Video Analytics While Moving
PTZ cameras

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1   Video Analytics While Moving with PTZ Cameras

As the demand for video analytics increases, so too does the number of alarm event chains being set between fixed cameras and moving cameras. Fixed cameras are set to monitor a preconfigured field of view, while PTZ cameras perform a scanning operation. Once a fixed camera detects an intruder and activates an alarm, the event chain can request the PTZ camera to commence tracking the intruder's movements.

Traditional PTZ cameras can't perform video analytics while the camera head is in motion, which makes the video analytics while moving feature on the MIC IP starlight 7000i and MIC IP fusion 9000i models a game-changer. This feature alerts the operator, or triggers the camera's Intelligent Tracking feature, the moment a moving object or person is detected while the camera is panning, tilting or zooming.

Outside of pre-positions, video analytics while moving can also detect and alarm on 'object in field'. These alarm fields are defined across all PTZ potential viewing ranges, and any part of those global fields within the view of the visible imager becomes active. As a result, guard tours sweeping across areas to monitor for intruders can also automatically alarm on those intruders.

This technical note is intended as a step-by-step guide to instruct users how to set up the video analytics while moving.

1.1 System Requirement

To fully configure the video analytics while moving on your browser, please download and install the MPEG ActiveX from the Bosch download store. Or you can download and install the Bosch Configuration Manager, which includes the latest ActiveX as standard: https://downloadstore.boschsecurity.com.

1.2 PTZ Settings

A smooth video is crucial for the reliability of video analytics while moving. For this feature, the maximum pan/tilt speed is 5° per second, therefore Bosch recommends setting the camera zoom to ≤ 5° per second.

On the **Configuration** page, select **PTZ Settings**. In the **Auto pan speed** field, set the value to ≤5 if you plan to use **auto pan** or **360° auto pan**. If you would like to pan/tilt manually, or to use recording **tour A/tour B**, you must set the values in the **Maximum pan speed [%]** and **Maximum tilt speed [%]** fields to ≤ 5.

Note: The maximum pan/tilt speed of tour B has been limited for video analytics while moving in firmware version. 6.42.
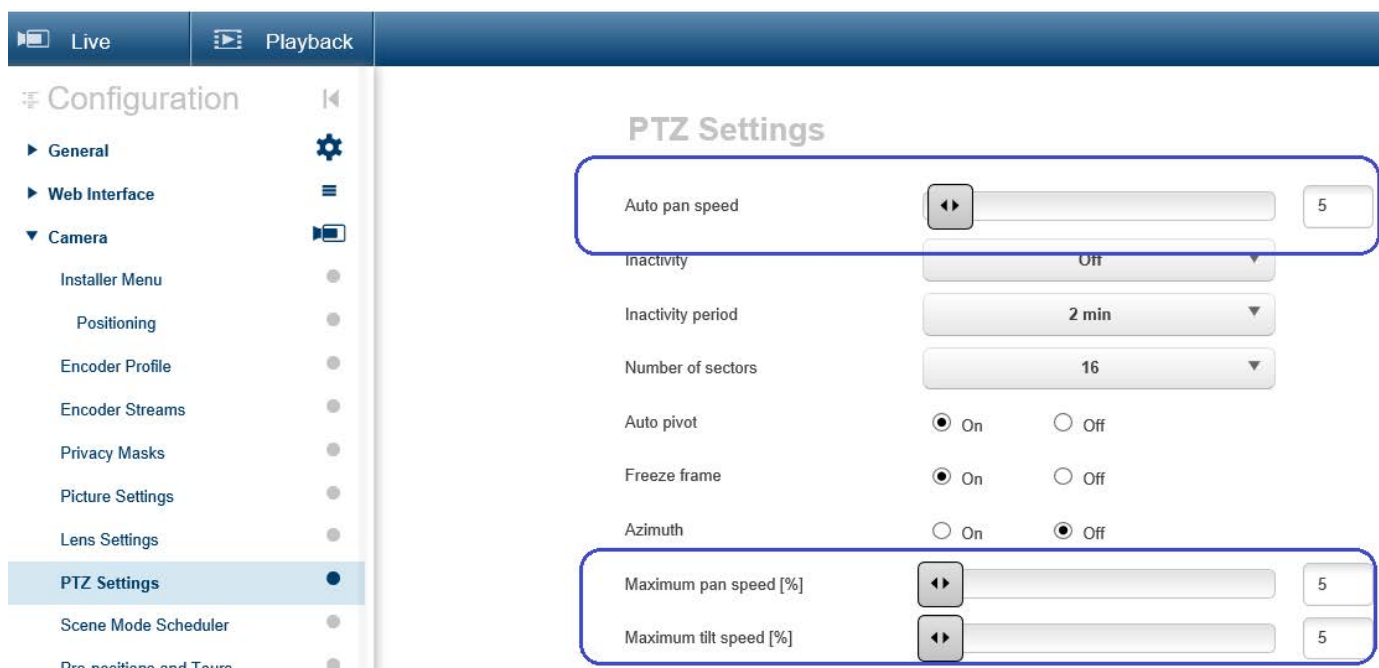

Figure 1.2: PTZ settings page

1.3 Video Analytics While Moving Setting

On the **Configuration** page, select **Alarm > VCA**. In the **VCA configuration** field, select **Global VCA** and click **Configuration**.
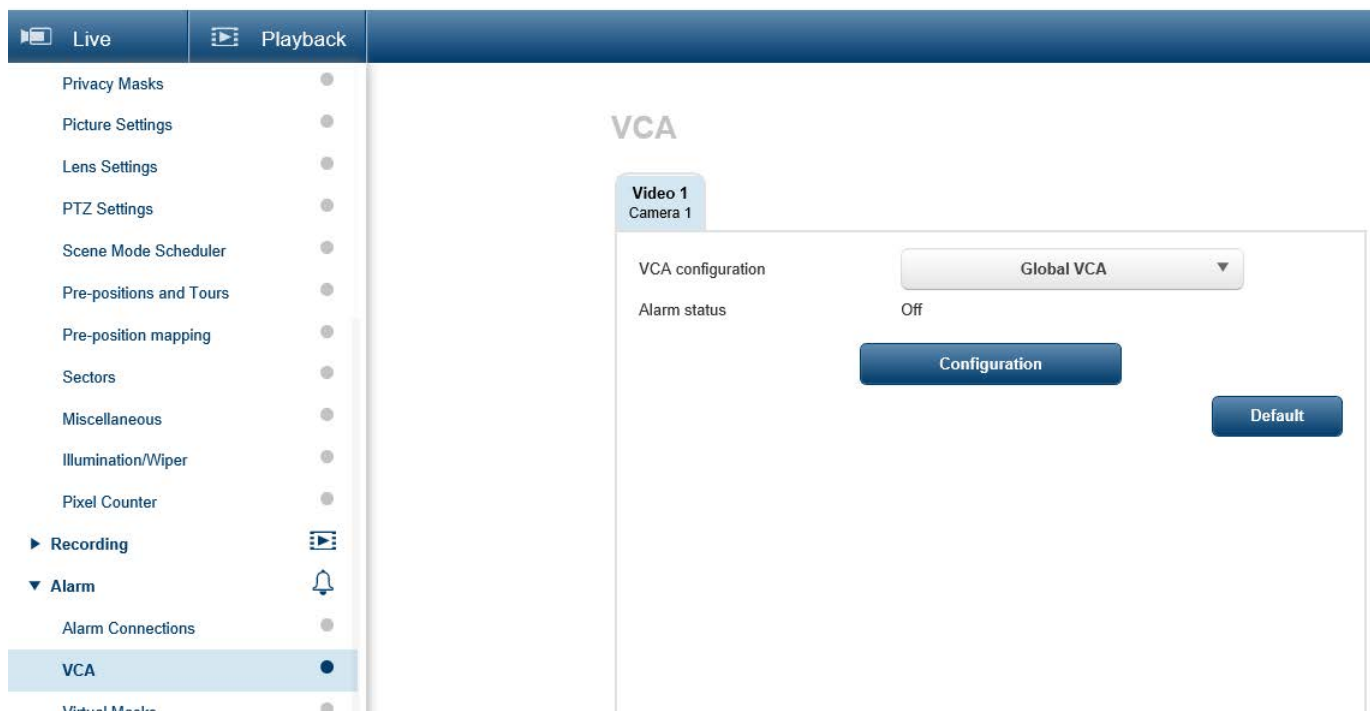
Figure 1.3.1: VCA settings page

On the **Configuration** page (Global VCA), edit an existing 'detect any object' task or create a new one. With multiple tasks it's possible to set multiple-monitoring regions. You can precisely limit the property (condition) and color properties of an object that triggers an alarm by following the setting sequence. You can also define the intersection trigger with the 'object base point', 'object center', 'edge of box' and 'complete box'. Refer to the VCA_Operation_manual for details of the Intelligent Video Analytics set-up. See Figure 1.3.2 for the Intelligent Video Analytics Configuration page.
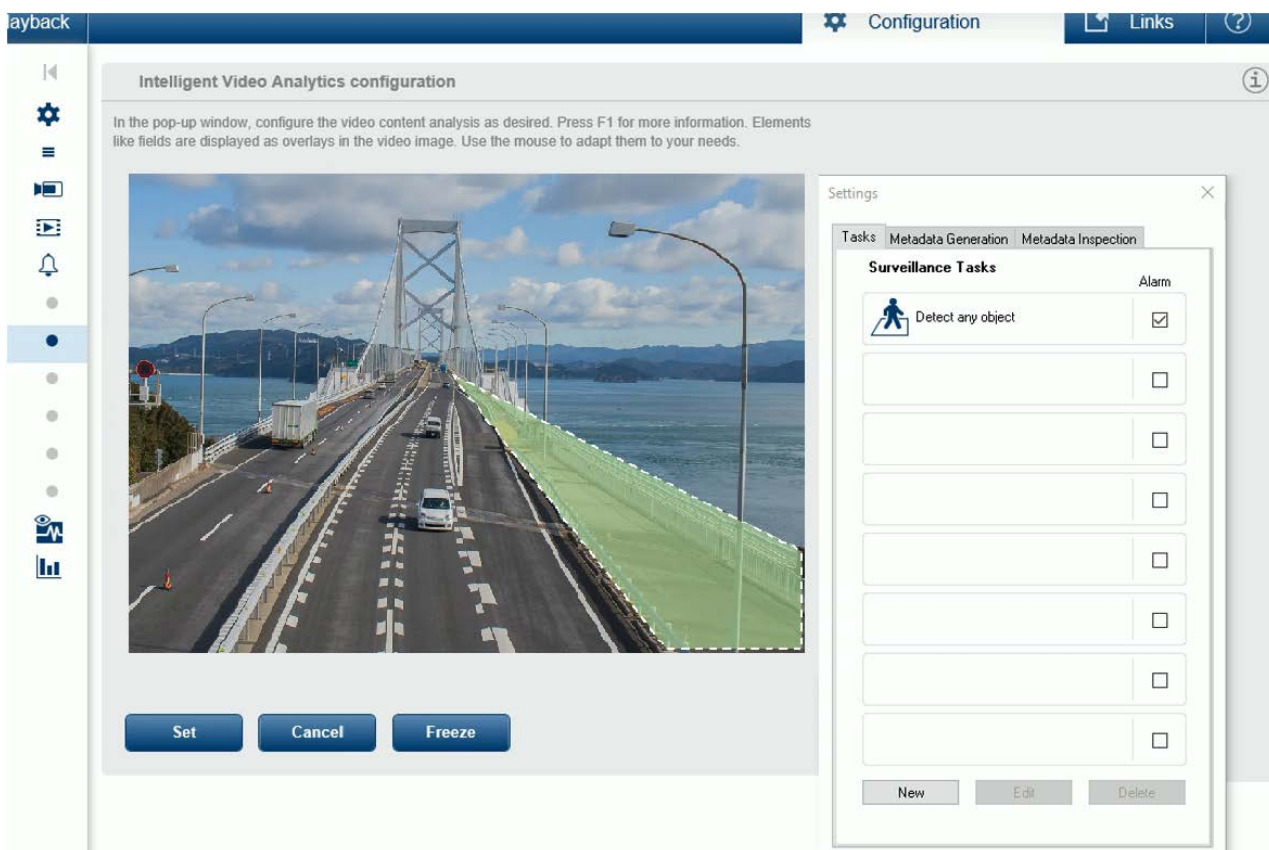

Figure 1.3.2: Intelligent Video Analytics configuration page

Once all monitoring regions are defined, click **Set**.

On the **Configuration** page, select **Web Interface > Appearance**. Select **Show VCA items** to display these items on the live video image. Click **Set** to save the setting. The sensitive areas for detection are displayed in the live video stream.
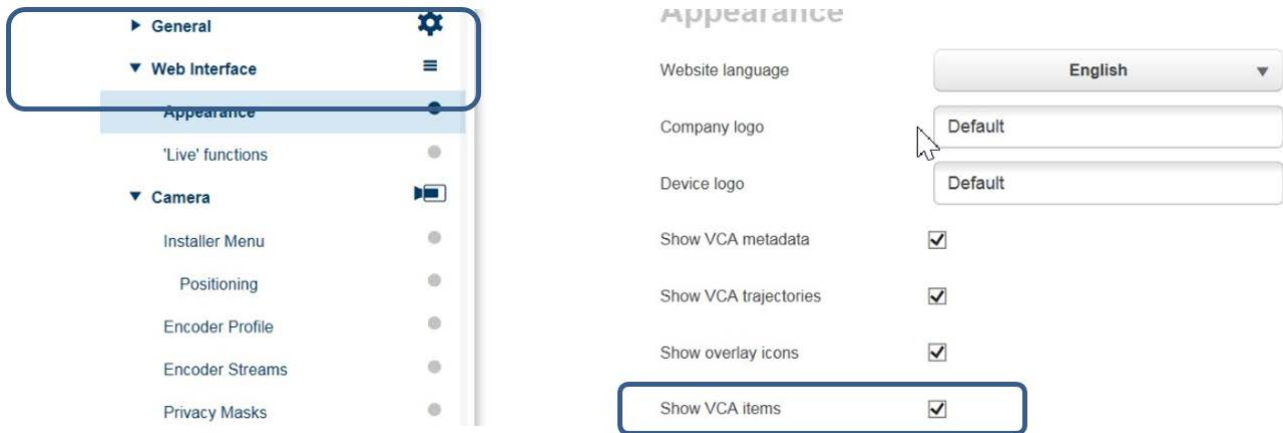

Figure 1.3.3: Camera appearance page

1.4 Virtual Masks Setting

In the default setting, the entire camera image is defined as the sensitive area. Use Virtual Masks to exclude permanent objects or areas that are irrelevant for alarm event generation. Only movements outside Virtual Masks are detected, in the sensitive area of the camera image, and as such generate an alarm event. Movements inside VCA masks cannot generate an alarm event even if they are caught by the camera. This setting also applies to video analytics while moving and Intelligent Tracking, and therefore requires setting up only once.

On the **Configuration** page, select **Virtual Masks**. Select the number of the Virtual Mask. A colored rectangle appears in the unlabeled video preview window above the Set button. Use the mouse to define the area for each Virtual mask. Virtual Masks can have 3, 4, or 5 corners (which are blue in the preview window) and can form any convex shape.
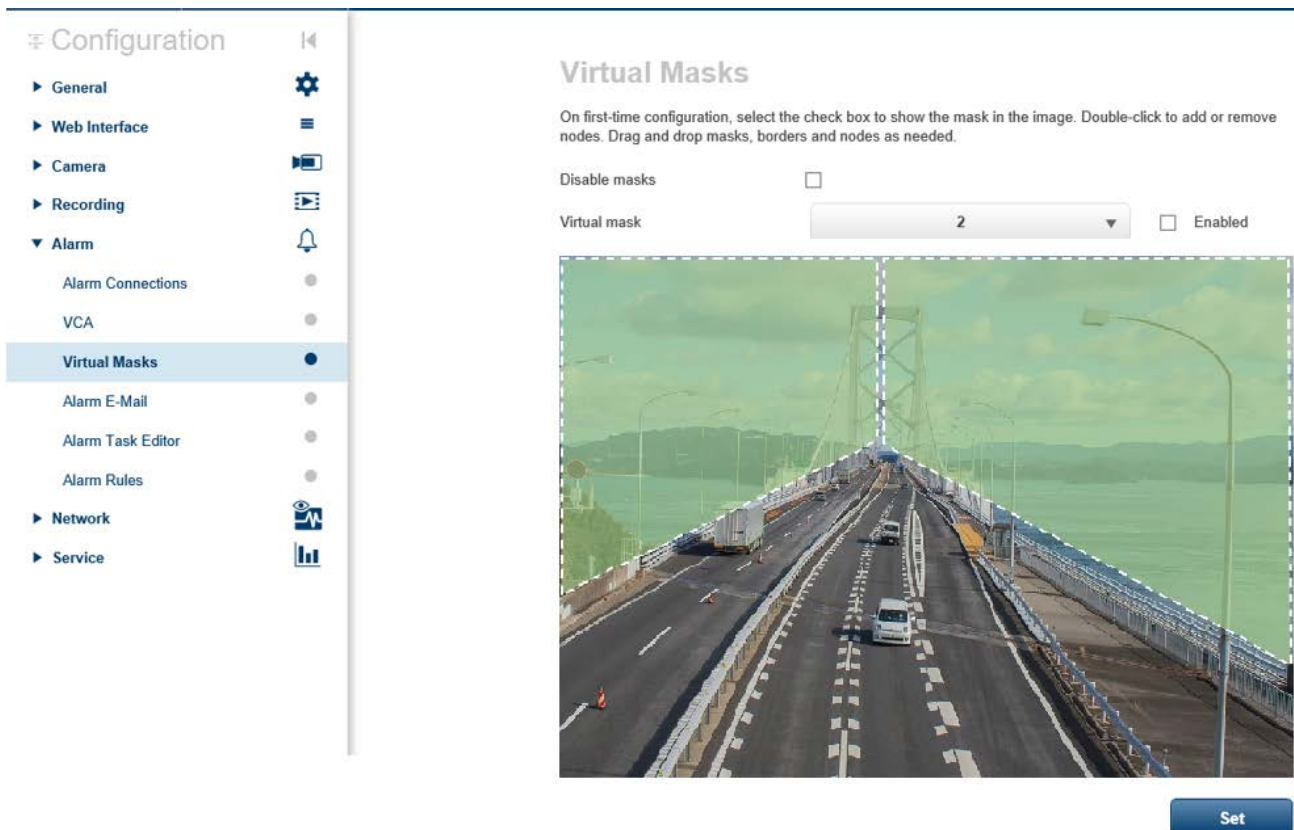

Figure 1.4: Virtual Masks configuration page

1.5   Auto Pan & Guard Tours

On the **Live** page, select **Special** Functions. Activate **Scan 360°** (AUX 1) / **Auto pan** (AUX 2) **/ Tour A** (AUX 50 or 51) **/ Tour B** (AUX 52 or 53). You can also use AUX commands to enable the desired functions.

Note: Refer to the Camera Operation manual to set up the right / left pan limit and to record a guard tour.

Figure 1.5: Live view- special functions

Note: These Global VCA alarm fields are defined across all potential PTZ views, therefore any part of those global fields currently within the camera's view becomes active.

Note: Intelligent Video Analytics will still detect and alarm on an 'object in field' when the user is operating the camera manually.

1.6   Recommended Camera Installation:

- To be detected and tracked, a person's size needs to be at least 12% of the image height. In 1080p and for a person of 1.6x0.5m size, this corresponds to 130 pixels' height and 40-pixels' width of the person. For objects with other aspect ratios, such as cars, the covered area (width x height) must be equivalent to or larger than the referenced person's size.
- All objects must have perceivable motion to be detected. The video analytics runs on 320x180 with 15fps, and perceivable motion means at least one pixel per frame in this resolution. This corresponds to at least 6 pixels per frame in 15fps, or 3 pixels per frame in 30fps for 1080p resolution.
- The minimum distance of a human-sized object to the camera is 7m in 1x zoom. The distance should be no more than 19m in zoom 1x and no more than 590m in 30x.
- Camera pan/tilt speed should be ≤5° per second.
- Only the 'object in field' alarm rule is available.
- The alarm could be triggered on the intruder's base point, edge and center of the object.

1.7 Limitations of video analytics while moving

This section describes the limitations you should be aware of when using video analytics while moving.

- If moving objects cannot be distinguished from the background, the motion of an individual object cannot be detected.
- The detection and analysis of moving objects entering the image will be delayed until clarity regarding size and motion has been achieved.
- Sharp shadows that appear suddenly, such as clouds, trees and buildings, can be mistaken as objects. Soft shadows are covered by the algorithm.
- In certain environments, the use of this type of video analytics may not always be advisable. This is because motion may not always be detected, or too much motion (because of various factors) may be detected.

2 Intelligent Tracking combined with Video Analytics While Moving

One of the key potential use cases of video analytics while moving is to combine with Intelligent Tracking. Once the alarm status is active, Intelligent Tracking will guide the camera in order for the operator to track the suspect closely, even outside the current pre-position. The video analytics while moving will be temporarily paused until Intelligent Tracking stops. Refer to the videos at the following link for examples: https://www.boschsecurity.com/xc/en/products/video-systems/solutions/mic-ip-cameras/

2.1 Set up Intelligent Tracking

On the **Live** page, select **Intelligent Tracking**. Select **Auto** to create the event chain between **Intelligent Video Analytics** and Intelligent Tracking. You can also use AUX ON 78 to enable the Intelligent Tracking Auto mode.

Figure 2.1: Live view – Intelligent Tracking

Note: Intelligent Tracking will be disabled when the user is operating the camera manually.

3   Alarm Rules

Another key advantage of video analytics while moving is when the feature is used in conjunction with pre-defined alarm rules. Users can define two alarm output(s) combined with video analytics while moving and respond automatically to intruders when the alarm is activated. The alarm output(s) can also be used to stop the operation of a guard tour, to go to a defined pre-position, to commence a different guard tour, or switch to night mode with active IR illuminator.

On the **Configuration** page, select **Alarm Rules**. Select the number of the alarm rule. Select **Video analytics/Motion+** to define the alarm input source. Next, specify up to two (2) rule outputs, or the camera's response to the input. Outputs include AUX ON/OFF command or a pre-position scene.

1. Click the check box **Enabled** to activate the alarm rule.
2. From the drop-down box of **Input**, select **Video analytics/ Motion+**.
3. Choose one of the following output commands for both Output 1 and Output 2 settings:

   − None: no defined command.
   − AUX On: defines a standard or custom keyboard ON command.
   − AUX Off: defines a standard or custom keyboard OFF command.
   − Pre-position: defines a pre-position scene.

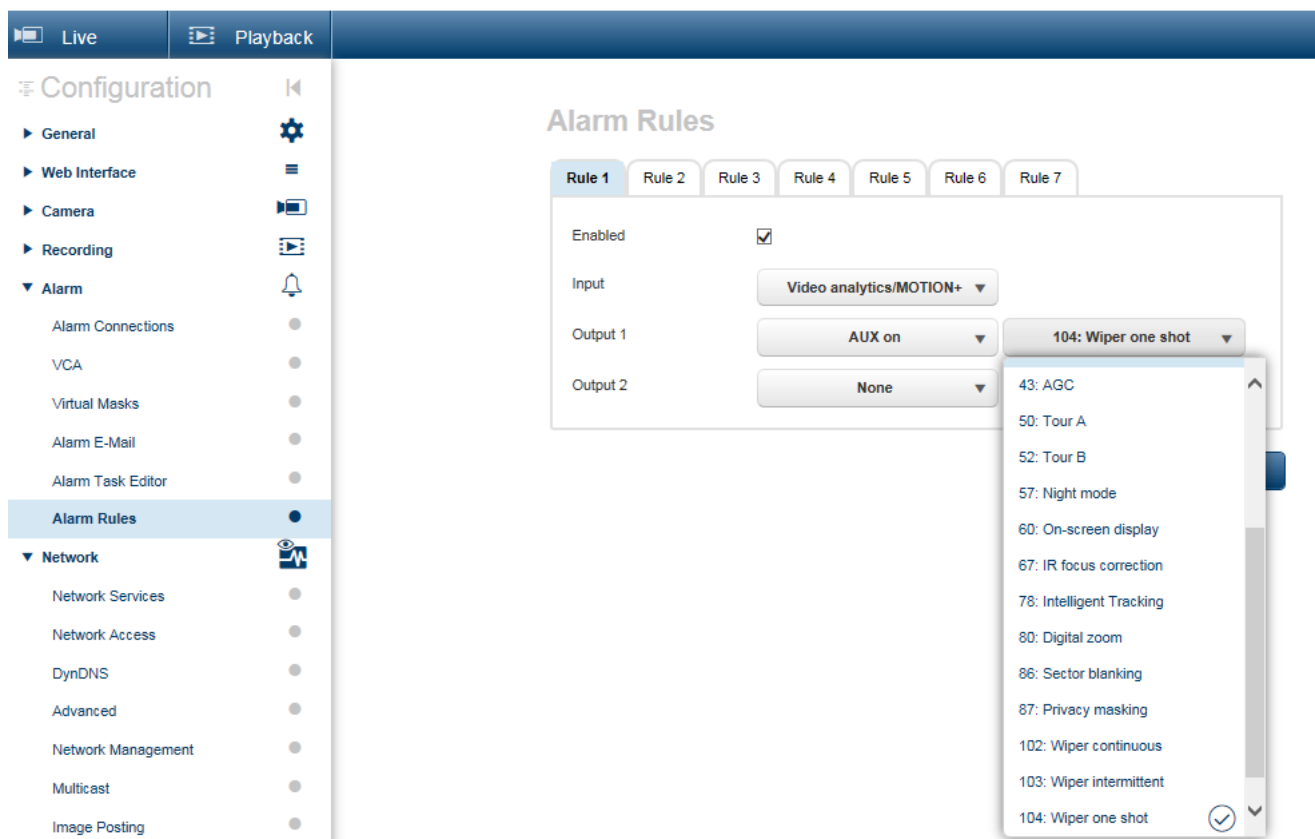4. Click **Set** to save. The camera's system will activate the alarm rules.

Figure 3.1: Live view − Intelligent Tracking

4 Related User Commands

The **AUX Control** tab in the **Live** page is used to enter pre-programmed keyboard control commands.

To enter an AUX Command:
1. Place the cursor in the **AUX Control** field.
2. Click the desired command number via the on-screen keypad.
3. Click either **AUX on** or **AUX off** to initiate or stop the command.

Function key	AUX Command No.	Command Name	Description
On/ Off	1	Scan 360°	Auto Pan without limits
On/ Off	2	Auto Pan	Auto Pan between limits
On/ Off	7	Play Custom Pre-position Tour	Activate/Deactivate
On/ Off	8	Play Pre-position Tour	Activate/Deactivate
On/ Off	50	Playback Tour A	Activate/Deactivate, Continuous
On/ Off	51	Playback Tour A	Activate/Deactivate, One Time
On/ Off	52	Playback Tour B	Activate/Deactivate, Continuous
On/ Off	53	Playback Tour B	Activate/Deactivate, One Time
On/ Off	54	Illuminators	Controls IR Illuminators / MIC 7000 only
On/ Off	57	Night Mode Setting	Enable/ Disables Night Mode
On/ Off	60	On screen Display	Activate/Deactivate OSD
On/ Off	68	White Light Illumination	Turns white light on or off
On/ Off	78	Intelligent Tracking	Turns Intelligent Tracking on or off
On/ Off	100	Record Tour A	On–start recording; Off–stop recording
On/ Off	101	Record Tour B	On–start recording; Off–stop recording