- Fixed mounted cameras
- Height of the camera: more than 3 meter (recommendation: 4 meter)
- Lens: Use lens that the diameter of the head of a person is between 7% to 14% of the screen width and 8% to 16% of the screen height.
- Camera tilt angle: 90°

First Step - Calibration

- ▶ We recommend using **Calibration method 2: Calibrating with Calibration Plane** or **Calibration method 3: Self-calibration** (see *Section 4.7.1 Calibration, page 44*).

Note:

The self-calibration method is only recommended if straight structures such as walls and doors are visible. **BEV correction** in the **Scale and Verification** dialog box ensures that the camera tilt angle is corrected for bird's eye view cameras.

Next Step - Select the Counting Trigger

- ▶ Select the trigger. To do this, click **Entering field** or **Crossing lines** (see *Section 4.5.14 Counter, page 41*).



Verifying the setup

If the setup was done correctly, the model-based person shapes should overlay the real person shapes in the camera image. If the model-based person shapes are clearly too small or too big, the calibration is not correct, which might cause problems in person detection and tracking. In this case, recalibrate the camera.

Camera perspective requirements for BEV people counter:

- see Section 2.4.1 Use cases, page 8
- see Section 2.4.2 Limitations, page 8

4.6

Statistics

When you select the **Statistics** tab, three histograms with statistics on the relevant detected objects are displayed on the right-hand side of the window, either for a selected field or for the whole screen. You can either select the field in the camera image by clicking it or click one of the tabs on the right-hand side of the window. A tab is shown here for the whole screen and for each respective field.

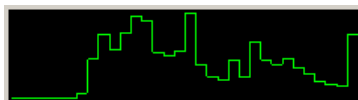
The statistics help you to refine the filter criteria for objects. For example, you may see accumulations of objects that have not triggered an alarm under the current filter criteria even though this might have been desirable.

The creation of the displayed statistics starts as soon as you open the IVA 4.5 window. The longer the window is left open, the more values will be entered into the statistics.

The statistics show three histograms:

- **Object Area Histogram [m²]**: accumulation of objects with a certain area.
- **Object Speed Histogram [km/h]**: accumulation of objects moving at a certain speed.
- **Object Direction Histogram [°]**: accumulation of objects moving in a certain direction.

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 histograms distinguish between objects that trigger an alarm (red line) and those that do not (green line).



Green:
Set of objects with no alarm



Red:
Set of objects with alarm

The x-axis of the top two histograms (area, speed) automatically adapts.

Displayed as the highest value here is the highest detected value up to this point.

Click **Reset** to begin building statistics again.

4.7 Configuration

This tab provides access to basic settings that you should specify before defining the individual tasks:

- Section 4.7.1 Calibration, page 44
- Section 4.7.2 Global Settings, page 54
- Section 4.7.3 Sensitive Area, page 56
- Section 4.7.4 Tracking, page 57
- Section 4.7.5 Crowd Fields, page 58

The settings and values defined here are valid for all tasks.

4.7.1 Calibration

Calibration is necessary for specifying the relationship between the camera image and the real-life environment. Areas and speeds can be correctly interpreted after the camera angle, camera elevation and distance are entered.

Calibration is required primarily so that the speed and size of detected objects or the radius of movement for loitering persons are correctly interpreted.

With a Bosch AutoDome, calibration must be completed for each preset.



NOTICE!

To display units of measurement according to the Anglo-American measurement system see Section 7 Display of Units of Measurement, page 72.

If you select the **Calibration** tab, the parameters with the currently set values are displayed on the right-hand side of the window.

IVA 5.5 allows the following types of calibration:

- Calibration method 1: Calibrating with Calibration Elements
- Calibration method 2: Calibrating with Calibration Plane
- Calibration method 3: Self-calibration

Switch between the calibration types by clicking one of the buttons:



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

Calibration method 1: Calibrating with Calibration Elements



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

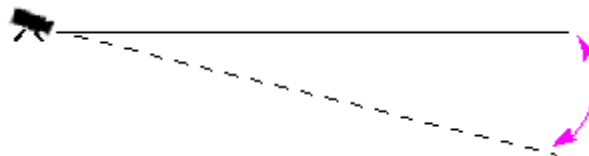
Examples:



1. In the **Camera** section, enter all the values you know regarding the camera and its positioning:
 - Activate the **Fixed** option in each case.
 - Then enter the corresponding value.

Tilt angle [°]

The angle between the horizontal and the camera.



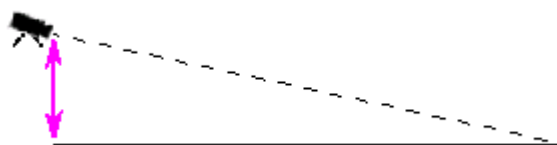
The flatter the tilt angle is set, the less accurate the estimate of object sizes will be. Estimates are no longer possible when you have reached 0°.

Roll angle [°]

The angle by which the camera is rolled. The setting can deviate from the horizontal by up to 10 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]

This value can be found in the camera documentation.

| | |
|----------------------------|--|
| Sensor size | This value can be found in the camera documentation. |
| Sensor aspect ratio | This value can be found in the camera documentation. |

2. Place 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 positioning and dimension 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.

If you double-click a button, this will remain selected. This will enable you to draw several elements of the same kind without having to repeatedly select the button.

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:
 - Click a line or an angle to highlight the element. The length of the line and/or angle is displayed underneath the buttons for the calibration elements.
Adjust these values so that they correspond to the actual situation.
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.
 - Move the elements or element end points with the right mouse button held down.
 - Click **Remove Element** to delete the selected element.

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** to carry out calibration.
Calibration is carried out automatically when the calibration elements are moved.
- The **Quality:** color field indicates the quality of the calibration:
- **red:** data conflicting or insufficient to complete a calibration.
 - **yellow:** calibration is inaccurate.
 - **green:** good quality calibration.
- The **Error** color field indicates the deviation of the plotted calibration elements from the perceived actual situation.
- **red:** significant deviation.
 - **yellow:** minimal deviation.
 - **green:** length of the plotted lines and angles indicate the actual situation.
- Once you have clicked **Adapt Elements**, the field will always be displayed in **green**.

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

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.

Popup Menu

Right-click in the camera image to open the popup menu. The following commands are available here:

- **Cut:** Removes the highlighted element.
- **Copy:** Copies the highlighted element to the clipboard.
- **Paste:** Reinserts a cut or copied element.
- **Clear All:** Deletes all elements.
- **To Background:** The highlighted element is moved to the background of the display. This allows you to highlight elements that were masked by the element.
- **Hide Other Elements:** Hides the elements that are not highlighted.
- **Display All Elements:** Displays elements that had previously been hidden.
- **Create Line on Ground:** Corresponds to clicking .
- **Create Vertical Line:** Corresponds to clicking .
- **Create Angle on Ground:** Corresponds to clicking .

Verify

The calibration can be verified by changing the verify mode.

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.

Applying the Calibration

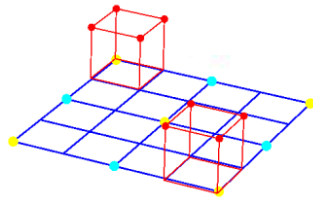
1. Click **Apply** to save the calibration for this image.
2. Click **Cancel** to return to the last saved calibration.

Calibration method 2: Calibrating with Calibration Plane



The calibration is defined by placing a virtual 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 plane and two cubes.



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

Two red cubes are displayed on the plane. 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. The cubes are shown in the perspective of the blue plane.

Requirements:

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

Adjusting the position and size of the cubes

You can adjust the position and size of the cubes – so that a cube corresponds to a car, for example.

1. Position one of the red cubes over an object that you wish to trigger an alarm event.
2. Adjust the cube to the size of this object. The second cube changes its size to suit the selected perspective.
3. You can place the second cube over another object of the same type, for example a second person who is further back in the image. This allows you to check whether the perspective is set correctly.

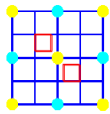
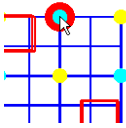
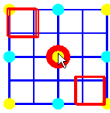
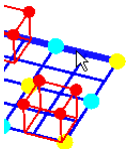
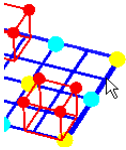
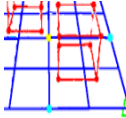
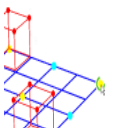
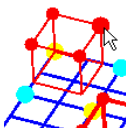

The more care you take over calibration, the more accurately the size, direction and speed of moving objects can be estimated.

You can, of course, alter your settings at any time.

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

Adjusting the Calibration Plane

This section provides an overview of the ways in which the calibration plane can be adjusted. Move the mouse cursor over an anchor point or a line and then perform the required action while holding down the mouse button.

| | | |
|---|--|---|
|  | Start position | At the beginning, the calibration plane is shown upright. |
|  | Anchor point center of a side line of the plane | The calibration plane is scaled. |
|  | Anchor point center of the plane | The entire calibration plane is moved. |
|  | One of the lines of the plane that is horizontal in the start position | The calibration plane is tilted horizontally; the tilt angle is changed. |
|  | One of the lines of the plane that is vertical in the start position | The calibration plane is tilted vertically; the roll angle is changed. |
|  | Anchor point lower corner of the plane | The perspective of the calibration plane is distorted. |
|  | Anchor point upper corner of the plane | The calibration plane is rotated. |
|  | Anchor point corner of a cube | The size of both cubes changes – both cubes always represent the same size. |
|  | Line of a cube | The cube can be positioned as desired. |

Editing Calibration Settings

You can also change the settings for each parameter by entering the relevant values.

Size [m]

Side length of the cubes.

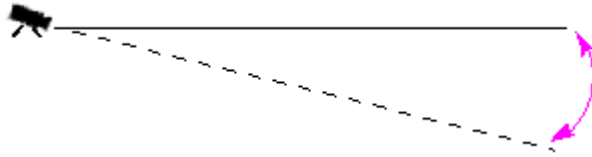
A side length of 2 m corresponds approximately to the height of a person.

Center Cubes

Both cubes are positioned centrally on the calibration plane.

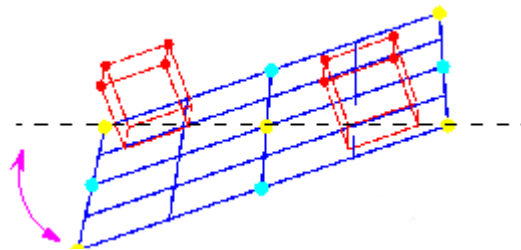
Tilt angle [°]

The angle between the horizontal and the camera.

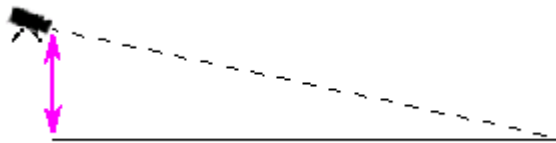
**Roll angle [°]**

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°.

The angle by which the calibration plane is tilted. The setting can deviate from the horizontal by up to 10 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]**

This value can be found in the camera documentation.

Sensor size

This value can be found in the camera documentation.

Sensor aspect ratio

This value can be found in the camera documentation.

Reset

All settings are reset to their initial conditions.

Applying the Calibration

1. Click **Apply** to save the calibration for this image.
2. Click **Cancel** to return to the last saved calibration.

Calibration method 3: Self-calibration



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.

Note:

The self-calibration is not available for VOT-320V.

First Step - Starting Self-calibration

- ▶ Click  to start the self-calibration wizard. The **Lens Distortion Correction** page with the camera image is displayed.

Next Step - 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.

- 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.

- Increase or decrease the sensitivity of the detected lines in the camera image. To do this, beside **Line sensitivity**, move the 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.

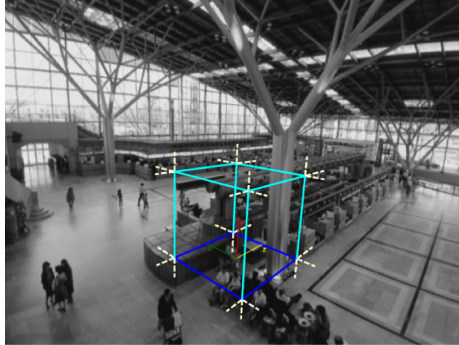
Note:

- 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.

- Click . The **Camera Calibration** page is displayed.

Next Step - 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, beside **Line sensitivity**, move the 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.

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.

4.7.2

Global Settings

Certain objects can be globally excluded from detection using this tab. The computing power required can be reduced if objects that are categorically not to trigger an alarm event are not monitored.

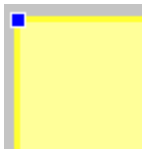
Size Constraint

Here you can specify a 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 and this will save computing power as a result.

Initially, the global settings are preset in such a way that no object is excluded.

The values are simultaneously graphically displayed in the camera image by two yellow-framed squares. Drag one of the blue nodes to adjust the values. Using the mouse, the yellow squares can be moved in the camera image to cover objects being used for size comparison.

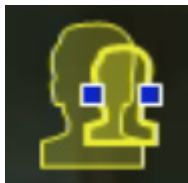
Make sure that the range between the minimum and maximum size is not too small, or relevant objects may be unintentionally eliminated from alarm generation.



Head Detection

To activate Head Detection:

1. Activate this option if you wish to use head detection.
Two head outlines, representing the minimum and maximum size of the heads to be identified, will be displayed in the camera image.



2. Move one of the outlines onto a head that is displayed in the camera image and adapt the size
or
enter the corresponding values in the input fields.

Note:

- Avoid false alarms and reduce required computing power by restricting head detection to the expected head sizes. If the required computing power is too high, heads can no longer be recognized.
- This option is not available for VOT-320V.

Note for BVC:

The **Head Detection** functionality is only available on the following conditions:

- Only in Forensic Search on recorded meta data.
- Only for BVC replay and search client.
- In BVC, the **Head Detection** check box in the Configuration Manager must be selected.

Notes on Finding Heads

An object is recognized as an object with a head if a shape resembling a head with colors that resemble human skin is detected. Head detection is only possible using a color camera. Heads will not be detected if the colors have been severely tampered with.

The best way to detect heads is if the camera captures them from the front and slightly from above. For optimum results, the height of the head should be approximately 10% of the height of the image. Individuals wearing large headdresses or that are only captured from the side will not be recognized as an object with a head.

Functions

- **Idle object detection**
Idle objects can only be detected if this option is activated.
An idle object is an object that was detected as an object based on an initial movement. The object is then classed as idle if it does not move for the time span entered under **Debounce time [s]**.
- **Debounce time [s]**
Enter the time span in seconds for which an object must remain idle in order to be classed as such.
- **Removed object detection**
Removed objects can only be detected if this option is activated.
An object is assumed to have been removed if changes are detected in the background following movement within an image.

- **Image stabilization**

If you activate this option, the movement of the image (strictly speaking, the camera) is compensated by up to 2% of the image size.

Activate this option if the camera is mounted on an oscillating mast, for example.



NOTICE!

Image stabilization is not available in all devices. Please refer to the IVA Release Letter to find out which devices can feature this function.

- **Enhanced separation**

- **Activated:** Improves the detection and separation of objects that move in close proximity to one another. This option requires additional computing power.

- **Deactivated:** Objects moving in close proximity to one another may blend into one object.

- **Smooth shapes**

- **Activated:** Smooths the shapes that are displayed as yellow line around detected objects. In **Enhanced tracking** mode, a model-based person shape is created around detected persons. This option improves the trajectory of objects by removing interfering parts, for example, the shadow around a person. No true segmentation of the object.

- **Deactivated:** True segmentation of the object, for example, the hand of a person can be detected.

Advantages and disadvantages of the individual setting depend on the captured image.

Reset

Click here to reset all settings to their initial conditions.

Apply

Click here to apply all settings.

4.7.3

Sensitive Area

The sensitive area is that part of the image seen by the camera that is analyzed. Objects moving outside the sensitive area cannot generate an alarm event even if they are caught by the camera.

Only objects moving inside the sensitive area are detected as such and generate an alarm event – this also applies for the later evaluation of recordings in the Bosch Video Client program.

The larger the sensitive area, the more computing power is required. Data will be processed more slowly.

A smaller sensitive area means that data processing is faster.



The sensitive area is shaded in yellow.

In the default setting, the whole of the image captured by the camera is defined as the sensitive area. Any areas that consist of small squares can be defined as non-sensitive (or

again as sensitive). There are four editing tools you can use for this purpose. You can repeat this operation as often as you like. You can therefore achieve a very precise definition of the sensitive area.

Examples of areas that could be defined as non-sensitive:

- 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 or bushes that move in the wind.

| | |
|------------------|--|
| Tool | Selection of an editing tool. |
| | Rubber band You can use the mouse to draw any size of square. |
| | Small square |
| | Medium square |
| | Large square You can edit the sensitive area as with a drawing tool. |
| Clear All | Click here to define the whole of the captured area as non-sensitive. |
| Set All | Click here to define the whole of the captured area as sensitive. |
| Apply | Click here to apply all settings. |

While you are drawing, hold down the SHIFT key to create non-sensitive areas. Drawing by itself without the SHIFT key marks out sensitive areas.

4.7.4

Tracking

This dialog box defines the tracking types for IVA.

1. 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, etc.
 - **Enhanced tracking:** Tracking of objects on the ground plane with an improved algorithm. This improves detection and tracking.
Only for scenes with one main ground plane. A scene that consists of multiple floors or a staircase for example, is not suitable for enhanced tracking.
 - **BEV people counting:** Tracking that is optimized for detecting and tracking people from above.
Camera perspective requirements for BEV people counter see *Section 2.4.1 Use cases, page 8* and *Section 2.4.1 Use cases, page 8*.
2. Click **Apply**.

Note:


- **Enhanced tracking** and **BEV people counting** 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 **Enhanced tracking** if camera height is below 2,50 m (recommended for optimal results: above 3 m).

4.7.5**Crowd Fields**

A crowd field must be created before crowd detection can be used. 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 and generate an alarm event – this also applies to the later evaluation of recordings in the Bosch Video Client program. A subsequent forensic search is only possible in the crowd fields which were activated during recording. You activate the crowd fields using the **Crowd detection** task wizard.

| | |
|---------------------|--|
| Crowd Fields | Creation of up to 3 crowd fields. You can create a new field or edit an existing one. |
| Add | Click here to add a new crowd field. |
| Remove | Click here to remove a crowd field. Select the crowd field before. |
| Apply | Click here to apply all settings. |

**NOTICE!**

Settings are only saved permanently when you click  in Configuration Manager or click **Save configuration** in the Web browser view.

4.8 Object Properties

Selecting this tab allows you to monitor the properties of a marked object over a longer period of time and observe changes.

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.

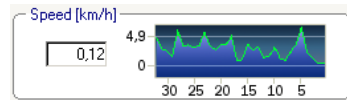
The color of an object depends on the lighting of the image, for example. Different colors are detected under a floodlight than in the shade.

Using the values displayed here, you can estimate which minimum and maximum values you must enter for the creation of a task to ensure the desired objects are captured.

Furthermore, the values displayed help to check and refine an existing calibration. Implausible values indicate faulty calibration.



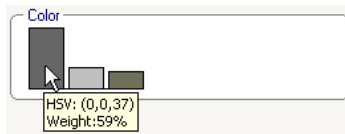
- Highlight an object in the camera image by clicking it. The object is marked with a yellow flag.
- The properties of the object are displayed on the right-hand side of the window. The numerical value for the property is updated every second while the object is marked. The progression graph displays the change in values of each property during the previous 30 seconds.



The **Color** property is not displayed using the numerical value and progression graph.

In the lowest field, 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.

If you move the mouse cursor over one of the color columns, a tooltip displays the values for hue, saturation and value (HSV), as well as the weighting of the color.



The illustration of the color columns is 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.

Colors cannot be detected for very small objects.



NOTICE!

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.

5 IVA 5.5 Flow

This chapter describes the program, configuration and different settings for IVA 5.5 Flow.

5.1 The Basics and Image Information

The IVA 5.5 Flow approach differs from the IVA 5.5 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 5.5 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.

Flow Detection Notes and Limitations

- 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.

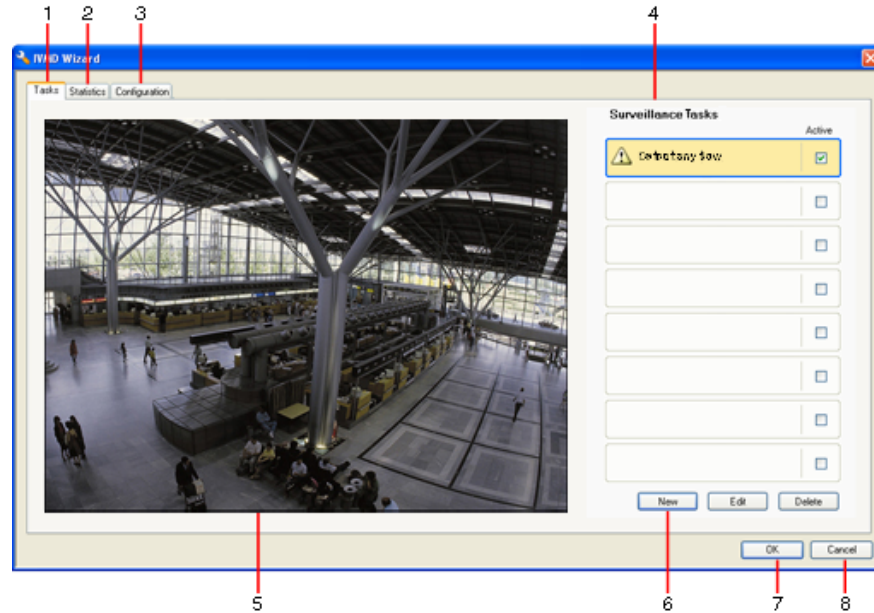
5.2 IVA 5.5 Flow User Interface

The following descriptions and screenshots relate to the user interface as it appears in Configuration Manager.

In the Web browser view all tabs are combined in a dialog box. The preview on the **VCA** configuration page is used as the camera image.

The configuration options are identical.

- ▶ To open the online Help for IVA 5.5 Flow click the area you are interested in and press **F1**.



1 Tasks

When this tab is selected, you can see all the defined tasks. You have the option to create new tasks and to edit or delete existing ones.

2 Statistics

When this tab is selected, the statistics for the detected flows are displayed.

3 Configuration

When this tab is selected, you can access the following settings:

- **Sensitivity Settings**

4 Depending on the tab selected, the following are displayed here:

- an overview of the defined tasks
- statistics on a selected field
- sensitivity configuration settings

5 Camera image

The camera image is displayed irrespective of the tab selected.

If the **Tasks** tab is selected, the popup menu in the camera window, for example, enables fields to be created and changed.

6 In this area, all the buttons are displayed that are required for work in the selected tab.

7 OK


This saves the settings for IVA 5.5 Flow and closes the window.
Incomplete settings are not saved.

8 Cancel

The IVA Wizard is closed.

Any changes that were made after the IVA Wizard was launched and not saved to the device will be lost.

**CAUTION!**

Settings are only saved permanently when you click  in Configuration Manager or click **Save configuration** in the Web browser view.

Saving the changes only in the **IVA Wizard** with **OK**, discards the changes after turning off and turning on the computer.

5.2.1**Popup Menu in the Camera Image**

The popup menu in the camera image allows you to create, edit and delete fields. It gives you access to display options. You can also start the IVA Task Editor.

- ▶ Right-click in the camera image in order to display the popup menu.

Depending on whether you click an object or free space, various commands are available.

If the **Statistics** tab is selected, then no popup menu is available.

Overview of commands:

- **Cut**

If a field is clicked, it is cut and copied to the clipboard using this command. You can also use the command to delete fields.

Fields integrated into a task cannot be cut or deleted.

- **Copy**

If a field is clicked, it is copied to the clipboard using this command.

- **Paste**

A field that has been copied to the clipboard is inserted using this command.

- **Create Field**

Creates a new field. The field can then be edited.

- **Show**

From the submenu, select the items to be displayed in the camera image:

- **Sensitive Area**

The area marked as sensitive is shaded in yellow.

- **Items**

Hide fields where necessary.

- **Advanced > IVA Task Editor**

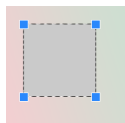
The IVA Task Editor shows all items, tasks and connectives in script form. This option is only designed for users who are familiar with the IVA Task Script Language (see *Section 4.3.2 The IVA Task Editor, page 21*).

Editing a Field

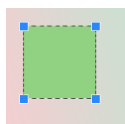
A field can be edited at any time. This includes:

- Inserting or deleting nodes
- Moving nodes
- Moving fields

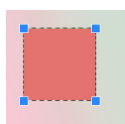
To change the form of the field, place the mouse cursor on a node or a line and move it while holding down the mouse button. To move the field, place the mouse cursor in the field and drag it while holding down the mouse button.



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.

5.3 Tasks

This tab is displayed when you click **Configuration...** in Configuration Manager in the **VCA** tab. Before defining tasks, specify the sensitive area and the motion detection parameters:

- Section 5.6.1 Sensitivity Settings, page 69

Movements can only be detected and analyzed within the sensitive area.

Each of these settings can be changed at any time.

Overview

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

Examples of typical events:

- An overall movement (flow) within an area.
- A movement against the flow.
- The camera is tampered with.

The result of a task is 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.

To edit a task, you must first highlight it. To do this, click the task. A highlighted task is outlined in blue.

To create and edit a task, you are guided step-by-step through the necessary settings. You can define up to eight tasks.



You can see the task list on the right-hand side of the window. Select a task and then click the name of the task directly in order to change it.



A task can be **Active**, i.e. an alarm event is generated. A task that is not active does not generate an alarm event.

Click the box next to the name of the task in order to activate it. An active task is indicated by a checkmark.



A task has an orange background if an alarm event is currently being triggered by this task.



A symbol in front of the task name indicates the type of task. The symbol corresponds to the symbol of the wizard that created the task.

New

Click here to create a new task. Instead of the task list, the window for selecting a wizard is displayed.

Edit

Click here to edit a selected task. The wizard that was displayed for the creation of the task is reopened. You can change individual parameters.

Delete

Click here to delete a selected task.

5.4

Creating/Editing a Task

A task is always created or edited using a wizard.

The following wizards are available:

- *Section 5.4.2 Tampering, page 64*
The camera is tampered with.
- *Section 5.4.4 Flow in field, page 66*
An overall movement (flow) is detected.
- *Section 5.4.5 Counterflow in field, page 67*
A movement against the flow is detected.

When you use the wizard to create or edit a task, you have access to the camera image and the popup menu. This means that you can create, edit or delete fields.

In Configuration Manager, the camera image with the popup menu is directly integrated into the IVA 5.5 window. When configuring in the Web browser view, you use the preview on the **VCA** configuration page.

You can immediately recognize from the color of the arrows whether a flow will trigger an alarm with the given settings:

- Red arrow: alarm event will be generated.
 - Yellow arrow: flow is detected, but an alarm event is not generated because of the filter conditions.
1. Click **Next** to go to the next step of the wizard.
 2. Click **Previous** to go to the previous step of the wizard.
 3. If you want to skip any further steps, click **Finish**. The presets are adopted for any unedited steps.

You can change any settings again at any time.

5.4.1

Default Task

When you work with IVA 5.5 Flow for the first time, the default task **Detect any flow** is already available. This task detects every flow in the entire camera image.

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

5.4.2

Tampering



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.

An alarm event is generated if one of the activated events occurs (logical connective = OR).

– **Scene too bright**

Activate this function if 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**
Activate this function if tampering associated with covering the lens (for instance, by spraying paint on it) should trigger an alarm. The average brightness of the scene provides a basis for recognition.
- **Signal loss**
Activate this function if the interruption of the video signal should trigger an alarm.
- **Reference check**
Activate this function if a deviation from the reference image on the VCA start page should trigger an alarm.

5.4.3



Crowd detection

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.

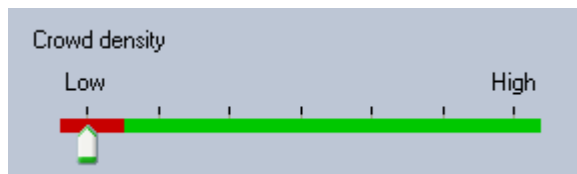
To use the crowd detection function, first a reference picture of the background without people present must be created on the standard VCA configuration page. The reference picture must depict the current background captured by the camera. Create a new reference picture if the background has changed fairly significantly.

Note:

This task is not available for AutoDome and VOT-320V.

Define the Crowd Field

1. Select one of the fields.
Use the list field in which all the crowd fields previously created in the **Configuration** tab, **Crowd Fields** sub-tab are shown. You cannot create or edit a crowd field here.
2. Select how dense a crowd must be so that it is detected as a crowd.
The **Crowd density** slide control sets the density progressively.



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. **Debounce time [s]**
If a value other than **0** (zero) is selected, the alarm event will not be generated until the crowd is detected within the field for at least the specified period.
4. **Smoothing time [s]**
If a value other than **0** (zero) is selected, the alarm event will not be generated until the crowd density averaged over the specified period is larger than the selected threshold value.

5.4.4



Flow in field

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.

First Step - Define the Field

1. Select one of the fields.

To do this, use the list field or click a field in the camera image.

You can also create a new field, edit an existing one or select **Whole screen**.

2. **Debounce time [s]**

If a value other than **0** (zero) is selected, the alarm event will not be generated until the flow is detected within the field for at least the specified period.

Final Step - Define the Flow

Here you can precisely 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.

Direction 1 [°] / Direction 2 [°]

Only flows moving in a certain range of directions usually should generate an alarm event. The range of directions is determined by entering two angles.



0° corresponds to the direction of movement from right to left.

It is counted counter-clockwise.

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

You can change the values by

- entering the figures in the fields
- moving the yellow circle segment while holding down the mouse button in order to redefine the direction of movement
- or
- placing the mouse cursor over one of the edges of the circle segment and moving it while holding down the mouse button in order to change the direction tolerance.

Activity [%]

In this context, an activity is the percentage of the monitored area in which a flow is detected. An activity that is to trigger an alarm event can be restricted. Change the values if you do not want a particularly low or high activity to trigger an alarm.

1. Activate this option if you wish to filter flows based on their activity.
2. 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.

Speed

The speed of the flow that is to trigger an alarm event can be restricted. Unlike IVA 5.5 object detection and tracking, the camera is not calibrated for IVA 5.5 Flow. Therefore no definitive

indication of the speed in 3D is provided. Instead flow speeds are indicated directly in the image plane as pixel/second.

Change the values if you do not want a particularly low or high speed to trigger an alarm.

1. Activate this option if you wish to filter flows based on their speed.
2. For the lowest speed **Min.**, choose between **Slow**, **Medium** and **Fast**.
3. For the highest speed **Max.**, again choose between **Slow**, **Medium** and **Fast**.

The selected speeds are indicated by two moving dots on the camera image.



4. Move or rotate this field with the mouse and place it over an area with a flow. This will enable you to align the flow speed with the selected settings.

5.4.5

Counterflow in field



This task generates an alarm event if a flow moving against a detected overall movement (main flow) is detected within a certain area. This means that an overall, potentially changing, movement is detected, and only flows that go against this direction of movement trigger the alarm.

First Step - Define the Field

1. Select one of the fields.
To do this, use the list field or click a field in the camera image.
You can also create a new field, edit an existing one or select **Whole screen**.
2. **Debounce time [s]**
If a value other than **0** (zero) is selected, the alarm event will not be generated until the flow is detected within the field for at least the specified period.

Final Step - Define the Counterflow

Here you can precisely limit the properties of a counterflow that triggers an alarm event.

Angle of tolerance for counterflow [°]:

The general direction of movement is automatically recognized as the main flow. Only flows moving in the opposite direction will trigger an alarm event. The maximum deviation of the movement against the main flow is determined by entering an angle. Angles between 0° and 180° are valid.

By selecting 0°, the direction of movement is restricted in such a way that any counter movement will not be detected, while selecting 180° will ensure that every movement is detected.

Adaption time window [s]:

Specify the period during which there must be activity for a main flow to be detected. In this context, an activity is the percentage of the monitored area in which a flow is detected. As soon as a main flow is detected as such, the counterflow will also be detected.

Activity [%]

The activity of the counterflow that is to trigger an alarm event can be restricted. Change the values if you do not want a particularly low or high activity to trigger an alarm.

1. Activate this option if you wish to filter flows based on their activity.
2. Enter a minimum and maximum value for the counterflow 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 counter flow is directly proportional to the activity in the area.

Speed

The speed of the counterflow that is to trigger an alarm event can be restricted. As the camera is not calibrated to detect flows, no definitive indication of the speed can be provided. Flow speeds are indicated in relation to the background and/or other movements.

Change the values if you do not want a particularly low or high-speed counterflow to trigger an alarm.

1. Activate this option if you wish to filter flows based on their speed.
2. For the lowest speed **Min.**, choose between **Slow**, **Medium** and **Fast**.
3. For the highest speed **Max.**, again choose between **Slow**, **Medium** and **Fast**.

The selected speeds are indicated by two moving dots on the camera image.



4. Move or rotate this field with the mouse and place it over an area with a flow. This will enable you to align the flow speed with the selected settings.

5.5 Statistics

When you select the **Statistics** tab, histograms with statistics on the relevant detected movements are displayed on the right-hand side of the window, either for a selected field or for the whole screen. You can either select the field in the camera image by clicking it or click one of the tabs on the right-hand side of the window. A tab is shown here for the whole screen and for each respective field.

The statistics help you to refine the filter criteria for flows.

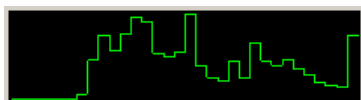
The creation of the displayed statistics starts as soon as you open the IVA 5.5 Flow window.

The longer the window is left open, the more values will be entered into the statistics.

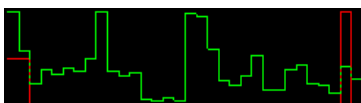
The statistics show four histograms:

- One for **slow**, **medium** and **fast** movements: accumulation of objects moving at a specified speed in a certain direction.
- **Activity Histogram [% of area]**: accumulation of activity

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 (green line).



Green:
set of flows with no alarm



Red:
set of flows with alarm

Click **Reset** to begin building statistics again.

5.6 Configuration

This tab provides access to basic settings that you should specify before defining the individual tasks.

The settings and values defined here are valid for all tasks.

5.6.1 Sensitivity Settings

Sensitive Area

The sensitive area is that part of the image seen by the camera that is analyzed. Objects moving outside the sensitive area cannot generate an alarm event even if they are caught by the camera.

Tracking Parameter

Define the following parameters to further define movement detection:

- **Tracking sensitivity**
Set a value with the slide control.
 - Max.:** Even minor activities are detected as a flow. 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 movements.
 - Min.:** This setting is useful in simple environments in which objects move in a straight line and are not hidden during their movement through the area concerned.

- **Min. tracking duration [s]**
Enter a value between 1 and 4 seconds.
A movement must span this period for it to be detected as a flow.
Activate this option if slow movements are also to be detected.
 - **Min. tracking distance**
The value indicates the distance the objects generating the movement have to cover for a flow to be detected. Small values will trigger an alarm event for slight movements.
Activate this option if quick movements are also meant to be detected as a flow.
- At least one of the last two options must be activated at all times for a flow to be detected.
High encoding power may require a longer tracking duration.

5.6.2


Crowd Fields

A crowd field must be created before crowd detection can be used. 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 and generate an alarm event – this also applies to the later evaluation of recordings in the Bosch Video Client program. A subsequent forensic search is only possible in the crowd fields which were activated during recording. You activate the crowd fields using the **Crowd detection** task wizard.

| | |
|---------------------|--|
| Crowd Fields | Creation of up to 3 crowd fields. You can create a new field or edit an existing one. |
| Add | Click here to add a new crowd field. |
| Remove | Click here to remove a crowd field. Select the crowd field before. |
| Apply | Click here to apply all settings. |



NOTICE!

Settings are only saved permanently when you click  in Configuration Manager or click **Save configuration** in the Web browser view.

6 IVA and VG4 AutoDome

If you implement IVA 5.5 or IVA 5.5 Flow with VG4 AutoDome, please note the following:

- There are ten different profiles available for configuring IVA 5.5 (see also: *Section 3.1 Configuration with Configuration Manager, page 10*).

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 5.5.

- Once you have assigned an IVA 5.5 profile to a preset, AutoDome is blocked to other users for approximately ten minutes.
- An IVA 5.5 image data analysis is launched approximately two seconds after AutoDome 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 AutoDome is moved to a new position or the zoom, iris or focus settings are changed, IVA 5.5 is no longer active for this scene.
- As soon as a message from VG4 AutoDome is displayed on the camera image, IVA 5.5 is no longer active for this preset. Recall this preset to reactivate IVA 5.5 for this scene.
- Use the **Inactivity** function to ensure that the camera automatically recalls a preset when it becomes inactive. This is particularly important with AutoDomes where the images are not viewed immediately. For more information, refer to the AutoDome documentation.
- Some of the AutoDome will enable you to reuse an alarm event triggered by IVA 5.5 as an alarm input. Thus, for example, an event detected on preset 1 can cause the recall of another preset.

7 Display of Units of Measurement

In the English-language user interface in the Configuration Manager program, you can display units of measurement according to the Anglo-American measurement system.

1. Close the Configuration Manager program.
2. Click **Start > My Computer**.
3. Right-click in the window and select **Properties** from the popup menu.
The **System Properties** window opens.
4. Click the **Advanced** tab.
5. Click **Environment Variables**.
The relevant window opens.
6. Click in the **User variables** area on **New**.
The relevant dialog box opens.
7. Enter:
Variable name: **LANG**
Variable value: **us**
8. Close all windows by clicking **OK**.
9. Start Configuration Manager.
The units of measurement are now displayed according to the Anglo-American unit system. The user interface is in the English language.

Delete this user variable in order to return to the original display.

This user variable is only valid for the relevant Windows login. You can set up various user accounts under Windows so the display varies depending on the Windows login.

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Bosch Security Systems

Werner-von-Siemens-Ring 10
85630 Grasbrunn
Germany

www.boschsecurity.com

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