

Aimetis Symphony™

Version 6.10

Analytics and Rules Guide

December 6, 2012



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Preface

Conventions

Table 1. Symbols and formatting used in this manual

Icon	Caption/Format	Description
	Note	Additional information.
	Example	Example scenario.
	Important	Vital additional instructions or links.
	Caution	You could lose recording footage or you must pay close attention to setting changes.
	Bold, Arial Font	Graphic User Interface term (button, menu, window, option) or keyboard item.
	<i>Italic, Arial</i>	Emphasis, new term, or an external reference.

Document Suite

Table 2. Aimetis documents and videos

Document Name	Links
Symphony Release Notes	https://www.aimetis.com/Xnet/downloads/documentation.aspx
Symphony Installation Guide	https://www.aimetis.com/Xnet/downloads/documentation.aspx
Symphony Administration Guide	https://www.aimetis.com/Xnet/downloads/documentation.aspx
Symphony Analytics Guide	https://www.aimetis.com/Xnet/downloads/documentation.aspx
Symphony Client User Guide	https://www.aimetis.com/Xnet/downloads/documentation.aspx
Knowledge Base Articles	http://www.aimetis.com/Support/knowledgebase.aspx
Case Studies	http://www.aimetis.com/Solutions/customers-case-studies.aspx
White Papers	http://www.aimetis.com/Solutions/whitepapers.aspx
Application Video Samples	https://www.aimetis.com/Xnet/Marketing/collateral-library.aspx
Recorded Webinars	http://www.aimetis.com/Events/webinars.aspx
Product Tour	https://www.aimetis.com/Xnet/Marketing/collateral-library.aspx
Supported Video Devices List	http://www.aimetis.com/Support/supported-video-devices.aspx
Licensing	http://www.aimetis.com/Symphony/default--licensing.aspx
FAQ	https://www.aimetis.com/Xnet/Support/faqs.aspx

Aimetis Xnet Portal

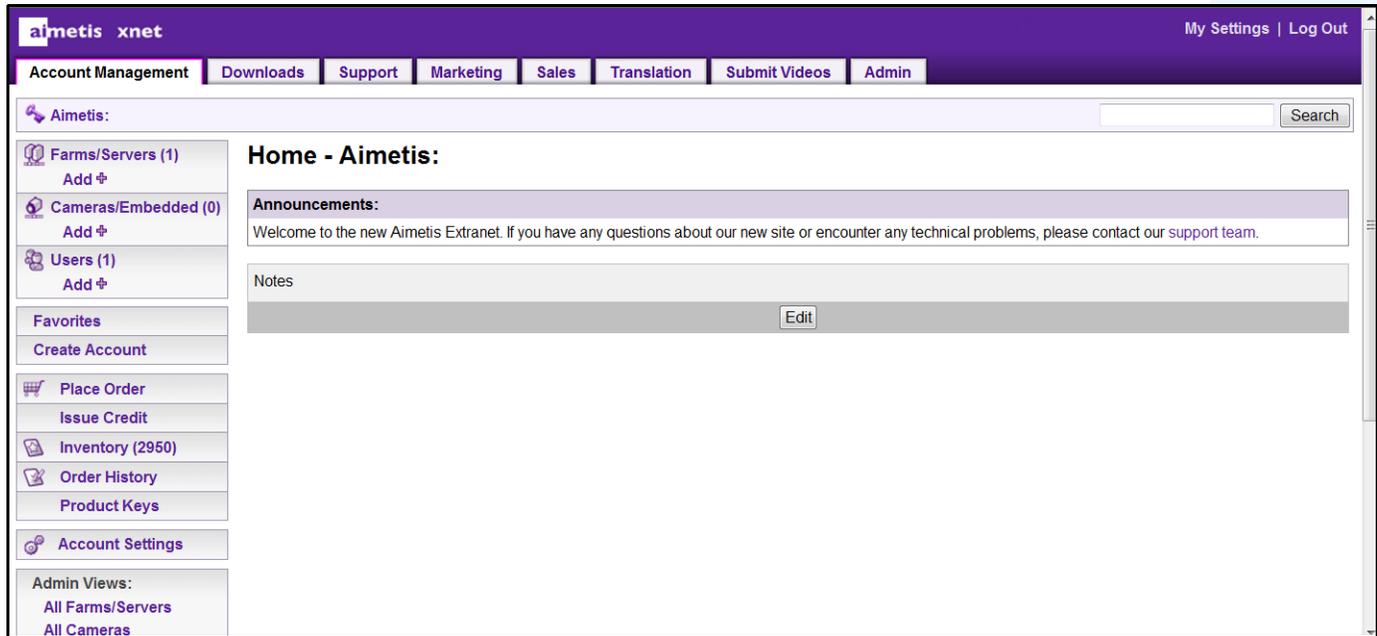


Figure 1. Aimetis Xnet home page

Xnet is the Aimetis Online Portal: www.aimetis.com/Xnet

You can :

- Order Licenses
- Manage Sub-Partner Accounts
- Access Technical Support & Downloads
- Access Sales & Marketing Tools
- Access Aimetis Software Translation



Note: Access to tools depends on account type, for example, Distributor, Certified Partner, Authorized Partner, End-User. For instructions, see [Table 3 on page v](#).

Table 3. Instructions for using the Xnet

XnetXnet Instructions	Links
XnetXnet Training Manual - Resellers	https://www.aimetis.com/Xnet/Marketing/collateral-library.aspx
Recorded Webinar - Xnet Training - Distributors	https://www.aimetis.com/Xnet/Marketing/collateral-library.aspx

Table 3. Instructions for using the Xnet

XnetXnet Instructions	Links
Recorded Webinar - Xnet Training - Channel Partners	https://www.aimetis.com/Xnet/Marketing/collateral-library.aspx
Xnet Training Manual - Distributors	https://www.aimetis.com/Xnet/Marketing/collateral-library.aspx
Aimetis Symphony Architectural and Engineering Specification	https://www.aimetis.com/Xnet/Marketing/collateral-library.aspx
Hardware Benchmarks guidelines for 10, 20, 40 and 200 camera systems.	https://www.aimetis.com/Xnet/Marketing/collateral-library.aspx

Contact Us

Table 4. Contact links, addresses, phone numbers

Contact Type	Description
About Aimetis	http://www.aimetis.com/Company/default.aspx
Contact link	http://www.aimetis.com/Company/contact.aspx
Support link	http://www.aimetis.com/Support/default.aspx
Americas	Aimetis Headquarters 500 Weber Street North Waterloo, Ontario, Canada N2L 4E9 Phone: +1866-544-2804 or +1 519-746-8888 Fax: +1 519-746-6444
EMEA	Aimetis GmbH Am Prime Parc 7 65479 Raunheim Germany Telefon: +49 (0) 6142 207 98 60 Fax: +49 (0) 6142 207 98 89 www.aimetis.de
Asia - Pacific	Aimetis China 5/F Standard Chartered Tower 201 Shiji Avenue Pudong Shanghai China 200120 Phone: 86-21-6182-6916 Fax: 86-21-6182-6777

Document History

Sym-6.10-P-902

Table 1. Changes to this manual

Date	Description
December 6, 2012	<ul style="list-style-type: none"> • “VE180 - Indoor/Outdoor People Tracking” on page 34 - additional description to introduction on why to use the VE180 versus the VE150 and VE250 engines. • Revised for VE140, VE141, and VE352: (Optional) By default VE250 is selected, in which case you must first deselect VE250.
September 13, 2012	Revised: Table 7, "Environment subtab options for all background models," on page 42 , Background Sensitivity. Important note revised for clarity: Important: If set to a low value, then objects with similar colour as the background will NOT be detected as valid objects to track.
August 2012	Release 6.10 <ul style="list-style-type: none"> • “ VE180 - Indoor/Outdoor People Tracking” on page 34 • “ Camera Position subtab” on page 38 • “Table 14. Troubleshooting Solutions for VE180” on page 54 • “ PT091 and PT090- Automatic PTZ Tracking” on page 65 • “Task 1: (Optional) Set up the Camera Tour” on page 66 • “Task 2: Calibrate the PTZ Camera” on page 67 • “Task 3: Configure PT09x” on page 68 • “Task 4: Creating a Rule using PT09x” on page 73
February 28, 2012	Revised: <ul style="list-style-type: none"> • “Figure 8. Analytics Configuration tab for VE141” on page 15 • “To configure the Analytics Configuration tab for the VE141:” on page 15
January 31, 2012	This is a new manual. Administration content is now in a separate guide. Release 6.9 Minor updates to: <ul style="list-style-type: none"> • “Table 10. Environment subtab options for Dual-Layer Dynamic background model” on page 45 • “Table 12. Environment subtab options for Multi-Layer Hybrid background model” on page 46 • “Table 13. Advanced subtab Options” on page 50 • New Environment Type Indoor: Retail, see “ Overview subtab” on page 36

Table 1. Changes to this manual (Continued)

Date	Description
November 28, 2011	<p>Release 6.8</p> <p>Revised:</p> <ul style="list-style-type: none"> • Table 7, "Environment subtab options for all background models," on page 42 for Large Change Detection in "VE180 - Indoor/Outdoor People Tracking" on page 34 • Information flow in "PT091 and PT090- Automatic PTZ Tracking" on page 65 <p>Removed:</p> <p>All references to Analytics Scheduler - change made in 6.7. Figures updated.</p> <p>Added:</p> <ul style="list-style-type: none"> • "When Using a Calibrated PTZ Camera" on page 69 for "PT091 and PT090- Automatic PTZ Tracking" on page 65
Sym 6.7-P-203	
October 2011	<p>Removed:</p> <p>Crowd Detection, Show Stats, and Max Mask Fill options in VE150 Advanced tab. See "VE150 - Advanced Motion Tracking" on page 17.</p>
September 26, 2011	<p>Removed:</p> <p>Instructions for "VE410 - License Plate Recognition" on page 77. All content now in <i>Aimetis Symphony Automatic License Plate Recognition Guide: Field Planning and Installation, Software Installation, Analytics Configuration</i>. See https://www.aimetis.com/xnet/Support/documentation.aspx</p>
September 6, 2011	<p>Release 6.7.1</p> <p>Added:</p> <ul style="list-style-type: none"> • "Using trackerapp to Adjust Settings" on page 55 for VE 180
August 2011	<p>Release 6.7</p> <p>Added:</p> <ul style="list-style-type: none"> • "VE180 - Indoor/Outdoor People Tracking" on page 34 <ul style="list-style-type: none"> • "Assisted Mode Versus Expert Mode" on page 39 • "Direction Line Subtab" on page 49 <p>Revised:</p> <ul style="list-style-type: none"> • "VE180 - Indoor/Outdoor People Tracking" on page 34 <ul style="list-style-type: none"> • "Environment subtab" on page 41 • "Advanced Subtab" on page 50
Sym-6.6-P-200.5	
July 8, 2011	<p>Corrigendum</p> <p>Removed:</p> <p>"Symphony runs its own internal SMTP server, so you do not need to configure Symphony with another external mail server" from Email definition in Table 18, "Rules Wizard Action Section tabs," on page 82.</p> <p>In progress:</p> <ul style="list-style-type: none"> • Revisions to Table 16, "PT090 Analytics Configuration Settings," on page 65. • Clarification of interface terms in "Overview subtab" on page 36 section for "VE180 - Indoor/Outdoor People Tracking" on page 34.

Table 1. Changes to this manual (Continued)

Date	Description
June 14, 2011	<p>Removed: May 18, 2011 content in “VE410 - License Plate Recognition” on page 77. Now in new manual, Aimetis Automatic License Plate Recognition (ALPR) Field Installation & Planning Guide.</p> <p>Added: • Suggestions for using VE180 Analytic- Table 4, "Ideal Camera Setup," on page 34.</p> <p>Revised: Icon change for Notes and Examples. “Conventions” on page iii. Font change - highly readable for both online and print documents.</p>
May 26, 2011	<p>Added: More information in “Actions” on page 81 to Table 18, "Rules Wizard Action Section tabs," on page 82 for Run Program tab.</p>
May 18, 2011	<p>In “VE410 - License Plate Recognition” on page 77</p> <p>Updated: Table 10 “Poor image quality issues,” on page 158</p> <p>Added: Examples of Good Images” on page 159</p> <p>Now in new manual Aimetis Automatic License Plate Recognition (ALPR) Field Installation & Planning Guide.</p>
May 16, 2011	<p>Release 6.6 “VE410 - License Plate Recognition” on page 77</p> <p>Revised: “ Operation Mode: Overhead People Counting” on page 31</p>
Sym-6.5-P-200.7	
February 16 and 28, 2011	<p>Added: Show XML View - Table 1, "Buttons beside Analytic Engines selection," on page 4. “VE180 - Indoor/Outdoor People Tracking” on page 34- Beta specified for clarity.</p>
November 29, 2010	<p>Added: Note to “Hardware Acceleration” on page 30 regarding minor differences between Static and Static OpenCL, and Dynamic and Dynamic OpenCL.</p>
November 26, 2010	<p>Added: “Hardware Acceleration” on page 30</p>
October 6, 2010	First version of this content in Administration and Analytics Guide. Symphony v6.5.3

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Video Analytics and Rules

About Video Analytics

With Aimetis video analytics, you can:

- detect specific events and activities automatically from your cameras without human intervention
- filter video and be notified only when events have been detected, such as vehicles stopping in an alarm zone, or a person passing through a digital fence

Today's robust video analytics produce far fewer false alarms than the previous motion detection methods employed in earlier DVRs or cameras. Aimetis offers video analytics add-ons on a per camera basis in the form of **Video Engines (VE)**.

Read content in the following order:
"Video Analytics Available in Symphony" on page 2
"Process Overview of Using Video Analytics" on page 3
"Video Analytic Instructions and Creating Rules" on page 10

Video Analytics Available in Symphony

Engine	License Required	Description
VE130 Simple Motion Detection	Standard	Detects simple motion. Used indoors. Does not classify objects. Does not provide object segmentation capability (which is required for object counting).
VE140 Video Input Error	Standard	Detects video signal loss.
VE141 Camera Tampering	Standard	Detects if camera's field of view is compromised (such as spray painting the lens).
VE150 Advanced Motion Tracking	Enterprise	Filters complex motion. Recommended for indoor and outdoor environments. Different modes of operation (for example, outdoor tracking, indoor people counting) are available depending on the environment and application.
VE180 Indoor/Outdoor People Tracking	Enterprise	Filters complex motion.
VE250 Motion Tracking	Enterprise	Plug and play motion tracking video engine.
VE352 Left & Removed Item Detection	Enterprise	Detects objects left behind or removed. Can be used indoors/outdoors.
PTO90 and PTO91 Auto PTZ Tracking	Enterprise	Auto PTZ tracking.
VE410 License Plate Recognition	Enterprise	License Plate Recognition



Important: Analytics running on PTZ cameras in the case where the camera tour is configured but disabled may not function correctly, as the analytic settings will revert to defaults.

Process Overview of Using Video Analytics

To detect special events and activities automatically, you must:

1. "Assign analytic(s) to the camera"
2. "Configure the analytics" on page 4
3. "Create a Rule and configure the video engine detection capabilities" on page 8

Task 1: Assign analytic(s) to the camera

In the **Server Configuration** dialog box (**Devices**), you select an analytic engine in the **Analytics Engines** tab.

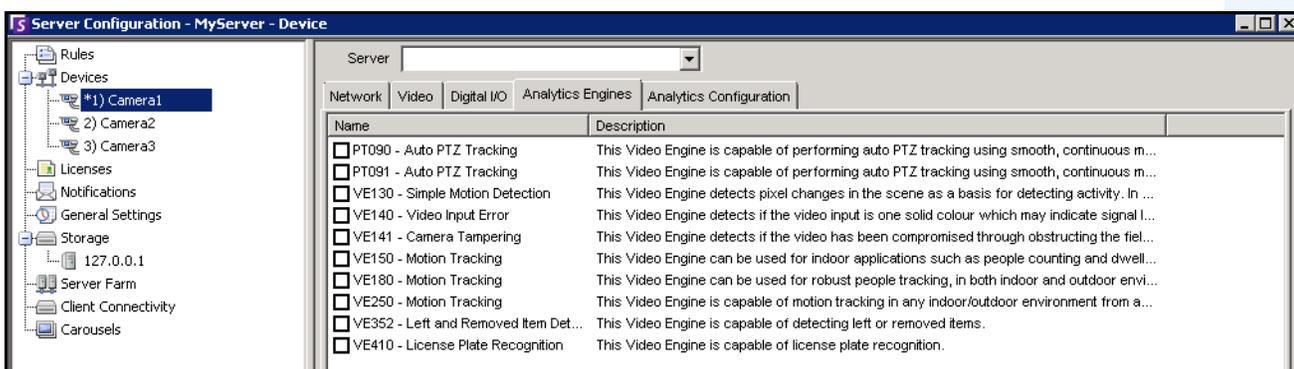


Figure 1. Analytics Engines tab



Important: Some Video Engines (VE) can be run concurrently per camera with others (such as VE150 Motion Tracking and VE352 Left Item Detection) but others cannot be run concurrently (such as VE130 Simple Motion Detection with VE150 Advanced Motion Tracking).

If the desired video engine is not selectable, clear the check box associated with the current engine in order to select any other.

Task 2: Configure the analytics

After cameras have been added and analytic engines have been enabled for cameras, the analytics themselves need to be configured. You configure analytics on the **Analytics Configuration** tab.

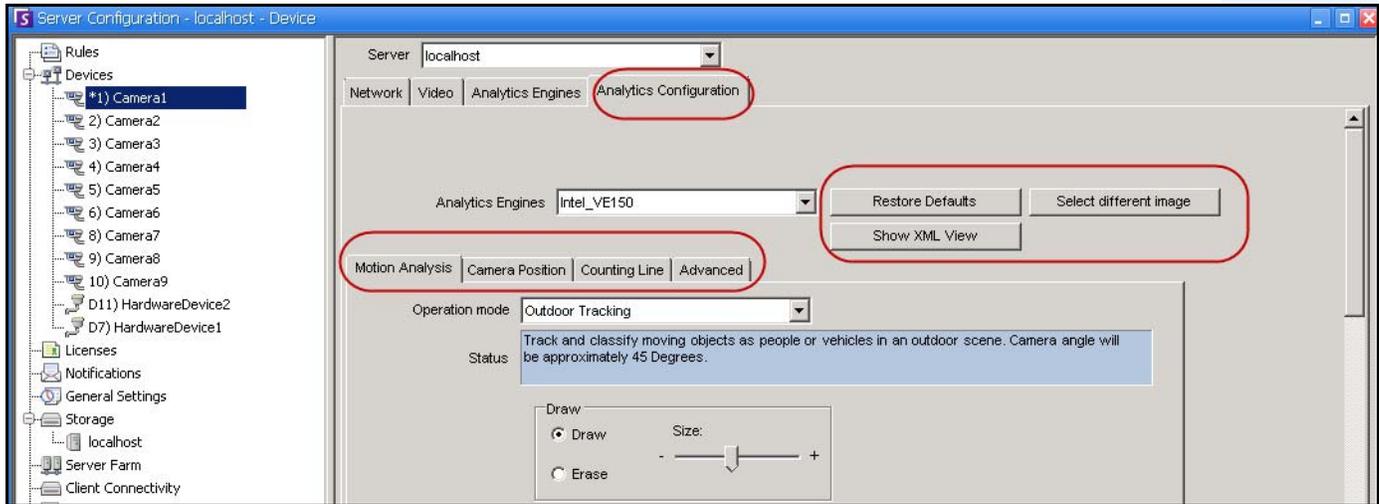
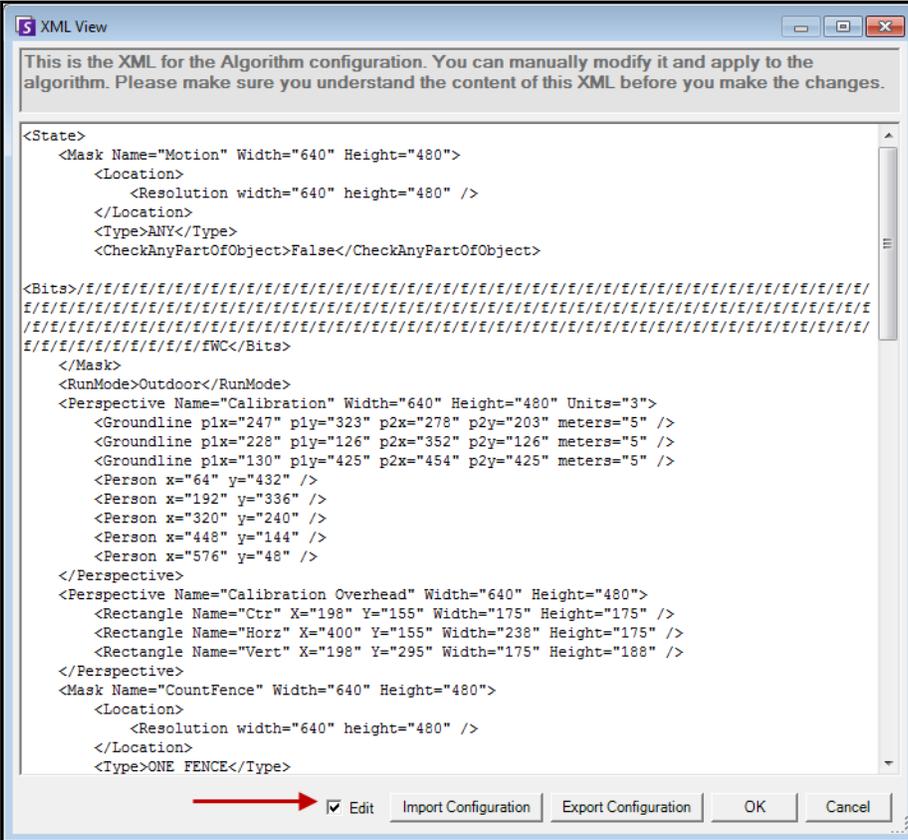


Figure 2. Analytics Configuration tab

Table 1. Buttons beside Analytic Engines selection

Button	Description
Restore Defaults	Allows you to restore your analytic settings to system defaults.
Choose Image	Allows you to select an image from the video clip to define where activity will be detected or alarms will occur in a scene.

Table 1. Buttons beside Analytic Engines selection (Continued)

Button	Description
<p>Show XML View</p>	<p>Allows you to modify settings in XML. Import Configuration allows you to load an analytic engine state XML from disk and manually modify the XML. Once you click OK, the XML is applied to the engine. Export Configuration allows you to save the current analytic engine state XML to disk. This XML option allows you to easily share configuration and, if necessary, submit the XML to Aimetis Support if you have trouble with the configuration.</p> 
<p>How to configure analytics</p>	<p>Opens the online help.</p>



Common Settings

Each video analytic may have slightly different configuration options; however, there are many commonalities:

- " [Masks: The Areas Where Symphony Tracks Objects](#)"
- "Analysis FPS"
- "Perspective" on page 7

Masks: The Areas Where Symphony Tracks Objects

Masks defines where Symphony can track objects. By default, the entire scene is covered in the yellow mask, meaning everything in the field of view of the camera will be analyzed. Symphony has been designed to work well in dynamic outdoor environments. Rain or snow would not normally result in Symphony falsely tracking objects. However, in some cases, you may want to remove certain portions of the screen from analysis (such as a neighbor's property, or a swaying tree which is causing false alarms).

Motion Mask versus Alarm Mask

Motion Mask:

- Defines the area (in yellow) of the image *where activity is detected*

Alarm Mask (set up in the Rule Wizard):

- Defines the area (in red) of the image *where alarms will occur*
- Cannot be greater than the **Motion Mask**
- Is bound by the **Motion Mask**

Analysis FPS

Analysis FPS allows you to modify the frames per second (FPS) that the analytic should analyze. Normally this field should be left at the default value.



Note: It is possible to *record at a higher frame rate* than what is analyzed by the analytic engine, to reduce CPU use.

Perspective

For certain video analytics, perspective information must be entered for proper functionality. For example, for **Outdoor Tracking**, perspective is established by using 3 lines at different distances in an image. For a general idea, see [Figure 3](#). Note how the size of people are adjusted for distance (foreground versus background).

The two red horizontal lines and the one vertical blue line in the image should closely represent distance at those positions in the image. The units (meters, feet) are irrelevant. The key is that in the distance, say 5 feet, is represented by a short line, while 5 feet in the foreground of the image is represented by a longer line, because of perspective. People and cars closer to our eyes appear bigger than people and cars in the distance. The figures standing on the red lines should closely match the size of a person at those positions.

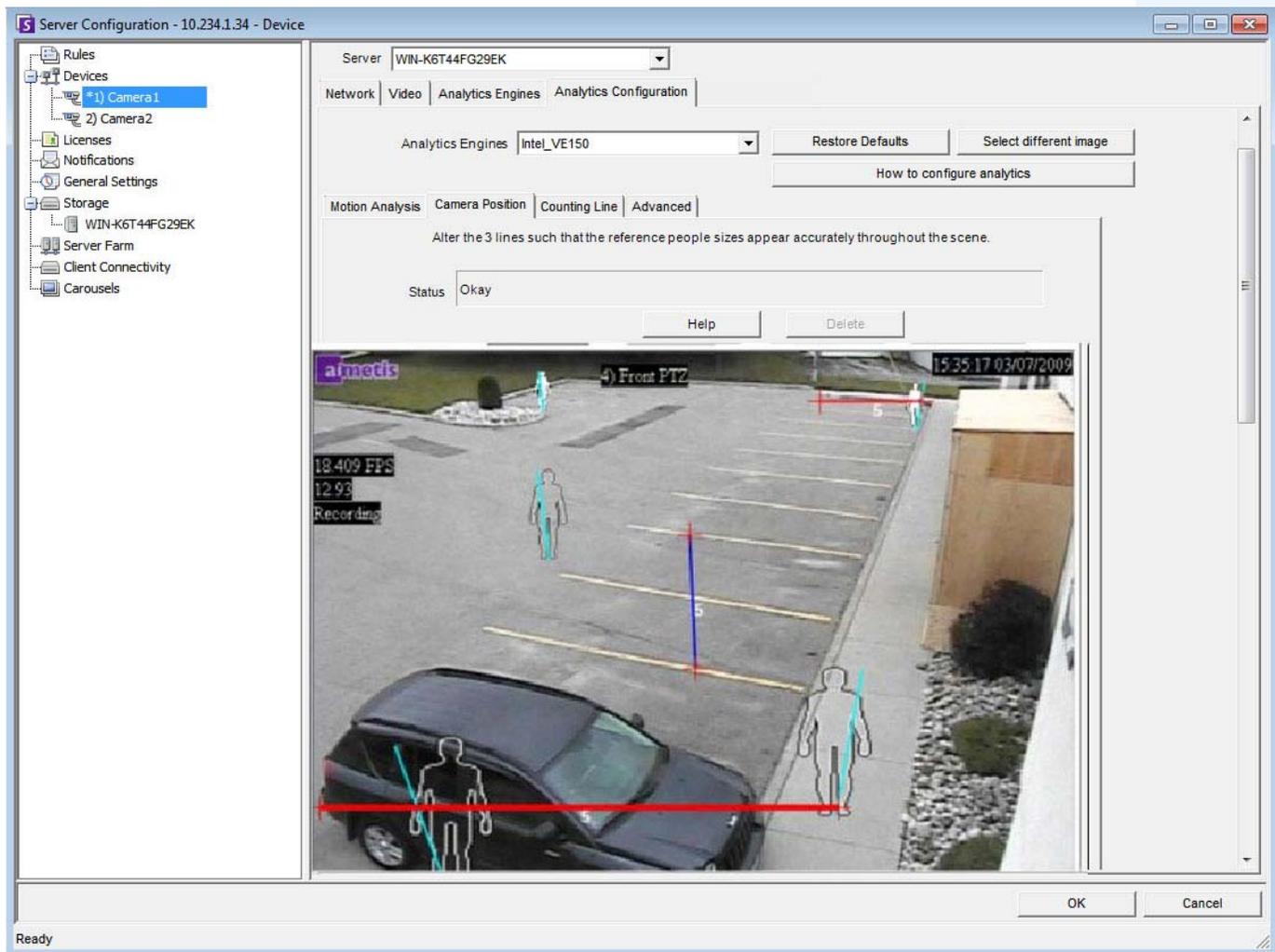


Figure 3. Lines representing perspective in the image

Task 3: Create a Rule and configure the video engine detection capabilities

As a final step, to receive real-time alarms for specific events, rules must be configured. Using the **Rule Wizard**, you configure the alarm capability of the analytic.

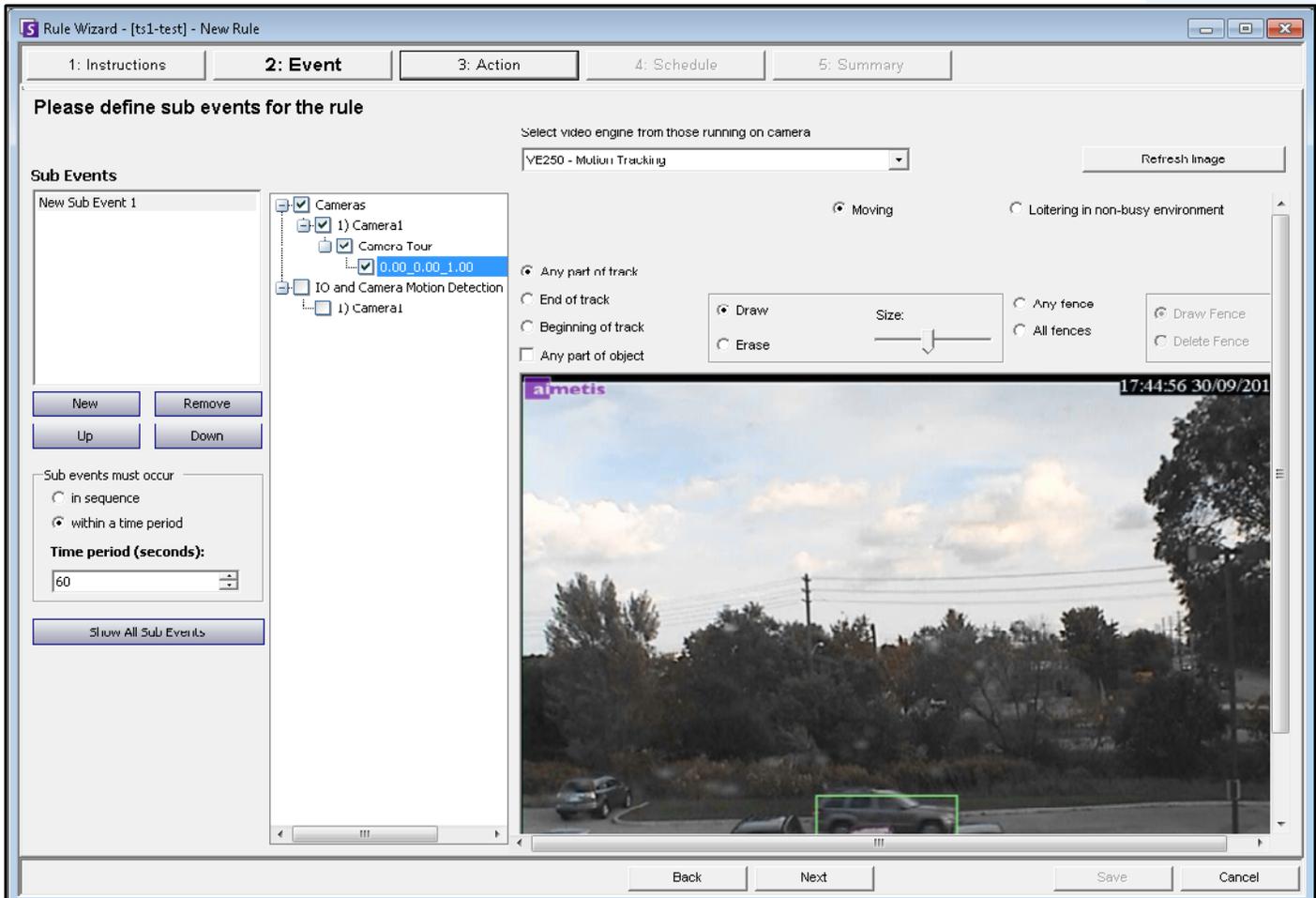


Figure 4. Rule Wizard

Tracking Color

A Symphony video analytic engine may be running on your system. Tracking lines may appear as the camera follows an object through an area. These tracking lines vary in color according to object tracked and video engine used.

VE130	Motion	green
VE150	Person	blue
	Vehicle	yellow
	Unknown	green
VE180	Person	blue
VE250	Unknown	green



Figure 5. Same parking lot: blue tracking line for person, and yellow tracking line for vehicle

Video Analytic Instructions and Creating Rules

Links to Instructions
"VE130 - Video Motion Detection" on page 11
"VE140 - Video Input Error" on page 14
"VE141 - Camera Tampering" on page 15
"VE150 - Advanced Motion Tracking" on page 17
"VE180 - Indoor/Outdoor People Tracking" on page 34
"VE250 - Motion Tracking" on page 57
"VE352 - Left and Removed Item Detection" on page 59
"PT091 and PT090- Automatic PTZ Tracking" on page 65
"VE410 - License Plate Recognition" on page 77
"Rules - Using the Rule Wizard" on page 78

VE130 - Video Motion Detection

The VE130 is a good choice in indoor environments where only motion is to be detected and the type of object or object count is not required. The VE130 is a good alternative over camera based motion detection due to its simplified configuration and higher accuracy. Camera position is not heavily constrained, making VE130 a good general purpose video engine in many applications. If you require object counting or dwell time, use the VE150. For outdoor environments, also use VE150 as shadows or lighting changes will cause VE130 to function inaccurately.

Task 1: Configure VE130

Procedure

To configure the VE130:

1. In Symphony Client, from the **Server** menu, select **Configuration**. The **Configuration** dialog box opens. This allows you to configure devices for the currently selected server.
2. In the left pane, click **Devices**. The **Devices** dialog box opens.
3. Click the camera you want to configure for use with video analytics and click **Edit**.
4. Click the **Analytics Engines** tab and select **VE130**. By default **VE250** is selected, in which case you must first deselect VE250.
5. Click the **Analytics Configuration** tab (Figure 6).

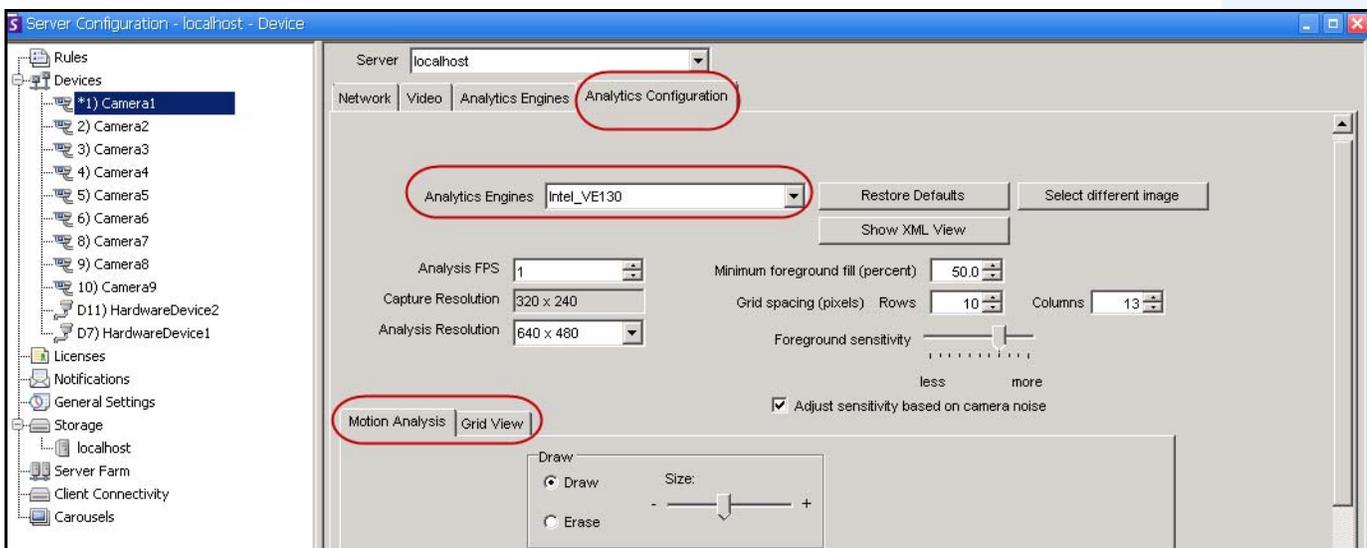


Figure 6. VE130 - Analytics Configuration tab (Grid View subtab)

Analytics Configuration tab

1. From the **Analytics Engines** drop-down list, select **Intel_VE130**.
2. Click the **Motion Analysis** subtab. A current image from the video is displayed.
3. You will define an area in the image for motion detection. If the image is not adequate, click **Select different image**. The **Select Image** dialog box opens. Select an image from the **Timeline**.

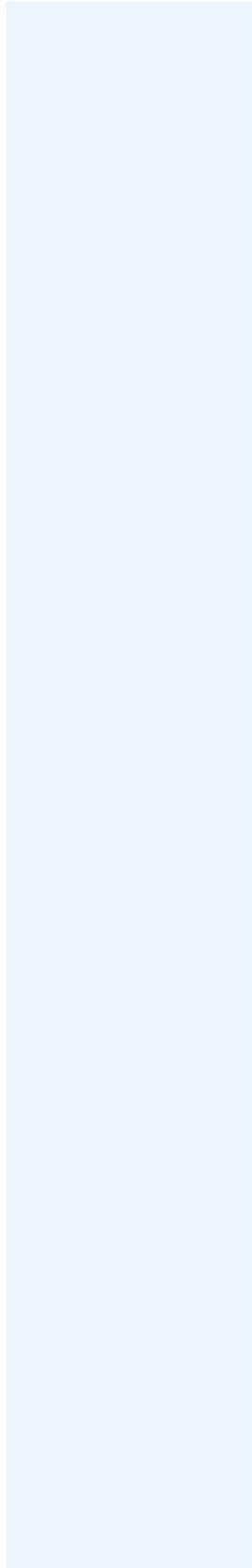
4. Using the displayed image from the video, define the area in yellow (a mask) where objects in motion should be detected. (Not sure of the concept? See ["Masks: The Areas Where Symphony Tracks Objects"](#) on page 6.)
 - Select the **Erase** option to erase the yellow mask.
 - Select the **Draw** option to draw the yellow mask.
 - The **Size** slider adjusts the pen thickness.
5. (Optional) You can adjust the following specifications:

Analysis FPS	Frame rate at which the video engine analyzes frames. Can be set lower than the record frame rate.
Capture Resolution	Displays the resolution at which the video is being recorded. This can be changed in the Device setup.
Analysis Resolution	Resolution which is used to analyze frames. Normally this is lower than Capture Resolution to conserve CPU.

6. Click the **Grid View** tab and adjust the following specifications as necessary.

Minimum foreground fill (percent)	The scene is divided into a grid. This value specifies how much each grid square must change (in %) before activity is detected in this square.
Grid spacing (pixels)	Defines grid spacing as Rows and Columns .
Foreground sensitivity	Defines how sensitive the video engine should be to scene change. The more sensitive it is to change, the more likely the minimum foreground fill will detect activity in the grid space.
Adjust sensitivity based on camera noise	

7. Click **OK** to save settings.



Task 2: Create a Rule using VE130

Procedure

To configure a Rule using the VE130:

1. From the **Server** menu, select **Configuration** and then **Rules**.
2. Click **New**. The **Rule Wizard** opens. Read the overview and click **Next**.
3. Select the check box next to the camera name. If it is a PTZ camera, select the camera tour position check box.
4. From the **Select video engine for those running on camera** drop-down list, select **VE130 - Simple Motion Detection**.
5. Using the displayed image from the video, define the area in red (a mask) where alarms should be set. (Not sure of the concept? See ["Motion Mask versus Alarm Mask" on page 6.](#))
 - Select the **Erase** option to erase the red mask.
 - Select the **Draw** option to draw the red mask.
 - The **Size** slider adjusts the pen thickness.
6. (Optional) **Sub Events** - see Rules content
7. Click **Next** to continue in the **Rule Wizard**. Set up the rules as per concepts and instructions in ["Rules - Using the Rule Wizard" on page 78.](#)



Important: Although the VE130 engine requires less CPU than other video engines, the video still needs to be decompressed in the server for analysis. As a result, the CPU savings are limited.

Troubleshooting

If too many false alarms are caused by shadows, rain, or other environmental conditions, use the VE150.

VE140 - Video Input Error

The VE140 analytic is designed to detect video signal loss. It is a good idea to run the VE140 on all cameras. This analytic is environment independent.

Task 1: Configure VE140

Procedure

To configure the VE140:

1. In Symphony Client, from the **Server** menu, select **Configuration**. The **Configuration** dialog box opens. This allows you to configure devices for the currently selected server.
2. In the left pane, click **Devices**. The **Devices** dialog box opens.
3. Click the camera you want to configure for use with video analytics and click **Edit**.
4. Click the **Analytics Engines** tab and select **VE140**. (Optional) By default **VE250** is selected, in which case you must first deselect VE250.
5. Click **OK** to save settings. No configuration is required for the VE140 from the **Analytics Configuration** tab ([Figure 7](#)).

The VE140 requires minimal CPU.

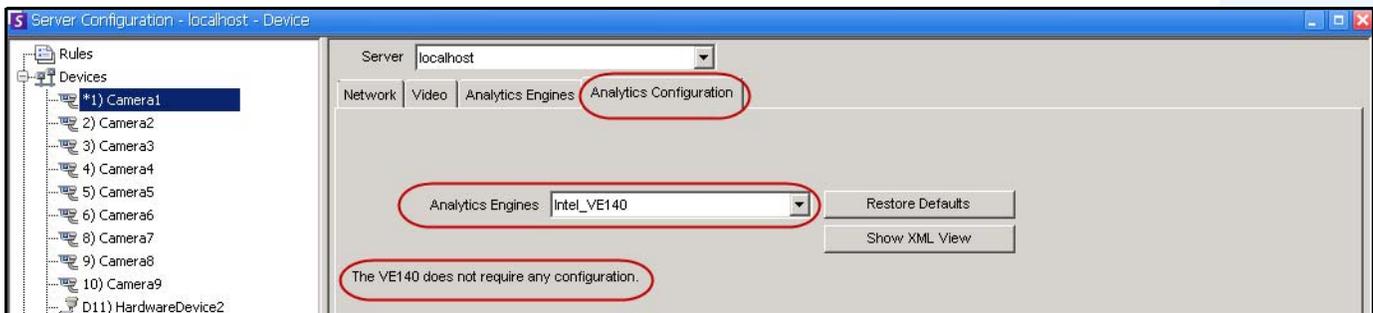


Figure 7. Analytics Configuration tab for VE140

Task 2: Create a Rule using VE140

Procedure

To configure a Rule using the VE140:

1. You must configure the VE140 before creating a Rule that uses the VE140.
2. From the **Server** menu, select **Configuration** and then **Rules**
3. Click **New**. The **Rule Wizard** opens. Read the overview and click **Next**.
4. Select the check box next to the camera name. If it is a PTZ camera, select the camera tour position check box.
5. From the **Select video engine for those running on camera** drop-down list, select **VE140 - Video Input Error**. No further configuration is required.
6. Click **Next** to continue in the **Rule Wizard**. Set up the rules as per concepts and instructions in "[Rules - Using the Rule Wizard](#)" on page 78.

VE141 - Camera Tampering

The VE141 Camera Tampering Engine is designed to detect when the field of view is obstructed. This can occur if the camera has been moved, if the lens is spray painted, or if a large object is placed in front of the camera. This is a general purpose analytic and should normally run on each camera.

Task 1: Configure VE141

Procedure

To configure the VE141:

1. In Symphony Client, from the **Server** menu, select **Configuration**. The **Configuration** dialog box opens. This allows you to configure devices for the currently selected server.
2. In the left pane, click **Devices**. The **Devices** dialog box opens.
3. Click the camera you want to configure for use with video analytics and click **Edit**.
4. Click the **Analytics Engines** tab and select **VE141**. (Optional) By default **VE250** is selected, in which case you must first deselect VE250.
5. Click the **Analytics Configuration** tab (Figure 8).

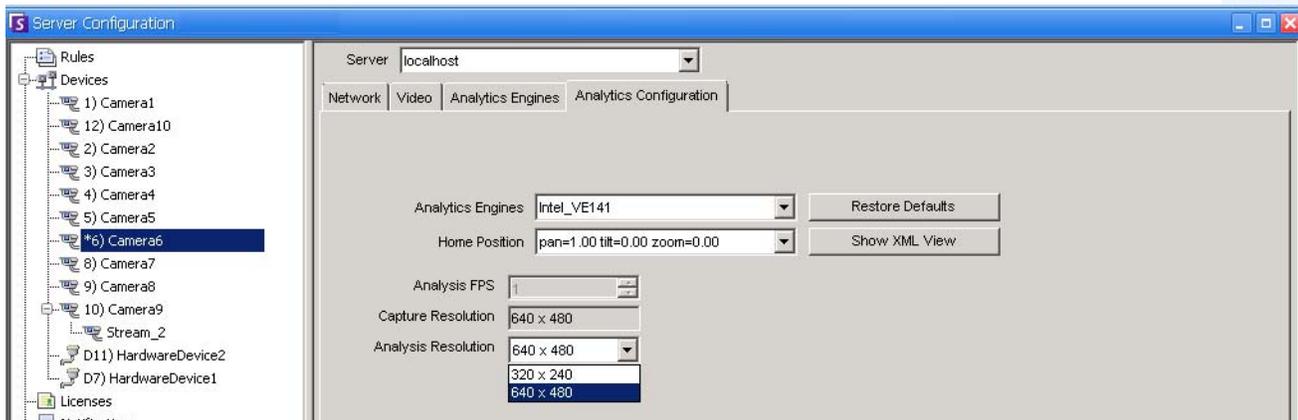


Figure 8. Analytics Configuration tab for VE141

To configure the Analytics Configuration tab for the VE141:

1. From the **Analytics Engines** drop-down list, select **Intel_VE141**.
2. Depending on the type of camera, you can define the pan, tilt, and zoom for a PTZ camera.
3. From the **Analysis Resolution** drop-down list, select a resolution.
4. Click **OK** to save settings.

Task 2: Create a Rule using VE141

Procedure

To configure a Rule using the VE141:

1. You must configure the VE141 before creating a Rule that uses the VE141.
2. From the **Server** menu, select **Configuration** and then **Rules**
3. Click **New**. The **Rule Wizard** opens. Read the overview and click **Next**.
4. Select the check box next to the camera name. If it is a PTZ camera, select the camera tour position check box.
5. From the **Select video engine for those running on camera** drop-down list, select **VE141 - Camera Tampering**. No further configuration is required.
6. Click **Next** to continue in the **Rule Wizard**. Set up the rules as per concepts and instructions in ["Rules - Using the Rule Wizard" on page 78](#).

VE150 - Advanced Motion Tracking

The VE150 is a good choice for indoor and outdoor motion tracking applications. The engine can classify the difference between people and vehicles, and can detect if the object is stopping, starting, or simply moving through the scene. Alarm rules can therefore be designed around these features.

Typical deployments include:

- commercial buildings, where people or vehicles are to be detected,
- military bases, where objects entering an alarm zone or crossing a pre-defined perimeter should be detected, or
- for car dealers and construction sites, where full time security guards are not a cost effective approach to detecting people or vehicles after hours.

The VE150 will produce far fewer false alarms caused by a changing outdoor environment as compared to normal motion detection algorithms. Different VE150 modes of operation are available, which can be used for indoor people counting and dwell time applications.

Task 1: Configure VE150

Procedure

To configure the VE150:

1. In Symphony Client, from the **Server** menu, select **Configuration**. The **Configuration** dialog box opens. This allows you to configure devices for the currently selected server.
2. In the left pane, click **Devices**. The **Devices** dialog box opens.
3. Click the camera you want to configure for use with video analytics and click **Edit**.
4. Click the **Analytics Engines** tab and select **VE150**. By default **VE250** is selected, in which case you must first deselect VE250.
5. Click the **Analytics Configuration** tab ([Figure on page 18](#)).

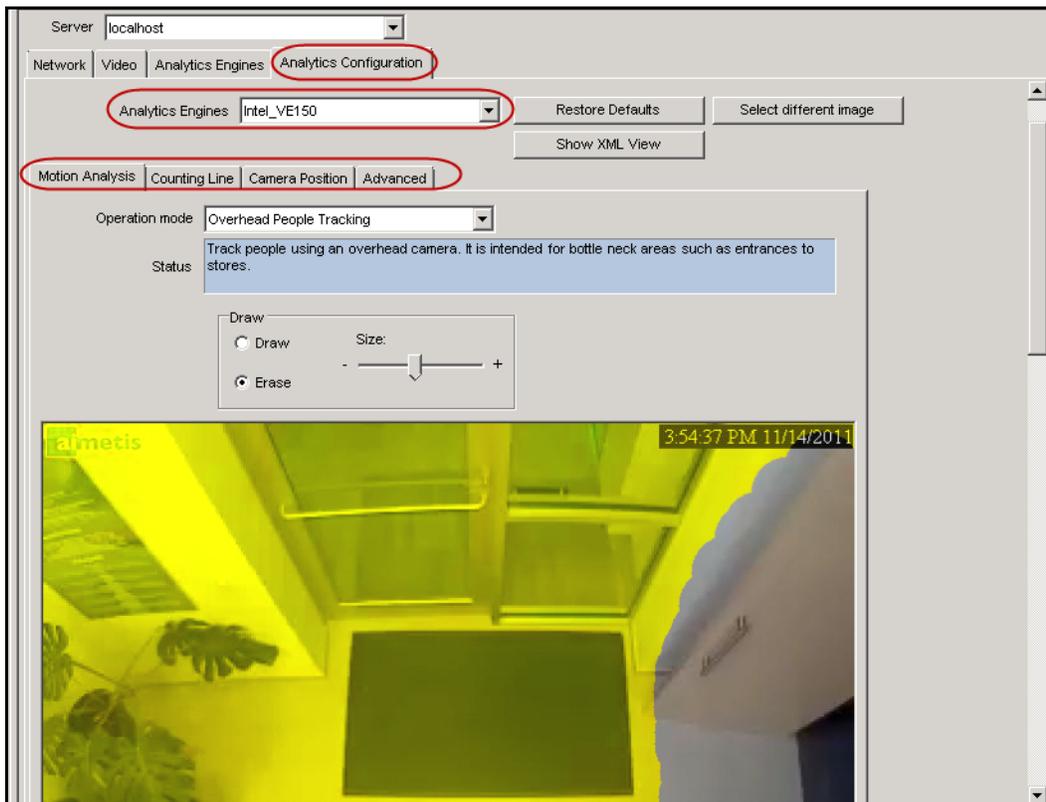


Figure 9. Analytics Configuration tab for VE150

Analytics Configuration tab

1. From the **Analytics Engines** drop-down list, select **Intel_VE150**.
2. Click the **Motion Analysis** subtab. A current image from the video is displayed.

Motion Analysis subtab

1. From the **Operation Mode** drop-down list, select a mode. The **Status** field displays a description of the operation mode selected.
 - Outdoor Tracking
 - Non-Overhead People Tracking
 - Overhead People Tracking
 - Overhead People Counting
 - Wrong Direction Detection
 - Simple Blob Tracker
2. You will define an area in the image for motion detection. If the image is not adequate, click **Select different image**. The **Select Image** dialog box opens. Select an image from the Timeline.
3. Using the displayed image from the video, define the area in yellow (a mask) where objects in motion should be detected. (Not sure of the concept? See "[Masks: The Areas Where Symphony Tracks Objects](#)" on page 6.)
 - Select the **Erase** option to erase the yellow mask.
 - Select the **Draw** option to draw the yellow mask.
 - The **Size** slider adjusts the pen thickness.

Camera Position subtab

1. Click the **Camera Position** subtab. Depending on which **Operating Mode** you selected in the **Motion Analysis** subtab, the **Camera Position** options will vary.

Operation Modes: **Outdoor Tracking, Non-Overhead People Tracking, and Wrong Direction Detection**

Specify the *camera's position relative to objects in the captured image*:

Alter the three lines such that the reference people sizes appear accurately throughout the scene. (To review the concept, see "[Perspective](#)" on page 7.)

- Resize lines by dragging the line end points.
- Move the line by dragging it at the center.
- Lines represent distance along the ground.
- Length value given only to understand how each line relates to the other lines (foreground versus an expanse in the distance). Therefore units of measurement are irrelevant.
- To move a reference person, **left-click** at feet location of person icon and drag.
- To add a reference person, **right-click** at the desired location in the image.
- To delete a reference person, **left-click** on person icon and press **Delete**.



Figure 10. Outdoor Tracking operation mode

Operation Mode: Overhead People Tracking

Specify the *camera's position relative to objects in the captured image*:

- You can configure all objects highlighted in cyan.
- Move the middle cyan point of the center box to a location directly below the camera.
- Using the corner points, adjust the center box to the size of an average person.
- Adjust the outer boxes' cyan lines such that the boxes represent the size of an average person.
- If the camera is placed very high and pointed directly down at the floor, make all three boxes the same size.

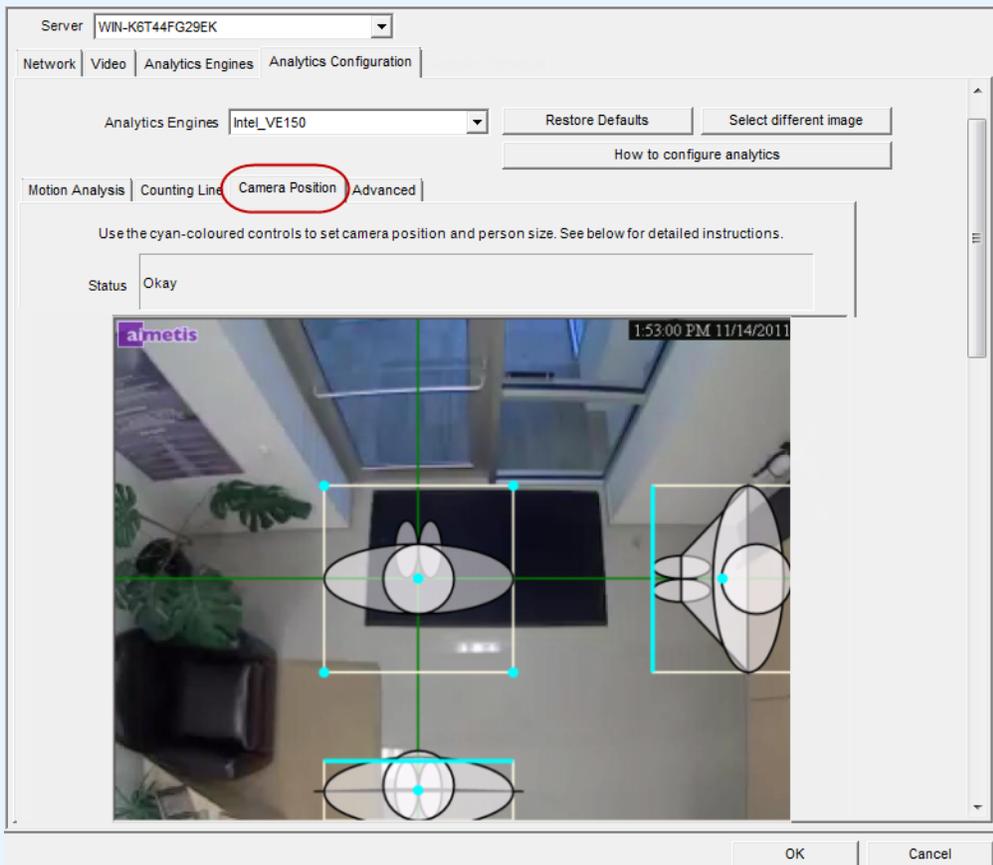


Figure 11. Overhead People Tracking operation mode

Operation Mode: Overhead People Counting

Specify the *camera's position relative to objects in the captured image*:

- You can configure all objects highlighted in cyan.
- Move the middle cyan point of the center box to a location directly below the camera.
- Using the corner points, adjust the center box to the size of an average person.

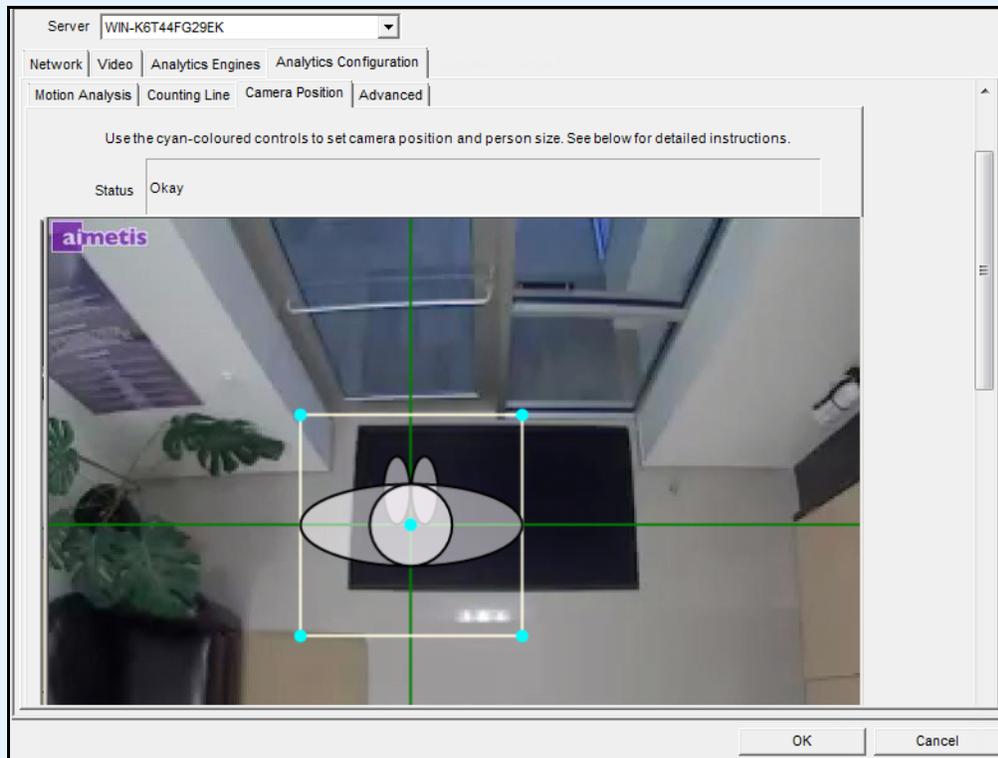


Figure 12. Overhead People Counting operation mode

2. Click **Apply** to save settings.

Counting Line subtab (display based on Operation Mode)

1. Ensure the **Camera Position** and **Motion Analysis** mask is set properly and then click the **Counting Line** subtab.
2. By default, the **Draw Counting Line** option is selected.
3. Left-click on the image and draw a line that will cause items (people or cars) to be counted as they pass the delineated area.
 - The line appears with arrows indicating when movement is detected as **In** to a delineated area and **Out** of the delineated area.
4. Click **OK** to save settings or click the **Advanced** subtab for further settings.

Advanced subtab



Important: The **Advanced** subtab settings are for experts only. Values should be changed only in cases where the analytic engine is not functioning as expected.

1. Enter a frame per second value in the **Analysis FPS** field.
 - This value indicates how many frames will be analyzed by the system. Typically the default value should not be altered. However, there may be cases where the analysis frame rate can be reduced to conserve CPU. Doing this may negatively alter the algorithms performance.
 - Like the **Analysis Resolution**, the **Analysis FPS** can be set to a different value than the **Record FPS**.
2. Set the **Analysis Resolution** as required.
 - Setting the **Analysis Resolution** the same as the **Capture Resolution** ensures that objects will be detected as far away as possible. However, in order to conserve CPU resources it is possible to down sample the video sent for analysis. Downsampling will reduce CPU requirements but may also reduce the detection range of the video analytic.
3. From the **Background Model** drop-down list, select the model that best represents the environment the camera is recording (for example, a high movement area). For a complete description of usage, see [Table 2 on page 23](#).



Important: Adjusting the **Background Model** is usually the best way to reduce false alarms. (It requires more CPU.)

Table 2. Background Model Usage

Background Model	When to use
Static	Use where the background is relatively static (no periodic movement in the background such as swaying trees). This is the fastest Symphony background model.
Dynamic	Use where there are periodic moving objects (like a tree branch moving back and forth in a fairly constant wind, or caused by unstable camera mounting). This background model can handle both static and dynamic backgrounds, but it uses more CPU power than the Static model and thus is not recommended for static backgrounds. Important: An environment might appear static during the day, but rain fall at night will create a dynamic environment. Therefore, you should select the Dynamic setting.
Dual Layer Dynamic	Similar to the Dynamic background model but is capable of tracking objects that are stationary for short periods of time. Use in outdoor areas where you want to track, for example, people standing still for 30 to 60 seconds.
Spatio- Temporal	Tracks only consistent motion, so it is capable of greatly reducing the false alarms due to tree branches and other objects in the background that can move randomly due to the wind. This will use more CPU and will reduce the detection range of the video analytics.

4. Various options and default settings are displayed based on the **Operation Mode** and **Background Model** selected. Before selecting options, learn about their usage from the information in [Table 3 on page 24](#).

Table 3. Advanced Options available based on Background Model selected

Option	Description	Default Setting
Learn normal behaviour	Learns the percentage of time each pixel is in motion and can subsequently ignore. Useful, for example, when tracking boats on water.	False
Options		
Appearance	Manual, Bright shiny, Grey matted	Manual
Lower bound	If Manual selected	0.70
Upper bound	If Manual selected	1.50
Mode	Coherent Motion, Abnormal Behaviour, Wrong Direction	Coherent Motion
Appearance Marginalization	Only detects motion patterns and is not influenced by the appearances.	True
Threshold	Detection threshold for Spatio-Temporal pattern.	0.03
Bg Frames	If Abnormal Behaviour selected	255
Fg. Frames	If Abnormal Behaviour selected	10
Direction	If Wrong Direction selected. Read-only.	242
Foreground contrast	Sets the minimum contrast needed for an object to be detected as a foreground object. Important: If set to a large value, then objects with similar colour as background will not be detected as valid objects to track.	Low
Reset background condition	If this percentage of the frame changes, the background is reset.	100
Foreground contrast for determining camera obstructed	Sets the minimum contrast needed between background and foreground before the change is considered for a camera-obstructed scenario.	Low
Background learning duration (seconds)	Determines the approximate length of time it will take a foreground object that becomes stationary to merge into the background. Important: If an object has a periodic movement with a period greater than the specified time, then that object will always be considered a foreground object (never merged into the background). The background is determined based on the last Update Background Seconds of video. The background is updated all the time, not only when the analytics engine starts.	15
Wait after large background change and before starting to track objects (seconds)	Allows you to set how long to wait after background reset and before starting to track objects. Ideally it should be zero, but if you are aware of a lighting issue where starting to track immediately can cause false alarms, then set this to the number of seconds needed for the light to stabilize.	0

Table 3. Advanced Options available based on Background Model selected (Continued)

Option	Description	Default Setting
High contrast threshold	The threshold used to determine how far apart an observation can be from the learnt background model before it is detected as foreground. A low value (for example, 5) will make the background model more sensitive to small changes in the pixel intensities. Note: The value can mean different things for different background models.	25
Remove ghost pixels	Any pixels that do not change in value for some time are not considered as foreground.	True
Track Slow Moving Objects / Object Speed	Tracks an object moving very slowly across the video. It can also be an object coming directly toward or directly away from the camera, which will appear to be moving slowly. If Track Slow Moving Objects is disabled these objects tend to become part of the background and as such will not be tracked. By enabling this option these objects will be tracked. Important: This option might increase some false alarms for situations where an object stands still in the video for a long time.	False
Shadow Sensitivity	Controls how aggressively shadows (decreases in lighting) are ignored when tracking moving objects. Increasing the slider (to the right) will allow the engine to correctly ignore more of the shadow areas. Note: This will also increase the potential of a person wearing dark clothing on light background to be classified as a shadow.	Middle (disabled)
Illumination Sensitivity	Controls how aggressively increases in lighting are ignored. Increases in lighting occur due to a light source such as car headlight or when an overcast day becomes a sunny day. Increasing the slider (to the right) will allow the engine to correctly ignore any increases in illumination. Note: This will also increase the potential of a person wearing light clothing on a dark background to be classified as an illumination increase.	Middle (disabled)
Cloud Check	Tries to ignore cloud motion.	False
Check for sudden background movement	Tries to remove false tracks due to sudden movement of objects in the background due to wind. It will also eliminate false tracks due to sudden movements of the camera.	False
Maximum distance in pixels	If Check for sudden background movement selected. A sudden movement is defined as a movement of an object or camera up to this many pixels.	5 (disabled)

Table 3. Advanced Options available based on Background Model selected (Continued)

Option	Description	Default Setting
Time to clear long-term background (seconds)	Only available for Codebook (Dual-Dynamic) background model.	False (disabled)
Time to clear short-term background (seconds)	Only available for Codebook (Dual-Dynamic) background model.	False (disabled)
Time to move short-term background to long-term (seconds)	Only available for Codebook (Dual-Dynamic) background model.	False (disabled)
Initial background model learn time (seconds)	Only available for Codebook (Dual-Dynamic) background model.	False (disabled)
Classification		
Automatic classification	Attempts to automatically classify objects such as cars, people or unknown. Includes colour coding as well.	True
Force all tracked objects to be classified as Vehicles		False
For all tracked objects to be classified as People		False
Force all tracked objects to be classified as Unknown		False
Find Objects		
Use contour-based segmentation	Better segmentation of moving objects using the contour.	True
People-only segmentation	If Use contour-based segmentation selected. Will try to keep nearby people as individually tracked objects. There is a potential that large vehicles might appear as multiple smaller objects.	False
Merge objects closer than (meters)	Any detected objects that are within the specified distance of each other will be merged into one object	2.5
Smallest object size (pixels)	Objects with width smaller than Smallest object size will be ignored by the engine.	2
Don't track objects larger than (% of screen)	If a detected object has a width or height greater than the specified percentage of image width or a height respectively, it is ignored.	90

Table 3. Advanced Options available based on Background Model selected (Continued)

Option	Description	Default Setting
Line People Counting		
Consider only contiguous segments	When performing line counting, looks for continuous segments. Does not try to accumulate all pixels for each direction.	False (disabled)
Min Object Width Ratio	The ratio of the object width considered as the minimum person width (0.33 by default). For example, if the object width is 9 pixels and less than 3 pixels are counted in one direction when crossing the line, it will be not counted as an object.	0.33 (disabled)
Max Object Width Ratio	The ratio of the object width considered as the maximum person width (1.88 by default). This is considered only when Multiple counting support in width is enabled. If more pixels are counted, a new person will be considered. For example, if the object width is 9 pixels and more than $9 \times 1.88 = 16.92$ pixels are counted in one direction when crossing the line, two people will be counted.	1.85 (disabled)
Multiple counting support in width (side-by-side)	Considers cases where there can be more than one person at the same time crossing the line side-by-side.	True (disabled)
Object Line Crossing Duration (seconds)	The time it takes for a person to cross the line.	1.00 (disabled)
Min Object Length Ratio	The ratio of time (with respect to object line crossing duration) that is required to detect an object. For example, assuming 10 FPS analysis rate, it is required that enough motion is detected in at least 2 consecutive frames in order to count a person (as well as in at least 3 pixels width).	0.30 (disabled)
Max Object Length Ratio	The ratio of time (with respect to object line crossing duration) that is required to consider that a <i>new</i> object is coming behind without any gap. A default ratio of 3 is considered in order for people walking with strollers/shopping carts not to be counted twice. If the environment does not allow for this, lower the ratio, for example to 2.2.	3.00 (disabled)
Multiple counting support in length	Considers cases where there can be more than one person crossing the line back-to-back without creating a gap.	True (disabled)
Track Objects		
Make all objects foreground	All detected objects will become foreground objects and be displayed.	False
Don't merge overlapping tracks	When the tracks of two objects meet they will not be merged into one object.	True
Foreground sensitivity	Adjusts how sensitive the engine is to tracking objects and can be used to reduce false tracks from trees blowing in the wind, or increase the likelihood of tracking a poorly visible object (such as people partially obstructed by vehicles in a parking lot).	Middle

Table 3. Advanced Options available based on Background Model selected (Continued)

Option	Description	Default Setting
Specify the minimum distance an object must travel to become a tracked object	Attempt to detect only tracks of a certain length.	False
Minimum travel (meters)		1.0
Reduce false tracks from snow	Try to remove tracks created by snow.	True
Track small objects	Objects less than 5/16 meters will not be deleted as snow.	False

Task 2: Create a Rule using VE150

Procedure

To configure a Rule using the VE150:

1. You must configure the VE150 before creating a Rule that uses the VE150.
2. From the **Server** menu, select **Configuration** and then **Rules**
3. Click **New**. The **Rule Wizard** opens. Read the overview and click **Next**.
4. Select the check box next to the camera name. If it is a PTZ camera, select the camera tour position check box.
5. From the **Select video engine for those running on camera** drop-down list, select **VE150**.
6. For a Digital fence assuming **Outdoor Tracking** mode was selected:
 - a. Click the **Any Fence** or **Delete Fence** to draw and erase the digital fences. The arrows define which direction the offending object must pass through the line(s) in order to cause an alarm.
 - b. Double-click the arrows to change their properties.
 - Red indicates an object crossing the line in this direction will cause an alarm.
 - The green arrow denotes the object crossing the line in this direction would not cause an alarm.
 - Multiple fence lines can be drawn.



Important: If **All fences** has been selected, the object must cross through all fences drawn to cause the alarm.

7. For **Alarm** zone, mark the **Alarm** zone:
 - Select the **Erase** option to erase the red mask.

- Select the **Draw** option to draw the red mask.
 - The **Size** slider adjusts the pen thickness.
8. The following settings apply only to alarm zones:
- **Any part of track** denotes the object can be anywhere in the red alarm zone to trigger an alarm. To alarm on vehicles moving anywhere in the alarm zone, select **Any part of track**.
 - **End of track** denotes that the object has stopped in the alarm zone. To alarm on vehicles entering the alarm zone and stopping in it, select **End of track**.
 - **Beginning of track** denotes that the object started moving in the alarm zone. To alarm on vehicles that were parked in the alarm zone and started to move, select **Beginning of track**.
9. Select the **Class** check boxes to filter or detect specific classes of objects.
10. Click **Next** to continue to next step in wizard. See "[Rules - Using the Rule Wizard](#)" on page 78 for details.

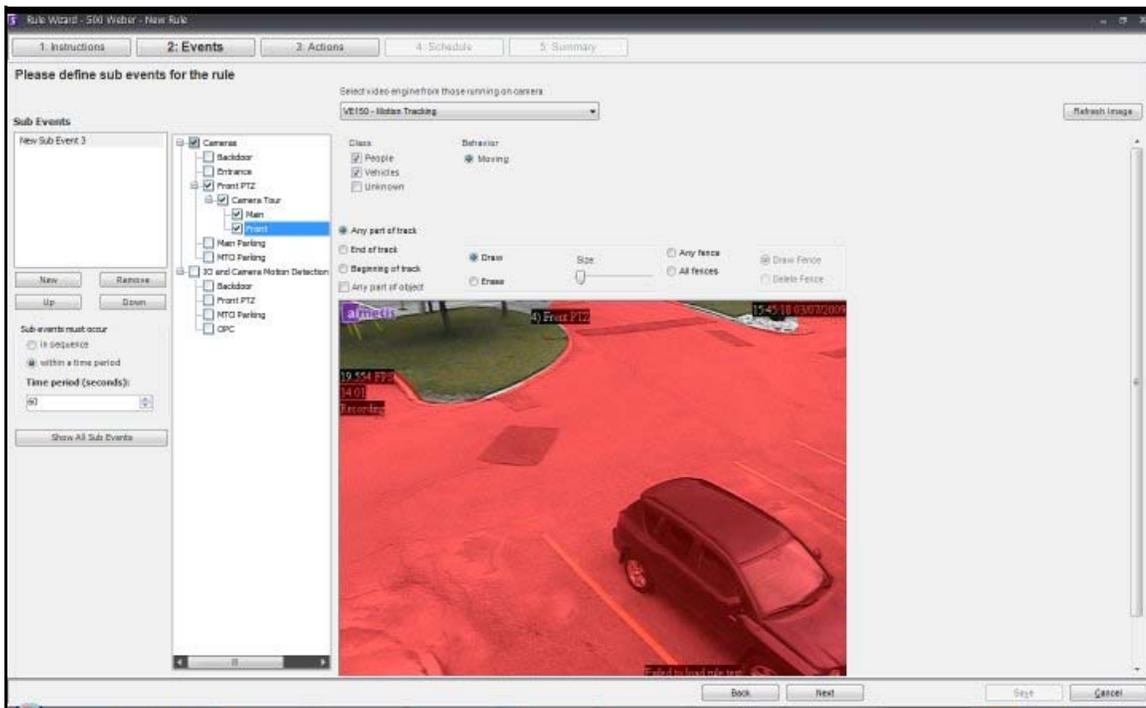


Figure 13. Rule Wizard

Note: In typical situations, the VE150 can detect a person 100 feet from the camera, a vehicle 150 feet from camera (assuming 4CIF or 640x480 and adequate lighting conditions). These distances depend on the lens and zoom used.



Keep the camera lens clean from rain droplets or bugs. Rain droplets hitting the camera lens directly will cause false alarms. Bugs will do the same. If a spot light is installed too close to camera, it will attract bugs.

The camera must be stable, if wind or vibrations causes the camera to move, false alarms will occur

Troubleshooting

- Ensure the correct frame rate is being used, and that enough CPU is available on the system to perform proper analysis.
- Verify that perspective has been properly set by adjusting the **Camera Position** tab.
- If nuisance false alarms occur by trees or reflections, try the **Dynamic background model (Environment tab)**. If problems still persist, contact Aimetis for support.

Hardware Acceleration

Graphics cards contain processing power which can be used by Symphony. This is called “hardware acceleration” and is currently available with the VE150.

When GPU (hardware acceleration) is used, the CPU is not used by VE150, which increases the scalability of Symphony.

Symphony GPU acceleration is achieved using **OpenCL**, which must be installed properly:

- **NVIDIA** comes with the latest drivers: <http://www.nvidia.com/Download/index.aspx?lang=en-us>
- **ATI/AMD** via ATI Stream v.2.0 with OpenCL 1.0 support: <http://developer.amd.com/gpu/atistreamsdk/pages/default.aspx>

If OpenCL is detected, new background models will appear in VE150 automatically (Static OpenCL, Dynamic OpenCL, Spatio-temporal OpenCL).



The **Static OpenCL** and **Dynamic OpenCL** models do not provide model specific options such as **Track Slow Moving Objects**, **Shadow/Illumination Removal**, and **Remove Ghost Pixels**.

<p>Example 1</p>	<p>Operation Mode: Overhead People Counting</p>
	<p>Camera Setup: A fully overhead camera configuration where the counting line will either be horizontal or vertical. Camera should be zoomed in such that a person takes up roughly 1/4th to 1/3rd of the width/height of the screen, depending on whether the counting line is horizontal or vertical.</p> <p>Operation Mode: Overhead People Counting</p> <ol style="list-style-type: none"> 1. Drag the counting line such that it covers the required area that people will be crossing. <ul style="list-style-type: none"> • An orange line indicates that the counting line is enabled (active). • A green line indicates that the counting line is disabled. 2. Ensure that the line is a little longer at both ends, such that it covers any possible areas where parts of people might be visible in the camera view. <div data-bbox="354 867 1211 1682" data-label="Image"> </div> <p style="text-align: center;">Figure 14. Example - Counting line</p>

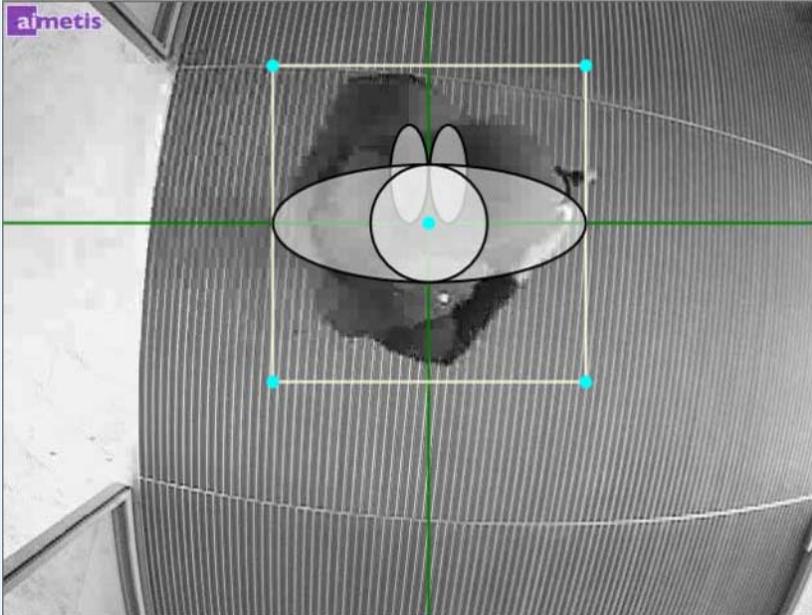
Example 1	Operation Mode: Overhead People Counting (Continued)
	<p data-bbox="297 306 443 333">Person Size:</p> <ol data-bbox="345 352 1263 520" style="list-style-type: none"><li data-bbox="345 352 1263 447">1. Select a good frame from the Timeline that has people walking by and crossing the desired counting line. The engine needs to know the size of the person right across the counting line.<li data-bbox="345 457 1263 520">2. Move the rectangle over the person and resize it such that its square is of size equal to the person's shoulders. <p data-bbox="297 569 1146 632">If you notice that too many people are counted, try decreasing the person size. Alternatively, if not enough people are counted, try increasing the person size.</p> 

Figure 15. Example - Person size

Example 1	Operation Mode: Overhead People Counting (Continued)
	<p>Advanced Options</p> <p>Analysis FPS: Should be at least 8 FPS, but higher FPS is recommended (10). The bigger a person is with respect to the total image size, the higher is the required FPS.</p> <p>Analysis FPS: By default, it should be 40x30 for regular size people (1/4th of the image or higher); however, for really small people, this should be increased to 80x60, because when down-sampled at that resolution, the person will become 1-2 pixels, which is not enough for processing. This will take more processing, so it is recommended that the image is zoomed in more.</p> <p>Background Model: Only the spatio-temporal background model has support for motion estimation. Do not change this option.</p> <p>Threshold: The default 0.03 should be used. If you notice that you get counts even when there are no people crossing, try increasing this value.</p> <p>Appearance Marginalization: Should be turned on by default. You can experiment turning it off in environments with more shadows (and adjust the threshold as well, such as increasing it to 0.1).</p> <p>Counting The following parameters influence the counting across the line. These parameters are typically good at the default setting and they usually do not require manual intervention.</p> <ul style="list-style-type: none"> • Consider only contiguous segments • Multiple counting support in width • Min Object Width Ratio • Max Object Width Ratio • Object Line crossing duration • Multiple counting support in length • Min Object Length Ratio • Max Object Length Ratio

VE180 - Indoor/Outdoor People Tracking

The **VE180** is a good choice for indoor/outdoor people tracking applications. Typical deployments include commercial buildings. This video engine can be used for applications such as people counting and dwell time.

[Table 4](#) provides ideal settings only. They are not mandatory. **The VE180 is a robust analytic.**

Use the VE180 engine (over the VE150 or VE250) in situations where people are crossing paths, or walking together, for instance, and you want to track them as individual objects. Note that the VE180 typically requires more CPU than the VE150 and the VE250 engines.

Table 4. Ideal Camera Setup

Setup	Ideal Conditions
Environment	<ul style="list-style-type: none"> • Away from moving objects such as elevator doors, or moved objects such as carts, carriages and large luggage. • Avoid camera placement near escalators or stairs. Ensure that people are tracked on flat and level surfaces for accurate detection. • Ensure that people are fully visible to the camera and not partially hidden by shelves or low walls.
Lighting	<ul style="list-style-type: none"> • At least 75 LUX or better. • Ensure there is consistent light throughout the space and throughout the period of time that people are tracked. • Ensure that there are no shiny objects, like a shiny floor in the area people are tracked. A shiny floor may reflect light/shadows from surrounding area and generate false counts. • In the indoor tracking area, if possible, avoid sunlight from outside. Sunlight occasionally obscured by moving clouds will cast shadows that cross a counting line. • Depending on the angle of an indoor light, the shadows of people walking by (but not through) a counting line can trigger false counts.
Counting Lines	<ul style="list-style-type: none"> • An overhead view is usually more accurate for counting people across a line, but it covers less ground than a 45-degree view if the ceiling is low. • Try to have at least 1 meter of floor space on either side of the counting line. • In angled views, try to have at least 2 meters of space on either side of the counting line. • Setting person size: A person crossing the line should not take up more than about $1/3$ of the view in width and no more than $1/2$ of the view in height.
Camera Placement	<ul style="list-style-type: none"> • Note that accuracy decreases for nearly horizontal views (for example, less than 20 degrees declination). • If the camera is placed such that people appear smaller than 20 pixels on the screen, counting accuracy will decrease and you will need to use advanced option settings.

Task 1: Configure VE180

Procedure

To configure the VE180:

1. In Symphony Client, from the **Server** menu, select **Configuration**. The **Configuration** dialog box opens. This allows you to configure devices for the currently selected server.
2. In the left pane, click **Devices**. The **Devices** dialog box opens.
3. Click the camera you want to configure for use with video analytics and click **Edit**.
4. Click the **Analytics Engines** tab and select **VE180**. By default **VE250** is selected, in which case you must first deselect **VE250**.
5. Click the **Analytics Configuration** tab ([Figure 16 on page 36](#)). From the **Analytics Engines** drop-down list, select **Intel_VE180**.
6. Click the **Choose Image** button to select an image from your camera on which to base your analytic configuration.
7. Click all the subtabs necessary to configure your analytic:
 - ["Overview subtab" on page 36](#)
 - ["Processing Mask subtab" on page 37](#)
 - ["Camera Position subtab" on page 38](#)
 - ["Environment subtab" on page 41](#)
 - ["Counting Line subtab" on page 48](#)
 - ["Direction Line Subtab" on page 49](#)
 - ["Advanced Subtab" on page 50](#)

Overview subtab

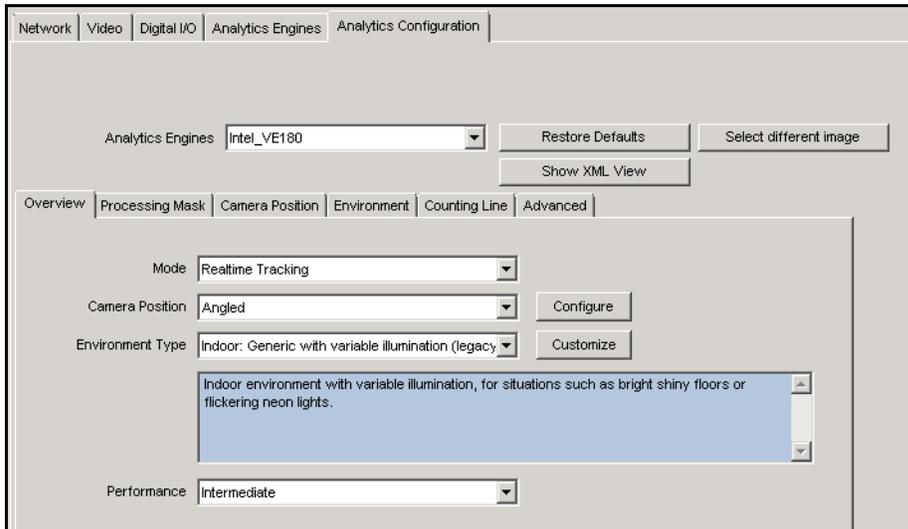


Figure 16. Overview Tab

1. From the **Mode** drop-down list, select **Realtime Tracking**.
2. From the **Camera Position** drop-down list, select **Angled, Overhead, Uncalibrated**.
 - **Uncalibrated** - Use only if objects are well separated and accurate counts are not required.
3. From the **Environment Type** drop-down list, select one of the following.
 - **Indoor/Outdoor: Generic**
 - **Indoor: Generic with variable illumination**
 - **Indoor: Generic with constant illumination**
 - **Indoor: Retail** - (constant illumination) See [Table 10 on page 45](#) and [Table 12 on page 46](#).
 - **Thermal camera**
 - **Outdoor: Water**
 - **Custom** - Automatically displays **Custom** if settings have been changed from default values in the **Environment** tab or **Advanced** settings.
4. From the **Performance** drop-down list, select the level of CPU processing: **Custom, Low, Intermediate, High**. By default, **Intermediate** is selected.

Processing Mask subtab

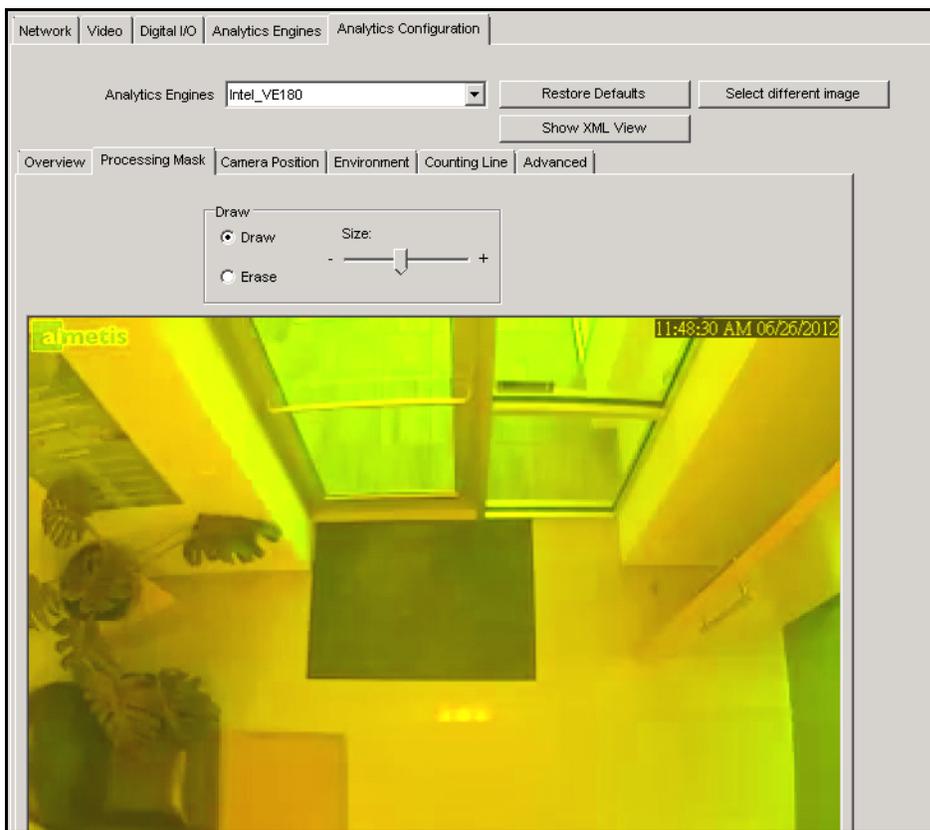


Figure 17. Processing Mask Tab

1. Using the displayed image from the video, define the area in yellow (a mask) where objects in motion should be detected. (Not sure of the concept? See ["Masks: The Areas Where Symphony Tracks Objects"](#) on page 6.)
 - Select the **Erase** option to erase the yellow mask.
 - Select the **Draw** option to draw the yellow mask.
 - The **Size** slider adjusts the pen thickness.

Camera Position subtab

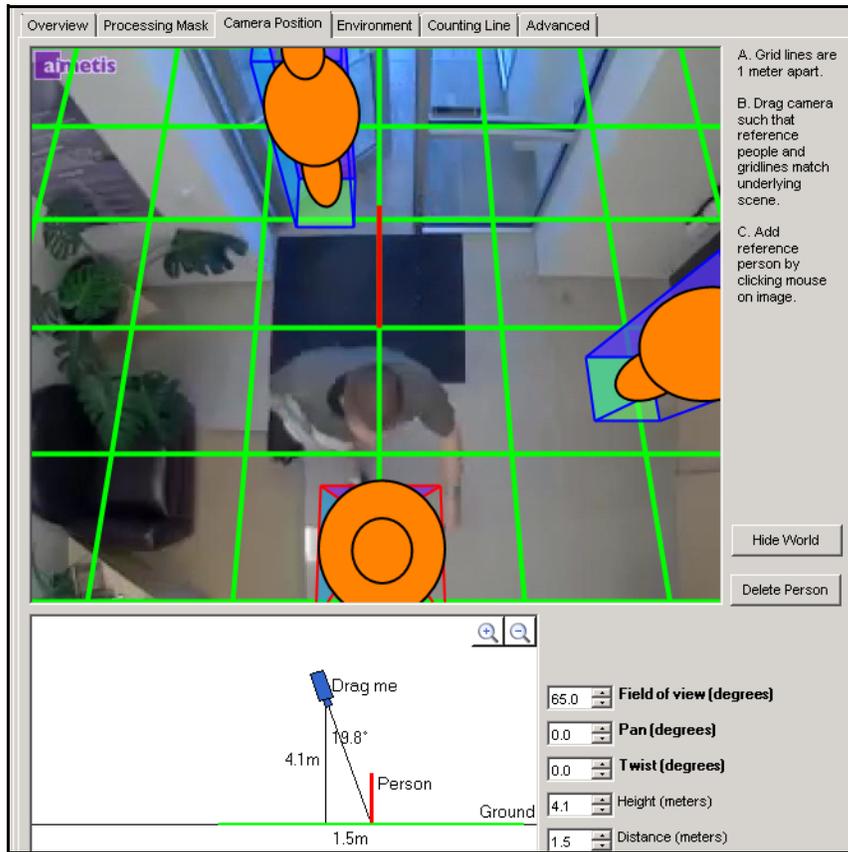


Figure 18. Camera Position Tab

Table 5. Camera position subtab

Option/Design	Description
Grid	Grid lines are 1 meter apart. Automatically displayed over scene.
Reference person icon	An orange colored form representing person size and position in an image. Four populate the image automatically. Move the reference people icons to various positions in the image, foreground and background as they would naturally occur. To add more reference person icons , click your mouse on the image.
Delete Person button	Removes a reference person icon. Click the reference person icon and then click the Delete Person button.
Hide/Show World button	Hides (or displays) the gridlines and reference person icons so that you can view the actual scene in the image.

Table 5. Camera position subtab (Continued)

Option/Design	Description
Interactive section	<div data-bbox="550 380 1062 621" data-label="Image"> <p>The diagram shows a camera icon labeled 'Drag me' at a height of 4.0m. A line representing the camera's field of view extends from the camera icon to a person on the ground, forming an angle of 75.1 degrees with the vertical. The horizontal distance from the camera's vertical projection to the person is 15.0m. The person is labeled 'Person' and the ground is labeled 'Ground'. There are zoom in and zoom out icons in the top right corner of the diagram's frame.</p> </div> <p>Allows you to adjust the grid and reference person size to match the underlying scene. Using your mouse, you drag the camera icon up and down and left and right.</p>
+/- magnification icons	<p>Allow you to zoom in and out in the interactive section</p>
Field of view	<p>Horizontal field of view.</p> <div data-bbox="578 848 1037 1184" data-label="Image"> <p>The diagram shows a camera icon on the left. Lines radiate from the camera to form a trapezoidal shape representing the field of view. Arrows indicate the horizontal extent of this field of view.</p> </div> <p>If you increase the value, you must drag the camera icon closer (down) to get the correct person size. If you decrease the value, you must drag the camera icon further away for the same rough size. If you obtain the exact camera position by measuring the actual height and distance, then you must adjust Field of view to make the reference people icons the right size in the scene.</p>

Table 5. Camera position subtab (Continued)

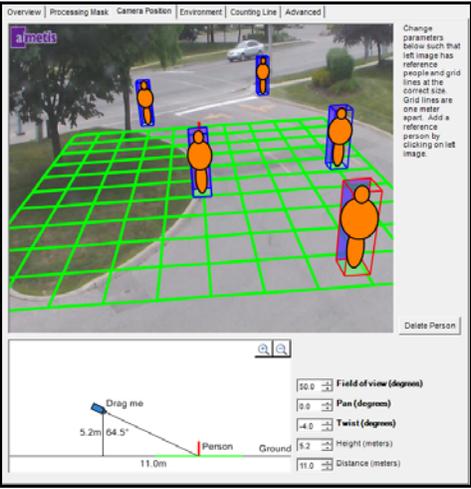
Option/Design	Description
<p>Pan</p>	<p>Movement of the camera from left to right or right to left around the imaginary vertical axis that runs through the camera.</p> <p>When the camera is pointed at the ground, it basically tilts the ground plane. When the camera is closer to horizontal, it looks more like a rotation of the ground plane.</p>  <p>Here Pan tilts the grid against the ground plane, which is incorrect based on the actual scene.</p> <p>Most useful in a near-overhead view when the camera is pointing off to the side (that is, the deflection from vertical is not completely on the camera view's up-down axis)</p>
<p>Twist</p>	<p>Rotation of the camera around the axis that extends directly out of the camera through the center of the view.</p>  <p>Useful in an angled view when the camera is twisted a bit so that a vertical line in the world does not correspond to up-down in the image. Also useful if the ground in the image appears to tilt a bit from left to right</p>

Table 5. Camera position subtab (Continued)

Option/Design	Description
Height and Distance fields	Values correspond to the movements of the camera icon in the interactive section.
Warning message	<div data-bbox="483 457 1133 682" style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> </div> <p>Symphony displays a warning message if the camera angle does not agree with Overhead selection</p>

Environment subtab

1. In this subtab, select the background model based on the environment in which your camera will be recording images. For usage, see [Table 6](#).

Table 6. Background Model Usage

Background Model	When to use
Static	Use where the background is relatively static (no periodic movement in the background such as swaying trees). This is the fastest Symphony background model.
Dynamic	<p>Use where there are periodic moving objects (like a tree branch moving back and forth in a fairly constant wind, or caused by unstable camera mounting). This background model can handle both static and dynamic backgrounds, but it uses more CPU power than the Static model and thus is not recommended for static backgrounds.</p> <p>Important: An environment might appear static during the day, but rain fall at night will create a dynamic environment. Therefore, you should select the Dynamic setting.</p>
Dual Layer Dynamic	<p>Similar to the Dynamic background model but is capable of tracking objects that are stationary for short periods of time.</p> <p>Use in areas where you want to track, for example, people standing still for 30 to 60 seconds.</p>
Spatio- Temporal	Tracks only consistent motion, thus it can greatly reduce false alarms due to tree branches and other objects in the background that move randomly because of wind.
Multi-Layer Hybrid	Uses colour, brightness and texture information. You can customize it to different scenarios by adjusting the sensitivity to intensity, colour or texture information in a given scene. It can also use multi-scale processing to fuse information from different scales.

2. Select other options in the **Environment** subtab as necessary. For all background models refer to [Table 7](#):

Table 7. Environment subtab options for all background models

Option	Description	Default Setting
Common		
Background learning duration (seconds)	Determines the approximate length of time it will take a foreground object that becomes stationary to merge into the background. Important: If an object has periodic movement with a period greater than the specified time, then that object will always be considered a foreground object (never merged into the background). The background is determined based on the last Update Background Seconds of video. The background is updated all the time, not only when the analytic engine starts.	30
Background Sensitivity	Sets the minimum background sensitivity needed for an object to be detected as a foreground object. Important: If set to a low value, then objects with similar colour as the background will NOT be detected as valid objects to track.	Medium
Learn normal behaviour	Learns the percentage of time each pixel is in motion and can subsequently ignore. Useful, for example, when tracking boats on water.	False (check box not selected)
Large Change Detection		
Method	% of screen change: Monitors the percentage of the scene that is considered foreground. If the amount of foreground is too high, model relearning is triggered. Brightness change: Monitors the scene for abrupt, overall changes in brightness (perhaps caused by a change in lighting or weather event). Spectrum change: Monitors the scene for abrupt, overall changes in brightness, but less sensitive to local changes (for example a person in a dark coat walks by). Combined change: A combination of % of screen change and Spectrum change . When environment: Indoor/outdoor generic (with variable or constant illumination) is selected, corresponding sensitivity is set to 70% by default.	20% sensitivity on slider
Sensitivity	Has values in the range between 0 and 100. A high sensitivity means the relearning is easily triggered. For example, 80 sensitivity will trigger when just 20% of the screen is foreground, while a low sensitivity triggers relearning only in an extreme situation.	(slider 20 out of 100)
Time to wait before resuming tracking (seconds)	Allows you to set how long to wait before resuming to track objects. Ideally it should be zero, but if the you are aware of a lighting issue where starting to track immediately can cause false alarms, then set this to the number of seconds needed for the light to stabilize.	3

3. For additional **Environment** subtab options per background model, see the following:

- [Table 8, "Environment subtab options for Static background model," on page 43](#)
- [Table 9, "Environment subtab options for Dynamic background model," on page 44](#)

- [Table 10, "Environment subtab options for Dual-Layer Dynamic background model," on page 45](#)
- [Table 11, "Environment subtab options for Spatio-Temporal background model," on page 45](#)
- [Table 12, "Environment subtab options for Multi-Layer Hybrid background model," on page 46](#)

Table 8. Environment subtab options for Static background model

Option	Description	Default Setting
Shadow/Illumination Removal		
Shadow Sensitivity	<p>Controls how aggressively shadows (decreases in lighting) are ignored when tracking moving objects. Increasing the slider (to the right) will allow the engine to correctly ignore more of the shadow areas.</p> <p>Note: This will also increase the potential of a person wearing dark clothing on a light background to be classified as a shadow.</p>	Middle (disabled)
Illumination Sensitivity	<p>Controls how aggressively increases in lighting are ignored. Increases in lighting occur due to a light source such as a car headlight or when an overcast day becomes a sunny day. Increasing the slider (to the right) will allow the engine to correctly ignore any increases in illumination.</p> <p>Note: This will also increase the potential of a person wearing light clothing on a dark background to be classified as an illumination increase.</p>	Middle (disabled)
Track Slow Moving Objects		
Track Slow Moving Objects	<p>Tracks an object moving very slowly across the video. It can also be an object coming directly toward or directly away from the camera, which will appear to be moving slowly.</p> <p>If Track Slow Moving Objects is disabled, slow moving objects tend to become part of the background and as such will not be tracked. By enabling this option, slow moving objects will be tracked.</p> <p>Important: This option might increase some false alarms for situations where an object stands still in the video for a long time.</p>	False (check box not selected)
Object Speed	Speed of tracked object.	Slow
Remove ghost pixels	Any pixels that do not change in value for some time are not considered as foreground.	True

Table 9. Environment subtab options for Dynamic background model

Option	Description	Default Setting
Shadow/Illumination Removal		
Shadow Sensitivity	<p>Controls how aggressively shadows (decreases in lighting) are ignored when tracking moving objects. Increasing the slider (to the right) will allow the engine to correctly ignore more of the shadow areas.</p> <p>Note: This will also increase the potential of a person wearing dark clothing on a light background to be classified as a shadow.</p>	Middle (disabled)
Illumination Sensitivity	<p>Controls how aggressively increases in lighting are ignored. Increases in lighting occur due to a light source such as a car headlight or when an overcast day becomes a sunny day. Increasing the slider (to the right) will allow the engine to correctly ignore any increases in illumination.</p> <p>Note: This will also increase the potential of a person wearing light clothing on a dark background to be classified as an illumination increase.</p>	Middle (disabled)
Track Slow Moving Objects		
Track Slow Moving Objects	<p>Tracks an object moving very slowly across the video. It can also be an object coming directly toward or directly away from the camera, which will appear to be moving slowly.</p> <p>If Track Slow Moving Objects is disabled, slow moving objects tend to become part of the background and as such will not be tracked. By enabling this option, slow moving objects will be tracked.</p> <p>Important: This option might increase false alarms for situations where an object stands still in the video for a long time.</p>	False (check box not selected)
Object Speed	Speed of tracked object.	Slow
Cloud Check	Tries to ignore cloud motion.	False
Check for sudden background movement	Tries to remove false tracks due to sudden movement of objects in the background due to wind. It will also eliminate false tracks due to sudden movements of the camera.	False
Maximum distance in pixels	If Check for sudden background movement selected. A sudden movement is defined as a movement of an object or camera up to this many pixels.	5 (disabled)
Remove ghost pixels	Any pixels that do not change in value for some time are not considered as foreground.	True

Table 10. Environment subtab options for Dual-Layer Dynamic background model

Option	Description	Default Setting
Timing		
Time to clear long-term background (seconds)	Only available for Dual Layer Dynamic and Multi-Layer Hybrid background models.	<ul style="list-style-type: none"> • 120 • 700 for Indoor: Retail
Time to clear short-term background (seconds)	Only available for Dual Layer Dynamic background model.	<ul style="list-style-type: none"> • 5 • 1 for Indoor: Retail
Time to move short-term background to long-term (seconds)	Only available for Dual Layer Dynamic and Multi-Layer Hybrid background models.	<ul style="list-style-type: none"> • 60 • 600 for Indoor: Retail
Sensitivity		
Appearance	Manual, Bright shiny, Grey matted	a preset value
Lower bound	If Manual selected	0.40
Upper bound	If Manual selected	1.50

Table 11. Environment subtab options for Spatio-Temporal background model

Option	Description	Default Setting
Model Specific		
Mode	<p>Coherent Motion, Abnormal Behaviour, Wrong Direction The background model tracks consistent motion, automatically detects abnormal behavior or tracks motion only in a specified direction:</p> <p>Coherent motion –Tracks consistent motion; therefore, greatly reduces false alarms due to inconsistent motion such as tree branches and other objects in the background that can move randomly due to the wind.</p> <p>Abnormal behavior -- Background model learns the normal patterns and directions of motion at each pixel; therefore, any abnormal direction of motion will be detected.</p> <p>Wrong direction - Tracks motion only in a specified direction; therefore, motion in any other direction will be ignored.</p>	Coherent Motion
Appearance Marginalization	Only detects motion patterns and is not influenced by the appearances.	True
Bg Frames	If Abnormal Behaviour selected	255

Table 11. Environment subtab options for Spatio-Temporal background model (Continued)

Option	Description	Default Setting
Fg Frames	If Abnormal Behaviour selected	10
Direction	If Wrong Direction selected. Read-only. Click Configure. Direction Line subtab opens.	355

Table 12. Environment subtab options for Multi-Layer Hybrid background model

Option	Description	Default Setting
Timing		
Time to clear long-term background (seconds)	Only available for Dual Layer Dynamic and Multi-Layer Hybrid background models.	<ul style="list-style-type: none"> • 120 • 700 for Indoor: Retail
Time to clear short-term background (seconds)	Only available for Dual Layer Dynamic background model.	<ul style="list-style-type: none"> • 5 • 1 for Indoor: Retail
Time to move short-term background to long-term (seconds)	Only available for Dual Layer Dynamic and Multi-Layer Hybrid background models.	<ul style="list-style-type: none"> • 60 • 600 for Indoor: Retail
Sensitivity Controls how sensitive the background model is to a perceived change from the expected background values. If sensitivity is low, it will attribute a change to natural variation in the appearance of the background. If sensitivity is high it will attribute the change to a foreground object. The Multi-Layer Hybrid background model checks three types of features: Brightness (from black to white), color (red, blue, gray, etc) and texture (local patterns of brightness). The slider controls sensitivity between zero and 1. At least one of the three features should be selected.		
Brightness	Looks for changes in gray-level (from black to white). This should usually be selected, but the appropriate sensitivity depends on how much the lighting in the scene varies over time.	True, Medium
Colour	The video engine looks for change in hue and saturation. Color is usually not as strongly affected by lighting, but not all objects can be distinguished from the background by color alone. It requires more CPU time than Brightness.	True, High
Texture	The video engine looks for changes in the local brightness pattern, especially new edges. Texture is generally less affected by lighting, but flatter objects may not have enough texture to be distinguished from the background. It requires more CPU time than Color.	False

Table 12. Environment subtab options for Multi-Layer Hybrid background model (Continued)

Option	Description	Default Setting
Multiscale Processing	Select this option to monitor for changes at multiple spatial resolutions. This can improve accuracy for difficult scenes (especially in combination with Texture features), but it increases CPU load.	True
Adaptation Time to adapt representation to show changes (seconds)	Controls how quickly the background model can adapt to slow changes in the scene (such as the sun going down). Use a large value if you need to detect slow changes in the scene, or a small value if the scene contains many gradual but relatively quick changes in lighting.	20

Counting Line subtab

Click this subtab if you want to use the analytic as a people counter.

1. Ensure the **Camera Position** and **Motion Analysis** mask is set properly and then click the **Counting Line** subtab.
2. By default, the **Draw Counting Line** option is selected.
3. Left-click on the image and draw a line that will cause items (people) to be counted as they pass the delineated area.
 - The line appears with arrows indicating when movement is detected as **In** to a delineated area and **Out** of the delineated area.
 - To reverse the **In-Out** orientation of the line, draw the line in the opposite direction. (Delete the original line first.)
4. Click **OK** to save settings.

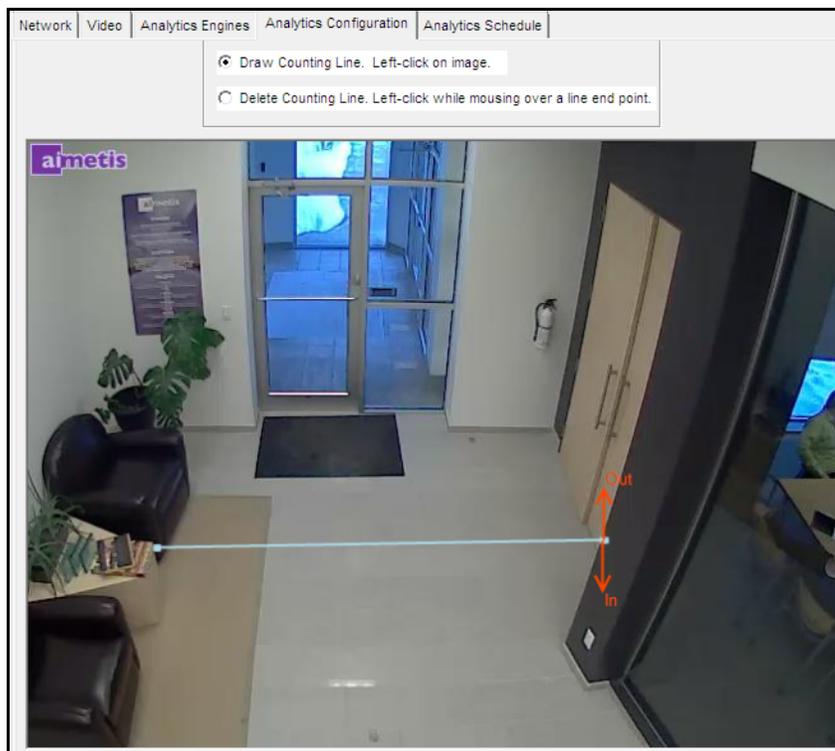


Figure 19. Counting line

Direction Line Subtab

Click and drag endpoints to position the arrow in the direction of interest. All objects moving in this direction will be detected and tracked.

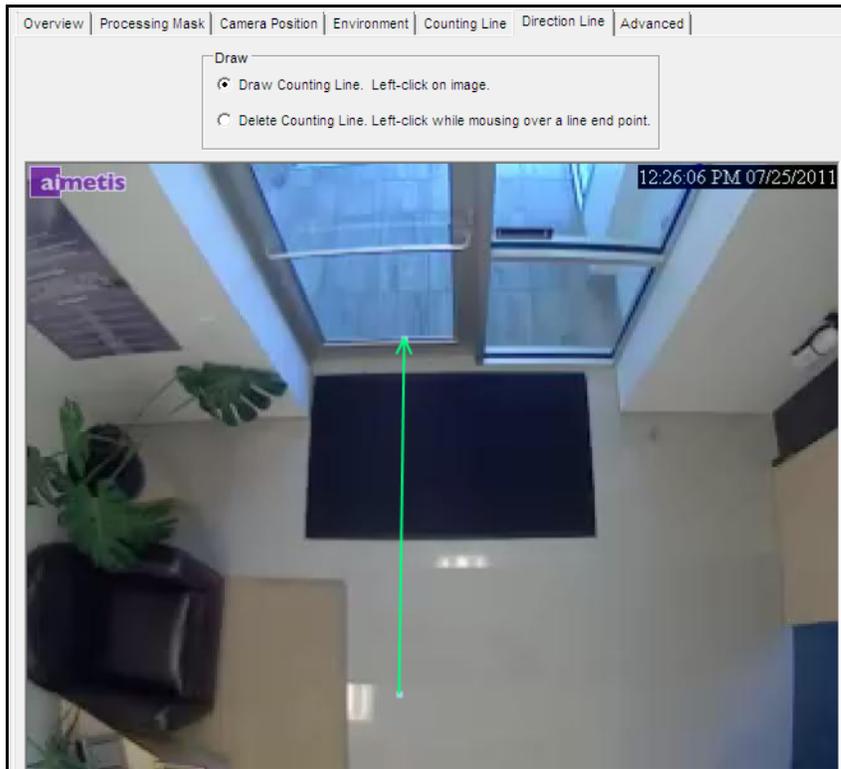


Figure 20. Direction Line subtab

Advanced Subtab

- The **Advanced** subtab settings are for experts only. Values should be changed only in cases where the analytic engine is not functioning as expected. For usage description, see [Table 13](#).

Table 13. Advanced subtab Options

Option	Description	Default Setting
Analysis FPS	Indicates how many frames will be analyzed by the system. Typically the default value should not be altered. However, in many cases the analysis frame rate can be reduced to conserve CPU. Doing this may negatively alter the algorithms performance.	8
Capture Resolution	Displays the resolution at which the video is being recorded. This can be changed in the Device setup.	320 x 240
Analysis Resolution	Setting the Analysis Resolution the same as the Capture Resolution ensures that objects will be detected as far away as possible. However, in order to conserve CPU resources it is possible to down sample the video sent for analysis. Downsampling will reduce CPU requirements but may also reduce the detection range of the video analytic.	320 x 240
Processing delay	For spatio-temporal background model, the tracker must run a few frames to create a buffer before tracking the live images.	0
Dwell Time		
Show after	Displays the number of seconds objects have been dwelling, if they have been dwelling for at least x seconds (10 seconds by default).	10
Motion limit (% of size)	<p>Defines how much an object can move and still be considered to be dwelling.</p> <p>Horizontal and Vertical are calculated as a percent of object size that the object can move.</p> <p>Examples: In an Uncalibrated Camera Position (see "Overview subtab" on page 36), Horizontal 50 means an object can move up to 50% of its max (height, width) horizontally before it is considered to have moved. This is similar for Vertical.</p> <p>For calibrated Camera Position (Angled, Overhead), Horizontal sets the percentage of height that they can move on the ground plane. Vertical is ignored.</p>	H 50 V 50
Tracking		
Total number of proposals per iteration	Defines how much analysis the algorithm is allowed to do per frame.	400
Max proposals per object	Defines how much analysis the algorithm is allowed per object (if there are few objects).	40

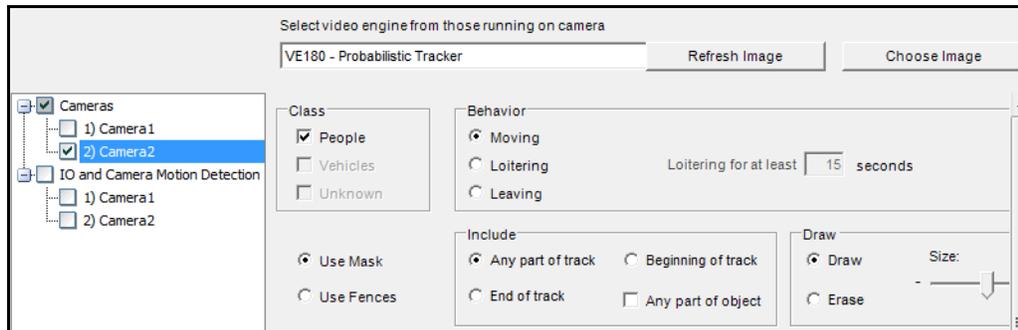
Table 13. Advanced subtab Options (Continued)

Option	Description	Default Setting
System Temperature	Defines how willing the system is to think about moves that do not immediately improve the scene model's correspondence with the available evidence.	25
Minimum New Object Size		3
Object Appearance		
Colour blocks	Stores the average colour value at particular locations on the object.	False
Colour histogram	Stores the rough distribution of pixel colour across the object.	True
Sizes and Distances		
Min New Object Size (pixels)		3
Hidden Object Max Jump Distance (meters)	When Overview Camera position is set to Angled, the default value is 3.0 meters. When Overview Camera position is set to Overhead the default value is 0.75 meters.	3.0
Max Hidden Object Duration (seconds)	When Overview Camera position is set to Angled, the default value is 3 seconds. When Overview Camera position is set to Overhead, the default value is 1 second.	3.0
Min New Object Travel Distance (meters)	When Overview Camera position is set to Angled, the default value is 0.5 meters. When Overview Camera position is set to Overhead, the default value is 0.2 meters	0.5
Min New Object Travel Distance (pixels)	When Overview Camera position is set to Angled, the default value is 5 pixels. When Overview Camera position is set to Overhead, the default value is 5 pixels.	5
General Proposers		
Add an object	Tries to add new objects to the scene. If this not selected, no objects will ever be tracked. The default setting weight (1.00) indicates how likely this action is to be tried relative to other actions.	0.20
Remove an object	Removes existing objects. If this is unchecked, they can't be removed.	0.20
Swap two objects' positions	Swap positions of two nearby objects	0.5
Swap two objects' depths	Swap their distance from the camera only	0.5
Adapt an object	Change the object's position to better fit the data.	0.5
Tracking Proposers		

Table 13. Advanced subtab Options (Continued)

Option	Description	Default Setting
Colour Blocks	Find a new position based on colour block information.	0.5
Colour Histogram	Find a new position based on colour histogram information.	0.5
Contours	Find a new position based on the object's outline.	0.5
Sparse Features	Find a new position based on local texture points.	0.5
Foreground	Find a new position that aligns the object with detected foreground.	0.5
Motion Dynamics	Find a new position, randomly, based on how it moved in previous frames.	1.0

Task 2: Create a Rule using VE180



Procedure

To configure a Rule using the VE180:

1. You must configure the **VE180** before creating a Rule that uses the **VE180**.
2. From the **Server** menu, select **Configuration** and then **Rules**.
3. Click **New**. The **Rule Wizard** opens. Read the overview and click **Next**.
4. Select the check box next to the camera name. If it is a PTZ camera, select the camera tour position check box.
5. From the **Select video engine for those running on camera** drop-down list, select **VE180**.
6. For a digital fence, select the **Use Fences** option:
 - a. Select the **Any Fence** option and draw a line over the image with your mouse. Arrows, which are automatically displayed when you draw a line, define which direction the offending object must pass through in order to cause an alarm.
 - b. With the **Any Fence** option selected, click the arrows to change their properties.
 - Red indicates that an object crossing the line in the arrow direction will cause an alarm.
 - The green arrow denotes that an object crossing the line in the arrow direction will NOT cause an alarm.
 - Multiple fence lines can be drawn.



Important: If **All fences** has been selected, the object must cross through all fences drawn to cause the alarm.

- To delete a line, select the **Erase Line** option and left-click on the endpoint of the line you want to delete in the image.
7. To designate an alarm zone, select the **Use Mask** option.
 - Select the **Erase** option to erase the red mask.
 - Select the **Draw** option to draw the red mask.
 - The **Size** slider adjusts the pen thickness.

The following settings apply only to alarm zones:

- **Any part of track** denotes the object can be anywhere in the red alarm zone to trigger an alarm. To alarm on objects moving anywhere in the alarm zone, select **Any part of track**.
- **End of track** denotes that the object has stopped in the alarm zone. To alarm on objects entering the alarm zone and stopping in it, select **End of track**.
- **Beginning of track** denotes that the object started moving in the alarm zone. To alarm on objects that were in the alarm zone and started to move, select **Beginning of track**.
- **Any part of object** denotes that any part of the object can be anywhere in the red alarm zone to trigger an alarm.

8. Click **Next** to continue to next step in wizard. See "[Rules - Using the Rule Wizard](#)" on page 78 for details.

Troubleshooting

Table 14. Troubleshooting Solutions for VE180

Problem	Reasons	Solutions
False counts. Not enough objects tracked	Calibration. Person size too big.	Adjust person size.
	Background model. Sensitivity too low.	Increase sensitivity of the background model.
	 <p>Trouble detecting people with dark clothing against a dark background (or light clothing against a light background).</p>	Increase the brightness sensitivity in the Multilayer Hybrid Background model (on the Environment tab). or Switch to the hybrid model and increase brightness sensitivity.
False counts. Too many objects tracked.	Real person tracked as two or more people. Calibration. Person size too small.	Adjust person size.
	Many objects throughout the scene. Background model. Sensitivity too high.	Decrease the sensitivity of the background model.
	Shadows or lighting changes.	Decrease brightness sensitivity.

Using trackerapp to Adjust Settings

The **trackerapp** utility allows you to run and adjust a video analytic on a live view/recorded video and see exactly which part of an object (for example, a person) is in the foreground.

Procedure

To use trackerapp:

1. In Symphony Client, stop the camera:
 - a. In the **Camera Tree**, right-click on the camera.
 - b. From the context menu, select **Stop Camera**.
2. In the command line, change your directory to **C:\Program Files\Aimetis\Symphony_bin**. If you are running on a 64 bit machine, use **Program Files(x86)** in the path instead.
3. Enter **trackerapp x** where x is the ID of the camera you are using. (The tracker number always precedes the camera name in the **Camera Tree**.)
4. The **Aimetis Demo (Motion Tracking)** dialog box opens ([Figure 21 on page 56](#)). A live video is displayed in the window.
 - If you want to run a recorded video instead:
 - a. Click the **Disk** icon. The **Open** dialog box appears.
 - b. Select the video you want to run back through Symphony (MPEG or AIRA) and click **Open**.
 - c. The **Select Movie** dialog box appears. Select the method/speed to run the video back through and click **OK**. Slow (real-time) is recommended. Symphony will now run the video back through tracker on the camera with the video engine and configuration you selected.

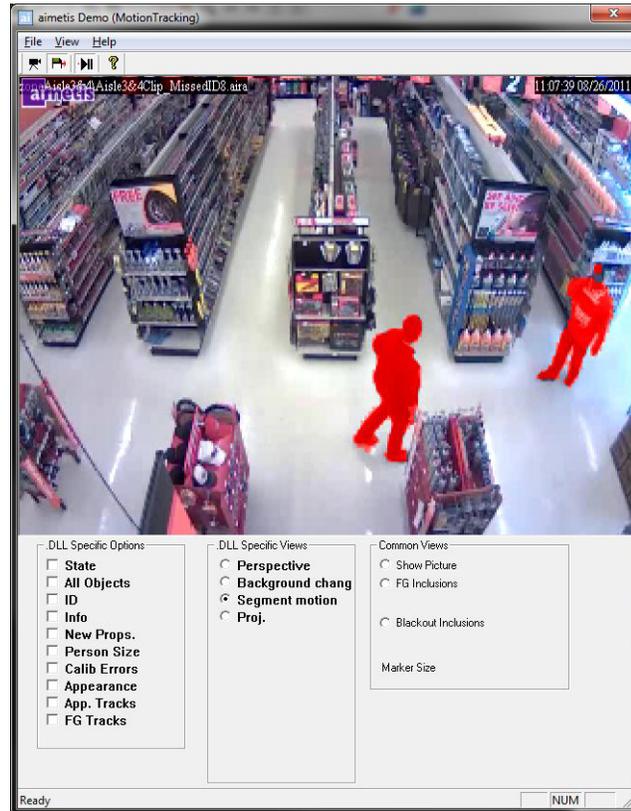


Figure 21. Motion Tracking Interface (trackerapp)

5. Select one of the following options and observe the live view (or run the video).
 - **Background change** - objects in the foreground should appear as red and objects in the background should appear as blue
 - **Segment motion** - foreground image should appear as solid red
 - **Proj. (Projection)** - ellipses appear around object, that is, a projection of the shape. For example, an egg shape around a person.
6. If the object does not appear to be in the foreground for proper detection, adjust settings in the **Analytics Engine - Environment** subtab. See "[Environment subtab](#)" on page 41.
7. If you are running a recorded video through the **trackerapp** (and not a live view) you must close **trackerapp** and stop the camera before running the video again.

VE250 - Motion Tracking

The VE250 is a good choice for indoor or outdoor motion tracking applications. The advantage the VE250 has over the VE150, is that no Perspective information is required. It is considered a plug and play video engine. It will work at virtually any camera angle. The VE250 also works better in busier environments since it has better object segmentation capabilities as compared with the VE130. However, the VE250 does not have any object classification capability, and will use more CPU.

Typical deployments include commercial buildings, where objects are to be detected, military basis, where objects entering an alarm zone or crossing a pre-defined line are to be detected, regardless of class of object (people or vehicles). The VE250 is essentially a big improvement over the motion detection technology previously on the market (which would generate numerous false alarms caused by lighting changes or environment changes). The VE250 can be used in moderately busy, indoor or outdoor environments, at virtually any camera angle. For best performance, the camera must be mounted far enough away from the objects that 8 frames will contain the moving object as it passes by the camera.

Task 1: Configure VE250

Procedure

To configure the VE250:

1. In Symphony Client, from the **Server** menu, select **Configuration**. The **Configuration** dialog box opens. This allows you to configure devices for the currently selected server.
2. In the left pane, click **Devices**. The **Devices** dialog box opens.
3. Click the camera you want to configure for use with video analytics and click **Edit**.
4. Click the **Analytics Engines** tab and select **VE250**. By default **VE250** is selected. If the check box for VE250 is not selected, you must clear other check boxes (algorithms) that conflict with VE250.
5. Click the **Analytics Configuration** tab.
6. From the **Analytics Engines** drop-down list, select **Intel_VE250**.
7. The Analysis FPS box configures how many frames will be analyzed by the system. Typically the default value should not be altered. However, there may be cases where the analysis frame rate can be reduced to conserve CPU. Doing this may negatively alter the algorithms performance. Like the Analysis Resolution, the Analysis FPS can be set differently than the record FPS.
8. Adjust the **Analysis Resolution** as required.
 - Setting the Analysis Resolution the same as the Capture Resolution ensures that objects will be detected as far away as possible. However, in order to conserve CPU resources it is possible to downsample the video sent for analysis. Downsampling will reduce CPU requirements but may also reduce the detection range of the video analytic.
9. Modify the motion mask by adjusting the yellow mask as required (see how to configure analytics for more help). Select the Erase radio to erase the yellow mask, and select Draw to draw the mask. The Size slider adjusts the pen thickness.
10. Click **Apply** to save settings.

Task 2: Create a Rule using VE250

Procedure

To configure a Rule using the VE250:

1. You must configure the **VE250** before creating a Rule that uses the **VE250**.
2. From the **Server** menu, select **Configuration** and then **Rules**
3. Click **New**. The **Rule Wizard** opens. Read the overview and click **Next**.
4. Select the check box next to the camera name. If it is a PTZ camera, select the camera tour position check box.
5. From the **Select video engine for those running on camera** drop-down list, select **VE250**.
6. Click **Next** to continue in the **Rule Wizard**. Set up the rules as per concepts and instructions in ["Rules - Using the Rule Wizard" on page 78](#).

VE352 - Left and Removed Item Detection

The VE352 video engine detects left or removed items in moderately to less busy indoor environments. Typical deployments include retail facilities where detecting removal of merchandise is desired. Camera position should be at least 15 feet above the ground, and the camera angle can be flexible, depending on the field of view you wish to capture.

Task 1: Configure VE352

Procedure

To configure the VE352:

1. In Symphony Client, from the **Server** menu, select **Configuration**. The **Configuration** dialog box opens. This allows you to configure devices for the currently selected server.
2. In the left pane, click **Devices**. The **Devices** dialog box opens.
3. Click the camera you want to configure for use with video analytics and click **Edit**.
4. Click the **Analytics Engines** tab and select **VE352**. (Optional) By default **VE250** is selected, in which case you must first deselect **VE250**.
5. Click the **Analytics Configuration** tab. From the **Analytic Engines** drop-down box, select **VE352**.
6. By default, the **Masks** tab is shown. Leave the default settings for the **Analysis FPS** and **Analysis Resolution**.
7. Click the **Persistence Mask** subtab and adjust the yellow mask as required.
 - Select the **Erase** option to erase the yellow mask.
 - Select the **Draw** option to draw the yellow mask.
 - The **Size** slider adjusts the pen thickness.
8. Click the **Perspective** subtab and set the perspective for the scene: The red lines must be drawn such that they represent a length of 5m at their location in the scene. The Person icon will be sized automatically.
9. Click the **Basic** tab to configure additional settings. See [Table 15 on page 60](#).

Table 15. Basic Settings

Option	Usage
Left item duration (seconds)	<p>Specifies how long an object must be left before an alarm will occur.</p> <p>Increasing the value:</p> <ul style="list-style-type: none"> • Reduces false alarm due to person standing still, reflection of people walking near by, etc. • However the person would have left the scene before an alarm is obtained. <p>Decreasing the value:</p> <ul style="list-style-type: none"> • Increases false alarms because there is not enough time to determine if it is a valid alarm • The person who left or removed the item might still be in the scene when the alarm occurred.
Initial background model learn time (seconds)	<p>Specifies how many seconds will be used to build background model.</p> <p>Set this low unless you know for sure there will not be any moving objects during start of camera because the longer the initial background model is learned the more certain the engine is of the initial background.</p> <p>During this time the engine is not running and as such it will not detect any left/removed items.</p>
Object merge distance (pixels)	<p>Determines the distance (in pixels) between objects where they will be automatically merged as one object, that is, the minimum distance between two adjacent alarmable objects.</p> <p>Increasing the value:</p> <ul style="list-style-type: none"> • If parts of a single object are detected as separate objects then they are merged together into one object. • There is a risk of two actual left/removed objects being merged together. <p>Decreasing the value:</p> <ul style="list-style-type: none"> • There is a risk of getting multiple alarms on the same object. • Ensures that two adjacent left/removed items are detected as two different objects.
Check for object drop-off	<p>This enables the software to check for activity around the left or removed item seconds before the alarm occurred (such as a hand reaching in). The pixel value defines the search area around the alarm.</p> <p>The reach width determines how big of an area around the left/removed item you want to search for motion.</p> <p>When selected, this option will reduce false alarms due to reflections, sudden lighting changes, etc. However there is a risk that a true alarm will be missed. For example when a person drops off or removes an item quickly the item might not be alarmed on.</p> <p>Increasing the reach width makes it easier to find the removing/adding motion; however, with a larger value, more motion is needed before the alarm is triggered.</p>

Table 15. Basic Settings (Continued)

Option	Usage
Reduce false alarms from still people	<p>May be used to reduce alarms caused by people standing in scene. The seconds value will determine how long to filter out still objects. A person can come into the scene and stand still for longer than the Left item duration causing a false alarm. This option can be used to remove these false alarms.</p> <p>When this option is enabled, an object of a person size standing still is alarmed on after Time to wait for still people (seconds) NOT after Left item duration (seconds). It is assumed a person will move within Time to wait for still people (seconds), which is set larger than Left item duration. This option ONLY affects objects of a person size as determined by the perspective configuration information.</p>
Reduce reflection	<p>Enables another filter that attempts to reduce false alarms caused by reflections. The slider controls how aggressively to eliminate reflections.</p> <p>Turning on the feature:</p> <ul style="list-style-type: none"> • Reduces false alarms due to reflections • Increases chance of missed alarms <p>Move slider to right</p> <ul style="list-style-type: none"> • Less aggressive reflection control • More alarms due to reflections but less missed alarms <p>Move slider to left</p> <ul style="list-style-type: none"> • More aggressive reflection control • Less alarms due to reflections but more chance of missed alarm
Camera looking at shelf	This should be enabled or disabled depending on camera location relative to shelf.

10. Click **OK** to save configuration changes.

11. The default settings in the **Advanced** tab are sufficient, but you may have cases where adjusting values would be beneficial. Consider the following:

- The advanced settings are a trade-off between detecting false alarms and missing true alarms.
- The default values were set with the assumption that for 99% of the time you do not want to miss any alarms even if some are false.
- Ideally place the camera such that there is little or no occlusion of the alarmable region by a person. This way you can minimize the false alarms due to people standing still. This is particularly important if you have a very small **Left Item Duration** below 60 sec.
- If you cannot place the camera so there is no occlusion of alarmable region by people, place camera such that the entire person is in view when they occlude the alarmable region AND set **Time to wait for still people** high; at least 60 sec, perhaps more.
- Also ensure that the perspective is set properly.
 - Zooming too much can at times cause false alarms do to the following reasons:
 - Parts of people might be detected as left/removed items.
 - Slightest lighting change will cause a large camera gain change, which will cause false or missed alarms.
- [Table 16 on page 62](#) provides details on advanced settings.

Table 16. Advanced Settings

Option	Description
Minimum fill rate %	<p>The default value was found to work for almost all cases. This value should be changed only as a last resort.</p> <p>Increasing this value:</p> <ul style="list-style-type: none"> • Reduces false alarms. • Increases chance of missed alarms (starting with objects on a diagonal). <p>Decreasing this value:</p> <ul style="list-style-type: none"> • Increases the chance of false alarms. • Ensures most true alarms are detected.
Time to recover or drop an item (seconds)	Determines how long [max time] it takes to remove or drop an item.
Minimum valid object dimension (pixels)	<p>Increasing the value:</p> <ul style="list-style-type: none"> • Reduces false alarms on noise. • Does not detect any small object. • Does not detect any object that looks similar to the background. (This happens in retail situations where the same products are stacked together.) <p>Decreasing the value:</p> <ul style="list-style-type: none"> • Increases false alarms for very small objects. • Increases the chance of detecting all true small alarms.
Merge small objects closer than (pixels)	<p>Similar to the Object merge distance option from the Basic tab but is used to merge objects that are smaller than the Minimum valid object dimension. If there are a lot of very small objects very close by, then when combined they should make a single valid alarmable object.</p> <p>Increasing the value:</p> <ul style="list-style-type: none"> • Increases false alarms but ensures you detect some objects that look similar to the background. <p>Decreasing the value:</p> <ul style="list-style-type: none"> • Reduces false alarms but misses some objects that looks similar to the background. <p>We recommend that you keep this value small.</p>
Grayscale background update rate	<p>Controls the long term background update rate.</p> <p>A fast update means only most recent frames are considered in obtaining the background.</p> <p>A slow update means only the older frames are considered in obtaining the background.</p> <p>Mainly effects the reflection reduction settings.</p> <p>Increase the update rate if you want to eliminate reflection objects but there is also a greater chance of missed detection.</p>

Table 16. Advanced Settings (Continued)

Option	Description
Time to clear long-term background (seconds)	Determines how long before a learned long-term background is forgotten. The larger the value, the longer the long term background is remembered even after being occluded by some other object. If an item is dropped then removed before Time to clear long-term background seconds, then no alarm will occur for the remove event.
Time to clear short-term background (seconds)	Determines how long before a learned short-term background is forgotten. This value determines how flexible the engine is in adapting to changing environments without causing false or missed alarms. Large value: <ul style="list-style-type: none"> • Ideal for less busy environments Small value: <ul style="list-style-type: none"> • Ideal for very busy environments
Background reset time after an object is deleted (seconds)	Determines how long to reset after a valid change object is discovered. During this time another object at the current location is not allowed. Large Value: <ul style="list-style-type: none"> • Decreases multiple alarms on same object. • Might miss a left item at the same spot, within this time period. Small Value: <ul style="list-style-type: none"> • Might have multiple alarms on same object. • Will not miss multiple objects at the same spot, within this time period.
Reset camera if this percentage of image becomes foreground in 1 frame	In two situations, you want to stop analysis and restart everything: <ul style="list-style-type: none"> • Sudden change in the video between frames (camera moves). • Slow change in the video within 5 frames (florescent lighting turned on).
Reset camera if this percentage of image becomes foreground in 5 frames.“	In two situations, you want to stop analysis and restart everything: <ul style="list-style-type: none"> • Sudden change in the video between frames (camera moves). • Slow change in the video within 5 frames (florescent lighting turned on).

Task 2: Creating a Rule using VE352

Procedure

To configure a Rule using the VE352:

1. You must configure the **VE352** before creating a Rule that uses the **VE352**.
2. From the **Server** menu, select **Configuration** and then **Rules**
3. Click **New**. The **Rule Wizard** opens. Read the overview and click **Next**.
4. Select the check box next to the camera name. If it is a PTZ camera, select the camera tour position check box.
5. From the **Select video engine for those running on camera** drop-down list, select **VE352**.
6. Using the displayed image from the video, define the area in red (a mask) where alarms should be set. (Not sure of the concept? See "[Motion Mask versus Alarm Mask](#)" on page 6.)
 - Select the **Erase** option to erase the red mask.
 - Select the **Draw** option to draw the red mask.
 - The **Size** slider adjusts the pen thickness.
 - The VE352 does not distinguish between a left or removed item.
 - Objects that are left or removed outside the red alarm zone will not cause alarms.
7. Specify what percentage threshold for an object, which is not fully inside an alarm zone, by adjusting the Alarm based on percentage of object inside alarm mask option.
8. (Optional) Alarm conditions may be filtered by enabling the **Alarm only if**, or **OR, at least** options. Both conditions can be enabled together or separately.
 - The **Alarm only if** filter is designed for retailers who want to alarm only if a certain number of items are removed from a shelf in a pre-determined time. For example, 2 LCD monitors must be removed before the event is triggered.
 - The **OR, at least** option is a work-around if multiple objects are removed but they are so close together it creates one bounding box (and therefore one alarm).
 - Therefore by combining both filters, many small background changes or one large background change (caused by a removed item) can trigger the event.
 - **Alarm only, if**: Defines how many alarms must occur in predetermined time
 - **OR, at least**: Defines the size of alarm before
 - **Alarms Occur**: Based on alarms detected
 - **Pixels Change**: Based on pixels changed
9. Click **Next** to continue in the **Rule Wizard**. Set up the rules as per concepts and instructions in "[Rules - Using the Rule Wizard](#)" on page 78.

Further Notes

Currently, there is no distinction between left and removed items.

Troubleshooting

If objects are too small, detection is difficult. Move camera closer to objects that are to be detected.

PT091 and PT090- Automatic PTZ Tracking

We recommend that you try the **PT091** Video Engine before trying **PT090**.

PT091 and **PT090** Video Engines are used to automatically control PTZ cameras when activity is detected. After the **PT091** or **PT090** is enabled for a PTZ camera, a Rule can be configured where the PTZ camera can be automatically controlled by Symphony to zoom and follow objects that have broken the Rule (such as entered into the alarm zone or crossed a tripwire).

Recommendations

- Minimize the number of moving objects in the camera's field of view that you do not want to track, for example, trees.
- Eliminate **On Screen Display (OSD)** of PTZ movements. Some cameras display information on the screen when panning/tilting/zooming. For example, "Zooming 5x" may appear in large letters at bottom of screen. The Symphony video engines may erroneously try to track this text instead of the objects of interest. Camera manufacturers typically provide a way to turn off this text. For example:
 - In a Bosch camera, you might select the **Camera OSD off** option in one of the **Settings Groups** of the camera Web page interface.
 - In a Pelco camera, you might have to click the **OSD** button, then select **Display Setup** and turn **OFF** various labels in the camera Web page interface.
- The camera must be stable, if wind or vibrations causes the camera to move, false alarms will occur.
- This engine does not perform well indoors, or where the objects are very close to the camera, or if the environment is very busy.
- Absolute positioning cameras are preferred over relative positioning cameras.
- MJPEG mode, or running MPEG-4 at higher frame rates increases performance.
- Ensure that enough available CPU is present to perform proper analysis.
- When troubleshooting, increase the frame rate and image quality settings.

How to Set up PT091 and PT090 Analytic Engines

Instructions apply to both **PT091** and **PT090** video analytic engines, henceforth referred to as **PT09x**.

- ["Task 1: \(Optional\) Set up the Camera Tour" on page 66](#)
- ["Task 2: Calibrate the PTZ Camera" on page 67](#)
- ["Task 3: Configure PT09x" on page 68](#)
- ["Task 4: Creating a Rule using PT09x" on page 73](#)

Additional Information

- ["Calibrating Many Cameras of the Same Make and Model" on page 75](#)

Task 1: (Optional) Set up the Camera Tour

1. In the **Camera Tree**, right-click on a PTZ camera. From the context menu, select **Camera Tour**. The **Camera Tour** dialog box opens.
2. Using the **PTZ Controls**, move the camera to where you want the Home position, and then click **Add Current Live View PTZ Location to the List**. This will be location 1 or Home.
3. Using the **PTZ Controls**, move the camera to where you want the second position, and then click **Add Current Live View PTZ Location to the List**. This will be Location 2.
4. Using the **PTZ Controls**, move the camera to each location you need for a tour, clicking **Add Current Live View PTZ Location to the List** each time. You can set up 8 locations (stops) on the camera tour.
5. For each location, you can define the amount of time in seconds that the camera pauses in that location. Enter the amount in seconds, for example, for a pause of 10 minutes you enter 600 seconds in the **Pause Time** field.
6. You can define a schedule for when the camera tour should be active. Click **Set Schedule for this Tour**. The **Schedule** dialog box opens. By default, the entire date/time chart is red, indicating **Active**.
7. By default, the **Inactive** option is selected. Using your mouse, click on the date and time intervals you want the Camera Tour to be inactive (green) and click **OK**.
8. Make any adjustments as necessary to your tour and click **OK**.

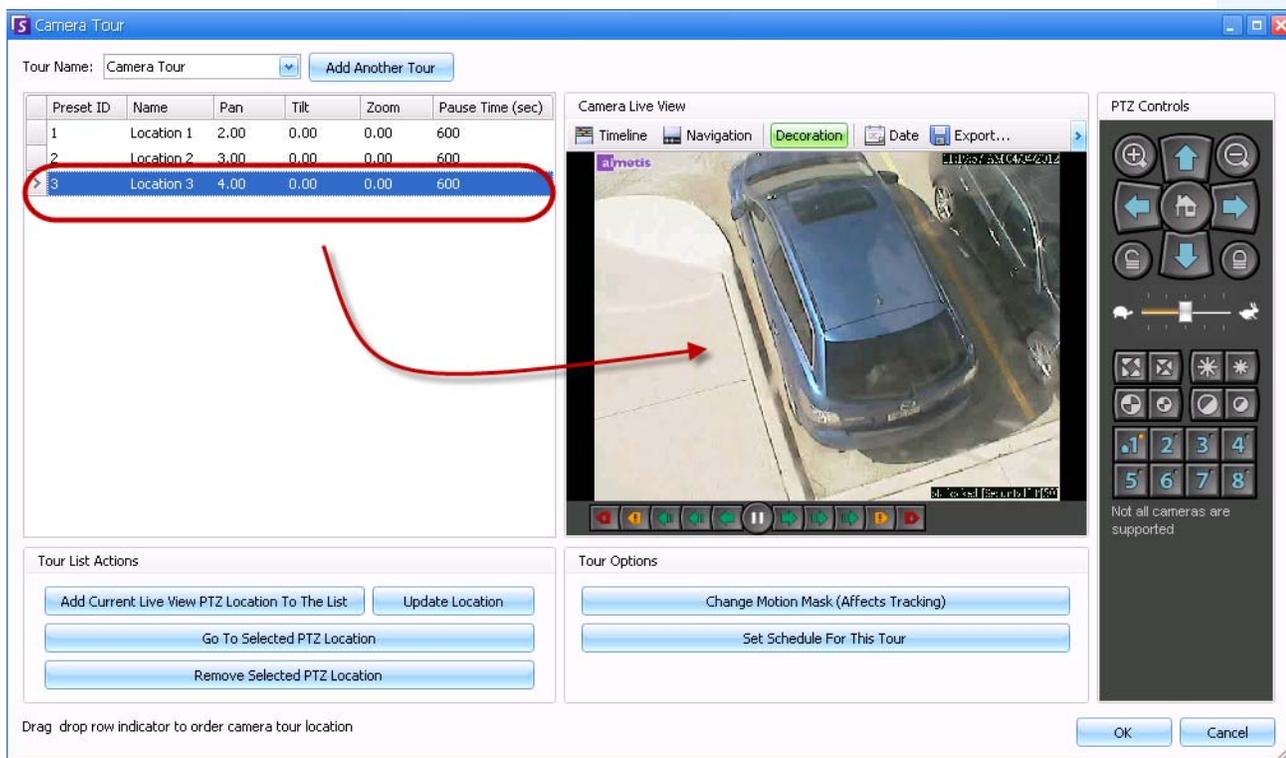


Figure 22. Camera Tour dialog box

Task 2: Calibrate the PTZ Camera

You must use a calibrated camera in order to use the **PT09x** Analytic Engine.

- Aimetis has a list of pre-calibrated cameras.
 - For uncalibrated absolute PTZ cameras, you must use the **PTZ Calibration** feature in Symphony:
 - The process may take up to 10 minutes
 - You must have a valid Enterprise license or you will receive an error message when you attempt to calibrate the camera
 - The calibration data for a camera is stored in the database and overrides any pre-calibrated data
 - If you have many absolute PTZ cameras of the same model, you can calibrate one and then save and apply the settings to other cameras of this model
1. In the **Camera Tree**, right-click on the PTZ camera and select **PTZ Calibration** from the context-menu.

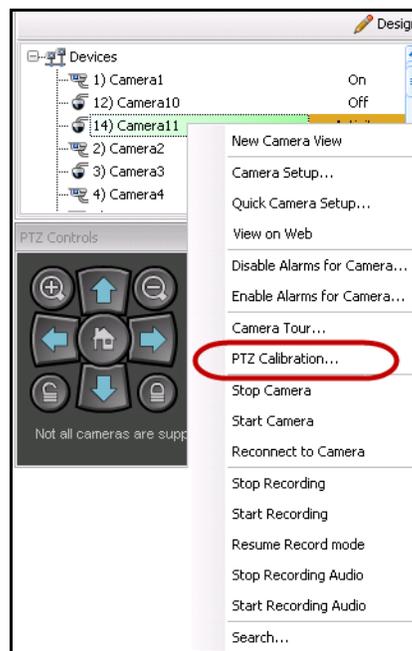


Figure 23. Right-click on PTZ camera for PTZ Calibration option

2. In the **PTZ Calibration** dialog box, click **Start Calibration**. The camera will run through a series of pans, tilts, and zooms.

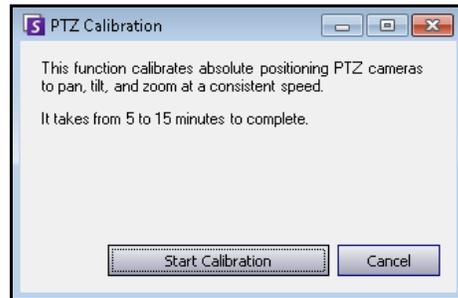


Figure 24. PTZ Calibration dialog box

3. In the **Calibration Complete** dialog box, click **OK**.

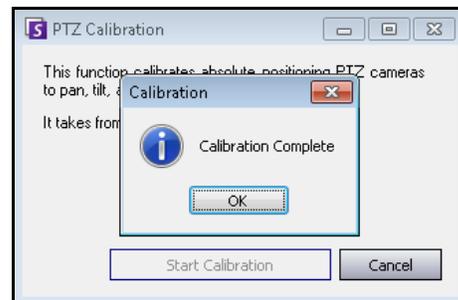


Figure 25. PTZ Calibration complete

Task 3: Configure PT09x

Procedure

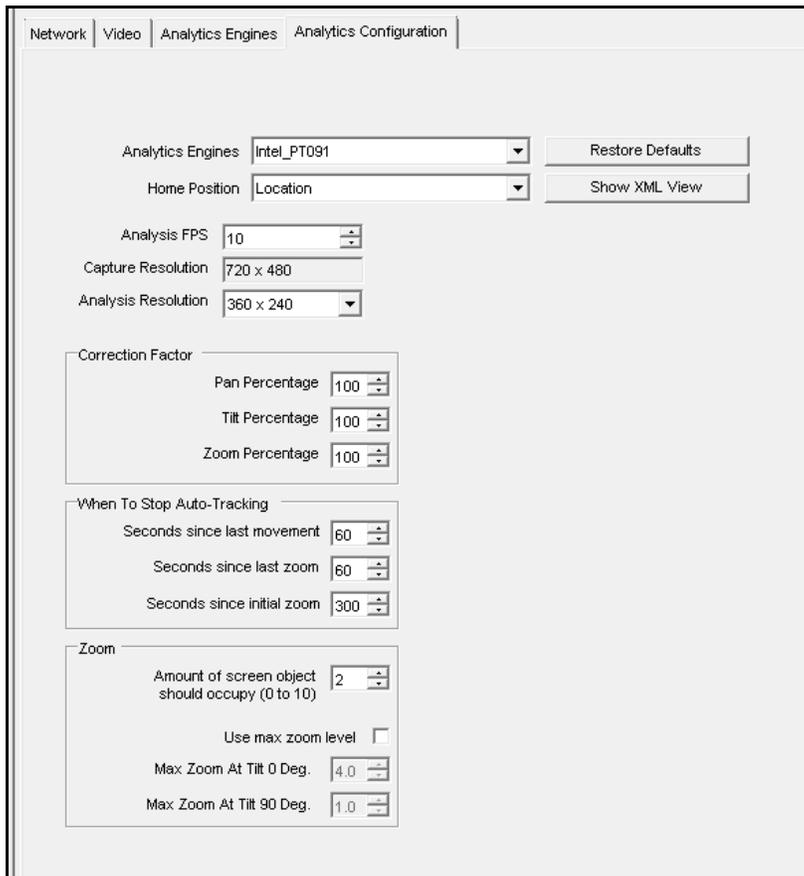
To configure the PT09x:

1. In Symphony Client, from the **Server** menu, select **Configuration**. The **Configuration** dialog box opens. This allows you to configure devices for the currently selected server.
2. In the left pane, click **Devices**. The **Devices** dialog box opens.
3. Click the camera you want to configure for use with video analytics and click **Edit**.
4. Click the **Analytics Engines** tab and select **PT091** or **PT090**. By default **VE250** is selected.
5. Configure the camera to also use the **PT09x**.



Important: The **PT09x** cannot be used by itself, since it is only used when auto-tracking has started. Typically the VE150 or VE250 analytic is also configured on the camera.

6. Click the **Analytics Configuration** tab. From the **Analytic Engines** drop-down field, select **Intel_PT091** or **Intel_PT090**. We recommend that you keep all default settings. Otherwise, consult [Table 17, "PT09x Analytics Configuration Settings,"](#) on page 70.
7. Click **OK** to save settings.



The screenshot shows the 'Analytics Configuration' tab with the following settings:

- Analytics Engines:** Intel_PT091 (dropdown)
- Home Position:** Location (dropdown)
- Analysis FPS:** 10 (spin box)
- Capture Resolution:** 720 x 480 (text field)
- Analysis Resolution:** 360 x 240 (dropdown)
- Correction Factor:**
 - Pan Percentage: 100 (spin box)
 - Tilt Percentage: 100 (spin box)
 - Zoom Percentage: 100 (spin box)
- When To Stop Auto-Tracking:**
 - Seconds since last movement: 60 (spin box)
 - Seconds since last zoom: 60 (spin box)
 - Seconds since initial zoom: 300 (spin box)
- Zoom:**
 - Amount of screen object should occupy (0 to 10): 2 (spin box)
 - Use max zoom level:
 - Max Zoom At Tilt 0 Deg: 4.0 (spin box)
 - Max Zoom At Tilt 90 Deg: 1.0 (spin box)

Figure 26. Analytics Configuration tab with Intel_PT091 engine selected

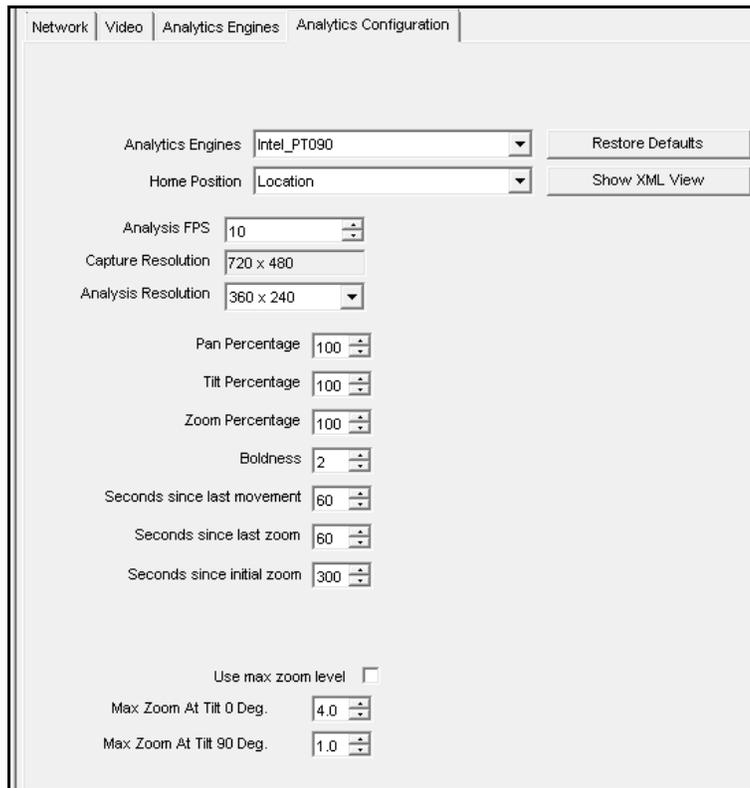


Figure 27. Analytics Configuration tab with Intel_PT090 engine selected

Table 17. PT09x Analytics Configuration Settings

Option	Description	Default	When to use
Analysis FPS	Indicates how many frames will be analyzed by the system.	10	Typically the default value should not be altered. To conserve CPU resources, you can lower the setting, but this may negatively alter the video engine performance.
Capture Resolution	Displays the resolution at which the video is recorded. This can be changed only in the Device setup.		Not applicable.
Analysis Resolution	Resolution that is used to analyze frames. Normally this is lower than Capture Resolution to conserve CPU.		Setting the Analysis Resolution to the same value as Capture Resolution ensures that objects will be detected as far away as possible. To conserve CPU resources, you can lower the setting, but this may reduce the detection range of the video analytic.

Table 17. PT09x Analytics Configuration Settings

Option	Description	Default	When to use
Pan Percentage	Enhances or dampens the control of the video engine.	100	If the camera overshoots or appears to be jumping a scene, reduce the percentage to ensure more stable tracking. Increase the percentage if it is too slow.
Tilt Percentage	Enhances or dampens the control of the video engine.	100	If the camera overshoots or appears to be jumping a scene, reduce the percentage to ensure more stable tracking. Increase the percentage if it is too slow.
Zoom Percentage	Enhances or dampens the control of the video engine.	100	If the camera overshoots or appears to be jumping a scene, reduce the percentage to ensure more stable tracking. Increase the percentage if it is too slow.
Seconds since last movement	Returns to the camera to home position after indicated seconds.	15	When the camera is not panning or tilting, and does not see anything moving anymore, it will return back home after 15 seconds (default).
Seconds since last zoom	Returns to the camera to home position after indicated seconds.	60	If the camera has been moving but not zooming, that is, it is caught on some small background movement.
Seconds since initial zoom	Returns to the camera to home position after indicated seconds.	150	The camera will return after this many seconds, no matter what it sees. For example, it has been tracking cars on the road.
Amount of screen object should occupy (0-10)	<ul style="list-style-type: none"> The video engine is trying to maintain the target as a certain fraction of the screen in width and height. 0 corresponds to 25% of the screen. 5 corresponds to 35% of the screen. 10 corresponds to 45% of the screen. 		Use a low value if you want to maintain more of a sense of the object's surroundings and want to minimize chances of losing the object. Use a high value if you want to zoom in close to better recognize the object, though this increases the risk of losing track.
Use Max Zoom Level	<p>This sets the maximum zoom level possible for a given tilt angle.</p> <p>Note: This does not mean you will reach this zoom level during tracking; it just guarantees you will never exceed this zoom level.</p>	Disabled because the max zoom level depends on where the camera is placed.	If you notice that the camera is zooming too much when tracking objects, use this feature to limit the max zoom. Limiting the max zoom can improve tracking at time.

Table 17. PT09x Analytics Configuration Settings

Option	Description	Default	When to use
Max Zoom At Tilt 0 Deg	When the tilt is 0 degrees you are looking into the horizon, so the distance between the camera and the object being viewed is large; a large zoom level is needed here.	10	If the video engine is zooming in too much when looking towards the horizon, then set zoom level appropriate to clearly see objects at the maximum distance you want to track them.
Max Zoom At Tilt 90 Deg	When the tilt angle is 90 degrees the camera is looking directly down, so the distance from the camera to the object being viewed is small (height of camera); a small zoom level is needed here.	1	Set to the zoom level appropriate to clearly see an object directly beneath the camera.

Task 4: Creating a Rule using PT09x

For illustrative purposes, a rule is created to zoom and follow objects that enter an alarm zone. You may set up many different kinds of rules. For details, see “[Rules - Using the Rule Wizard](#)” on page 78.

Procedure

To configure a Rule using the PT09x:

1. You must configure the **PT09x** before creating a Rule that uses the **PT09x**.
2. From the **Server** menu, select **Configuration** and then **Rules**.
3. Click **New**. The **Rule Wizard** opens. Read the overview and click **Next**.
4. Select the check box next to the camera name. If it is a PTZ camera, select the camera tour position check box.

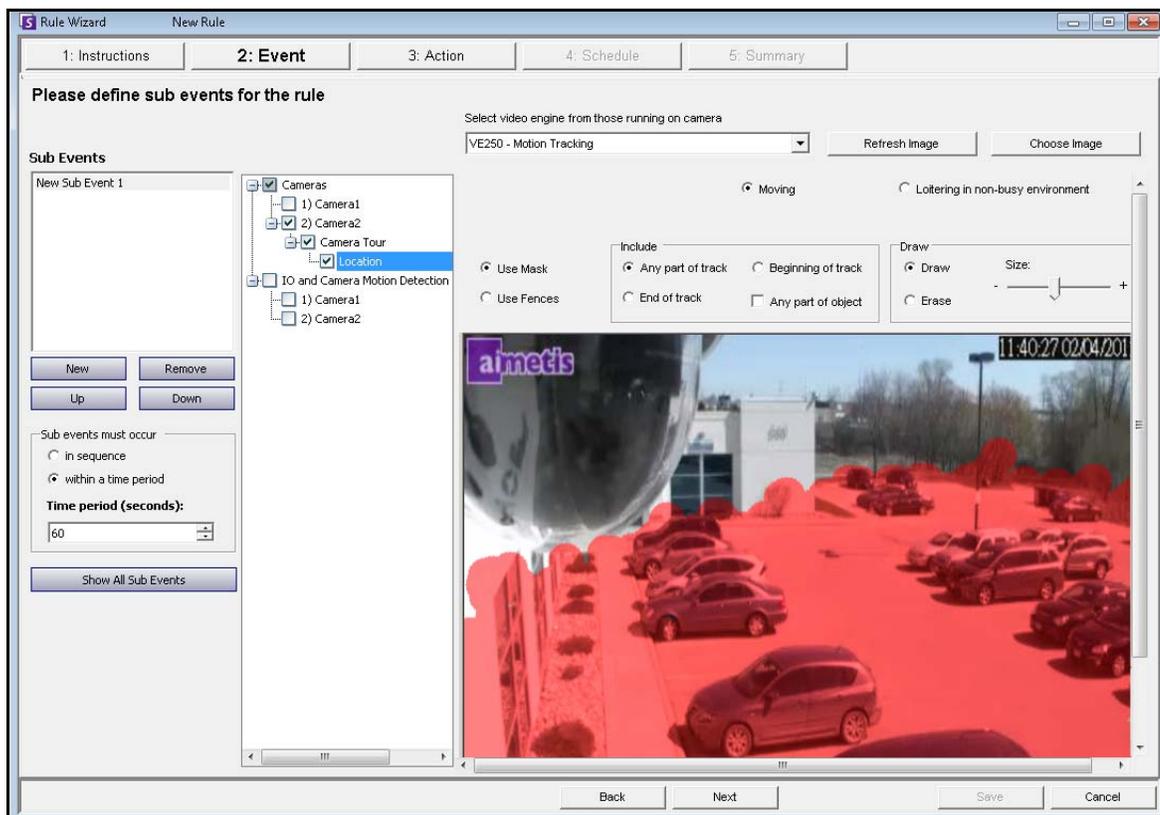


Figure 28. Rule Wizard - Example defining an alarm zone

5. From the **Select video engine for those running on camera** drop-down list, select **VE250**. (The engine should be the one you chose in “[Task 3: Configure PT09x](#)” on page 68.)
6. Select the **Draw** option and using your mouse paint the area in the image that you want to define as the alarm zone. If objects enter this area, the camera will zoom in and follow the objects.
7. Click **Next** to continue in the **Rule Wizard**. In the **Event** screen, **Alarm** tab, ensure that the **Raise Alarm** check box is selected.

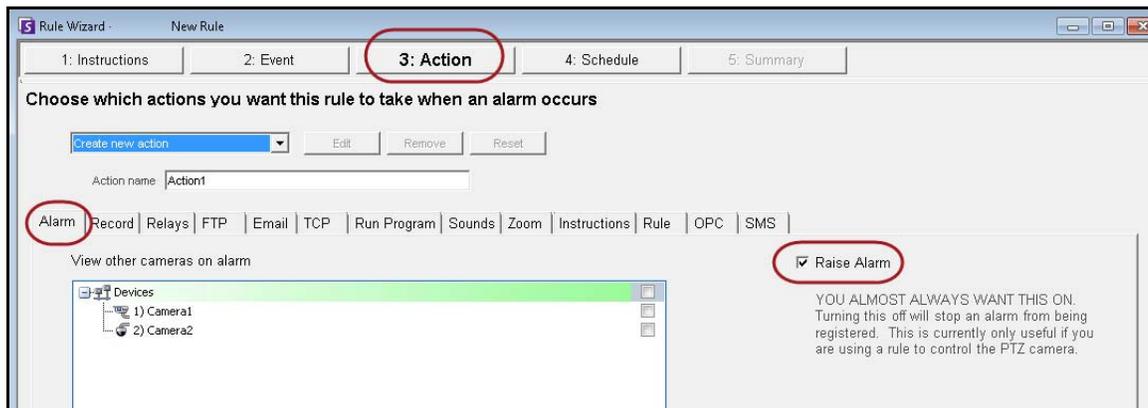


Figure 29. Raise Alarm option selected

8. Click the **Zoom** tab. Select the **Auto-tracking** check box. (The camera will zoom in on an object in an alarm zone and track the object.)

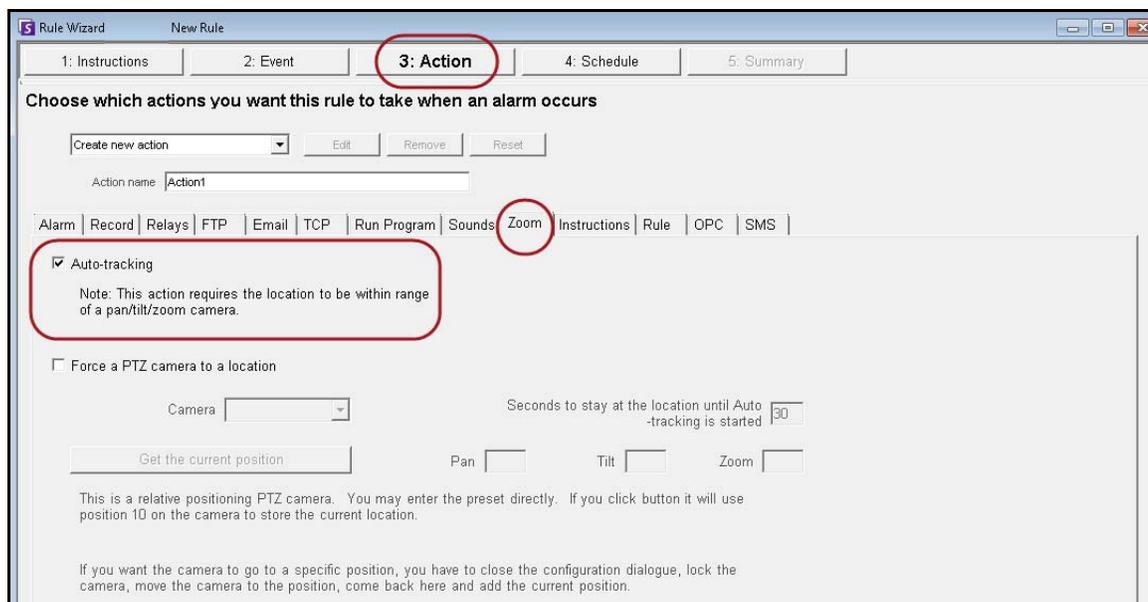


Figure 30. Zoom tab with Auto-tracking option selected

9. Click **Next** and set up a **Schedule** as necessary. For details, see "[Schedule](#)" on page 84 in the "[Rules - Using the Rule Wizard](#)" on page 78 section.
10. Click the **Summary** tab and give this rule a name, for example, *Object in Parking Lot*.

Calibrating Many Cameras of the Same Make and Model



Important: Ensure that you have calibrated the camera first. See “Task 2: Calibrate the PTZ Camera” on page 67.

Task 1: Obtain the Camera Model String

Note, certain setting changes require services to be manually restarted.

Settings

Type ID

Type	Section	ID	Key	Value	Action
Camera	Camera	14	Recompress	0	
Camera	Camera	14	ReloadTracker	11:05:34.1789007	
Camera	Camera	14	RestartTracker	11:47:06.8574738	
Camera	Camera	14	ServerID	5000	
Camera	Camera	14	video_settings	<multiStream><...	
Camera	Camera	14	XmlCapsCache	Intel_PT091.dll,C:...	
Camera	Client	14	cameratable	nm=Camera11	
Camera	Client	14	DetectionXML	<AirDevices><+>	
Camera	PTZ	14	PTZInfo	<AirDevices><Status>OK</Status><Manufacturer name='Axis'><Model name='AXIS Q6035-E' type='PTZ Camera'>	
Camera	PTZ	14	PTZMaxLockedMi...		
Camera	PTZCalibration	14	PTZCalibration		

Copy Setting Delete Setting Revert Setting

```
<AirDevices><Status>OK</Status><Manufacturer name='Axis'><Model name='AXIS Q6035-E' type='PTZ Camera'><MaxZoom>20</MaxZoom><PanSpeed>75</PanSpeed><TiltSpeed>75</TiltSpeed><ZoomSpeed>10</ZoomSpeed><HomeFOV>48</HomeFOV><PTZ>1</PTZ><PanRange>360</PanRange><TiltRange>180</TiltRange><ZoomRange>20</ZoomRange><PanSpeedMin>1</PanSpeedMin><PanSpeedMid>50</PanSpeedMid><PanSpeedMax>94</PanSpeedMax><TiltSpeedMin>1</TiltSpeedMin><TiltSpeedMid>27</TiltSpeedMid><TiltSpeedMax>48</TiltSpeedMax><ZoomSpeedMin>5</ZoomSpeedMin><ZoomSpeedMid>5</ZoomSpeedMid><ZoomSpeedMax>5</ZoomSpeedMax><AspectRatio>1.3333333333333333</AspectRatio><PTZ_Protocol>Axis</PTZ_Protocol><Video>1</Video><Network>1</Network><devname>VideoRecvAxis</devname><DefaultUsername>root</DefaultUsername><FrameRate default='5'>All</FrameRate><ImageFormat default='H264'>MJPEG,H264,H264 Unicast,H264 Multicast,H264 Over TCP,H264 Over HTTP,H264 Over HTTPS</ImageFormat><Firmware_Version>5.25</Firmware_Version><HTTP_Version>3</HTTP_Version><Resolution default='704x480'>1920x1080,1280x720,800x450,480x270,320x180</Resolution><XmlOption>DIO=1</XmlOption><DIONumInputs>0</DIONumInputs><DIONumOutputs>0</DIONumOutputs><MultiStream>1</MultiStream><MotionDetection>1</MotionDetection><ChangeFPS>1</ChangeFPS></Model></Manufacturer></AirDevices>
```

Figure 31. Obtain camera model string

1. From the **Server** menu, select **Manual Configuration Editor**.
2. Expand **Type: Camera**
3. Find the **ID** of your camera and expand it.
4. Find the row where Section= **Client** and Key= **DetectionXML**.
5. In the **Value** column, click the + sign to expand the field. Copy the manufacturer and model name. For example:
<Manufacturer name='Axis'><Model name='AXIS Q6035-E' type='PTZ Camera'>

Task 2: Copy calibrations settings from camera

- Using the same camera ID from “Task 1: Obtain the Camera Model String” on page 75, find the row where Section=PTZ Calibration and Key= PTZ Calibration
- In the Value column, click the + sign to expand the field. Copy the contents of the Value field.

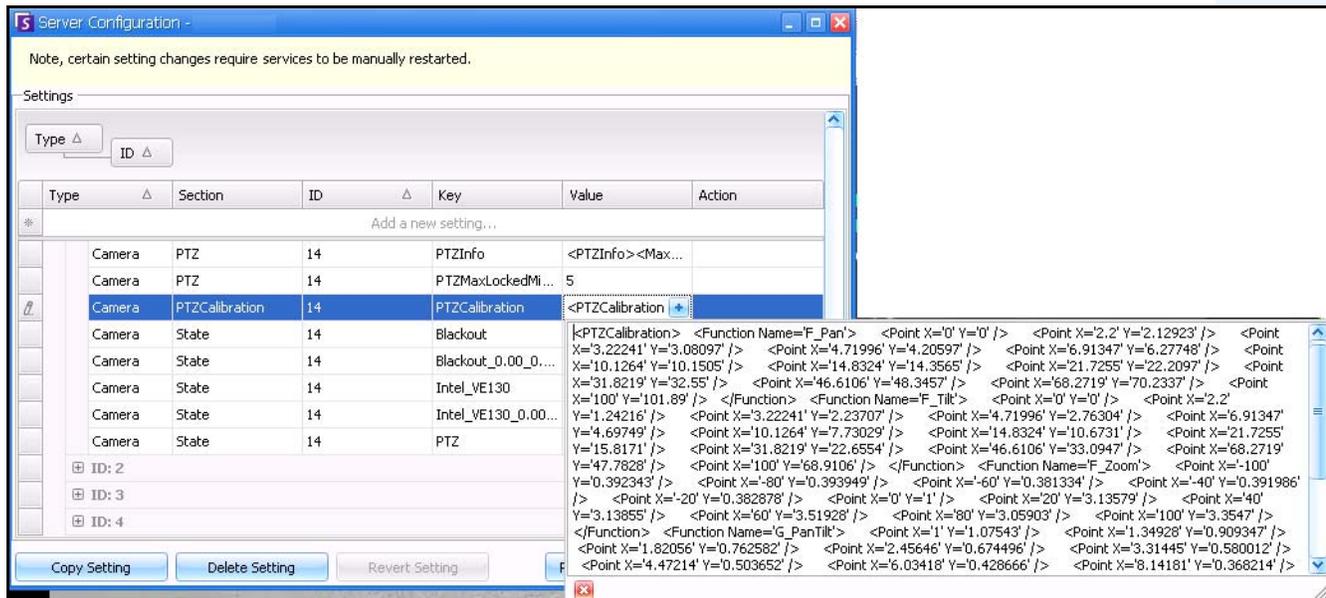


Figure 32. Copy content from PTZ Calibration Value field

Task 3: Apply calibration settings copied from one camera to cameras of the same model

- Expand **Type: Global**.
- Click **Add a new setting...** in the first row to activate the cells. Enter the following settings (indicated in bold font) in the first row under the specific column headings:
 Type=**Global**
 ID
 Section=**PTZCalibrationOverride**
 Key= **<Camera Model String>**
 Value = **<XML Calibration String>**

Where Key must be entered as **<Manufacturer name><Space><Model Name>**. This information is from the Value field for Key=**DetectionXML** that you found in “Task 1: Obtain the Camera Model String” on page 75. Using the example from Task 1, **<Manufacturer name><Space><Model Name>** would be **Axis AXIS Q6305-E**.

- Paste contents you copied in “Task 2: Copy calibrations settings from camera” on page 76 (PTZ Calibration) into the Value field.
- To confirm your entry, click the **Action** cell and click **OK**

VE410 - License Plate Recognition

Automatic License Plate Recognition is available as a video engine inside Aimetis Symphony. The VE410 allows you to detect and index license plates. It is designed for vehicle access control applications as well as traffic control and enforcement applications.

- For complete instructions on field installation and planning, software installation, and analytics configuration, see the **Aimetis Automatic License Plate Recognition (ALPR) Guide**.
<https://www.aimetis.com/xnet/Support/documentation.asp>

Rules - Using the Rule Wizard

A Rule is user-definable and generates Alarms in Symphony. Alarms can occur as a result of a video event (such as video motion detection) or a signal from another device (such as I/O devices). The **Rules Summary** dialog box lists all the current Rules and allows you to add, edit, delete, disable and enable each one.

Procedure

To access the Rules Summary dialog box:

1. From the **Server** menu, select Configuration. The **Server Configuration** dialog box opens.
2. In the left pane, click **Rules**. The **Rules Summary** opens in the right pane.

Options available in the Rules Summary:

- **New** - Create a new rule.
- **Edit** - Modify an existing rule. Select the rule on the list and click **Edit**.
- **Delete** - Delete an existing Rule. Select the rule on the list and click **Delete**.
- **Disable**- Temporarily disable a rule instead of deleting it entirely. Select the rule on the list and click **Disable**.
- **Enable** - Enable a rule that has been disabled. Select the rule on the list and click **Enable**.

Disable Alarms for Server

The **Disable Alarms for Server** dialog box allows you to disable all the alarms for the currently selected server. This is useful in cases where all alarms should be disabled for a period of time on the server. This is faster than manually disabling individual Rules.

Procedure

To quickly enable or disable all Rules:

1. From the **Server** menu, select **Disable Alarms for Server**.
2. Specify the amount of time to disable the alarms for the current server and click **OK**.

Overview of Process

You must configure the Event, Action, and Schedule for each rule.

- Set Event - Define what causes an Alarm, such as motion detected, people loitering, I/O inputs, etc.
- Set Actions - Define what actions Symphony should take after the alarm is detected.
- Set Schedule - Define which times the Alarm Rule is active.



Note: Rule elements can be reused. For example, if you change the "24/7" Schedule, it will affect all Rules that use this Rule Element.

Events

The first Rule Element to configure is the Event.

- An Event may comprise one or more sub-events. For example, the Event may involve a car stopping and a person loitering within 30 seconds before the Event is triggered.
- The Event could also be an input from an Alarm IO device, or Video Motion Detection (VMD) detected on a network camera.

Selecting a camera as input

Procedure

To configure the Event dialog when selecting a camera as an input:

1. Select a camera to assign to a rule.
2. Select which video engine to configure from those running on camera.
3. Define what alarming attributes this rule will have, such as an alarm zone, or class of object (that is, people, vehicles). Depending on the video engine, different options will be available.
4. If only one event will be used in the rule, click **Next** to continue.
5. If other events are to be included, click the **New** button in the left pane under **Sub Events**.
 - a. Repeat steps 1-3 above. You can select a different analytic engine for the same camera to combine the Events in the Rule.
 - b. In the **Sub Events** group area you will notice two events listed. You can rename the sub-event to something more descriptive: Click inside the **Sub Events** group area and select the sub-event.
 - c. In the **Sub events must occur** group area, you can define what order or what period of time all the sub-events must occur before the alarm will take place.
6. Click **Next** to configure the **Actions**.

Selecting an I/O device as input

Alarm inputs include Video Motion Detection (VMD) from network cameras, external I/O devices, and many others.

Procedure

To configure the Events dialog when selecting the I/O or VMD as an input:

1. Select which Digital I/O Devices (DIO) to assign to this Rule. The **Triggered by camera** group area appears.
2. Enter which **Input Number** to control, and then select if it should be **Activated** or **Deactivated** to trigger the event.
3. Click **Next** to configure the **Actions**.

License Plate Recognition

If you are using the **VE410 - License Plate Recognition** video engine, you will see additional options in the **Rule Wizard**.

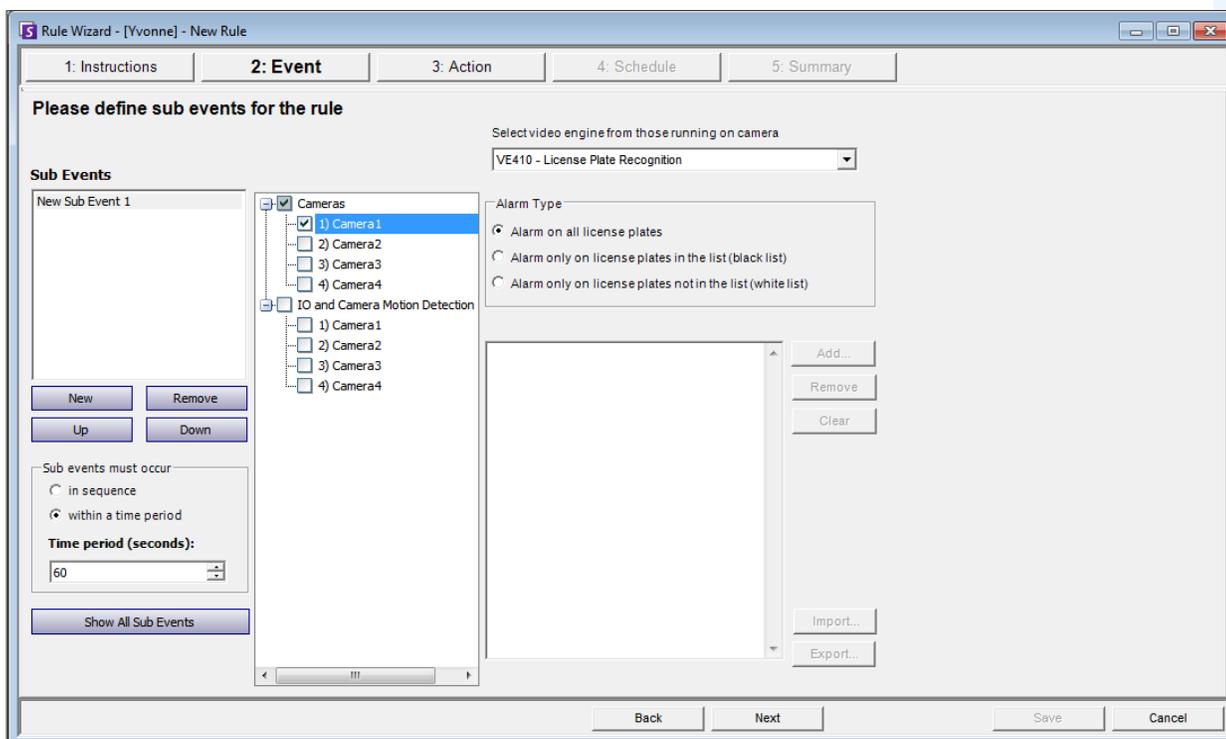


Figure 33. Rule Wizard - Events tab for License Plate Recognition

After selecting the camera or IO/VMD devices, select the **Alarm Type**.

- **Alarm on all license plates** - a useful option when a perimeter should not be crossed at a specific time, for example, a parking lot at night
- **Alarm only on license plates in the list (black list)** - any plates seen by the system that are on the list will raise an alarm

- **Alarm only on license plates in the list (white list)** - any plates seen by the system that are **not** on the list will cause an alarm
- You can **Add** a license, **Remove** a license, or **Clear** the list of license plates.
- You can **Import** a black list or white list of license plates. The list must be stored in .CSV format, for example, license plate number [comma] followed by plate type.
 ABCD123, Ontario
 171807, Illinois
- You can **Export** the list to save it on your computer for future use as well. The list will be stored in .CSV format, for example, license plate number [comma] followed by plate type.

Actions

While the Events define what causes an alarm, Actions specify what Symphony should do as a result.

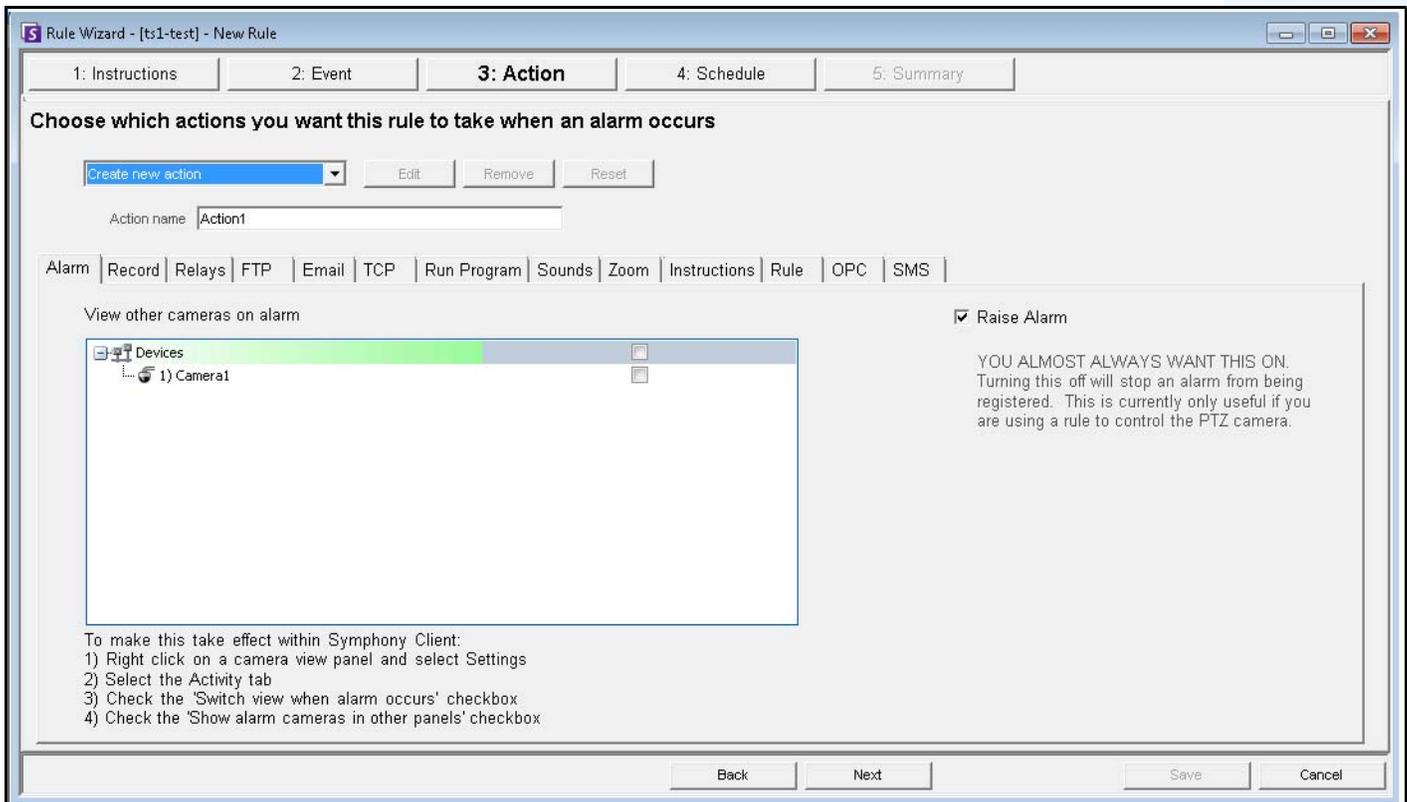


Figure 34. Rules Wizard - Action

Table 18. Rules Wizard Action Section tabs

Tab	Description/Usage
Alarm	<p>If Raise Alarm check box is selected, the Timeline and Alarm Log will reflect an alarm has occurred. When this check box is clear, the opposite is true. However, all other actions specified will still occur.</p> <p>This is useful in the case of zooming with PTZ cameras since it may be unnecessary to show an alarm every time the camera automatically zooms.</p>
Record	<p>The Record check box will ensure video recording for this camera occurred, even if the default setting for the camera is No Recording as defined in the Device setup.</p> <p>The Start recording on other cameras selection is required in cases an alarm I/O has been selected as the event. You select the camera that will be associated with this alarm for the purposes of adding the event to the camera's Timeline.</p>
Relays	<p>Use this to automatically send an electrical signal to an external device whenever an alarm occurs. This would be useful if you setup a Rule that detected when cars were stolen and you wanted Symphony to automatically close a gate or turn on a light. Symphony has been designed to work with alarm relays (such as the QK108) to connect via the serial port of the Symphony Server.</p> <p>Trigger Relay check box allows you to set if the relay should be turned on, off, or toggled.</p> <p>Relay # field allows you to define which address of the relay board to control.</p> <p>Restore state after check box allows you to specify how long the relay should be in its current state before being reset.</p> <p>For more information, visit the Aimetis Knowledge Base article on configuring Alarm Relays.</p>
FTP	<p>You can specify Symphony to automatically send a jpg to a FTP site after a Rule is broken. The jpg features and filenames are configured in this tab.</p> <p>The filename can be automatically generated based on the date, time, Rule and camera information using the symbols shown in the FTP tab.</p> <p>Examples of filename patterns are:</p> <p>%d 2004_06_30.jpg</p> <p>%t 14_01_45_050.jpg</p> <p>%d-%t 2004_06_30-14_01_45_050.jpg</p> <p>%m-%a-%h 05-30-14.jpg</p> <p>%h_%i_%s_%l_%p 14_01_45_050_My_Rule.jpg</p>
Email	<p>You can configure Symphony to automatically send email messages whenever an alarm occurs. You may specify multiple recipients. Each recipient will receive an email with a picture attached of the event which caused the alarm. The email will include a hyperlink to the Aimetis Symphony Web Access application that will navigate to the alarm in question.</p> <p>The email will also include a hyperlink to the alarm's actual jpg file on the server.</p>

Table 18. Rules Wizard Action Section tabs (Continued)

Tab	Description/Usage
TCP	Opens a TCP socket to some IP & port, and sends the specified ASCII message. This is a generic way to interface with any access control system or other device.
Run Program	<p>By configuring this, Symphony can execute another 3rd party program.</p> <p>Working Directory - Must contain the path to the program\bat file. For example: C:\Program Files\Aimetis\Symphony_bin</p> <p>Executable Name - Must contain the path and program of cmd (for bat files at least). For example: C:\Windows\System32\cmd.exe</p> <p>Arguments - Must contain the batch file name and the "/C" parameter. For example: /C RecordToggle.bat</p>
Sounds	You can configure Symphony to play a pre-recorded sound when a Rule is broken. You can upload files to Symphony and select which sound file (such as a .wav file) to play when the current Rule is broken. This might be useful to automatically warn trespassers that the property is under surveillance.
Zoom	<p>Allows you to specify actions for a dome (PTZ) camera after the current Rule Trigger is detected.</p> <p>By selecting the Auto-tracking check box, the camera will leave its Home Position and automatically zoom and track the object.</p> <p>If you select the Force a PTZ camera to a location check box, you must specify a pre-programmed position for the camera to move to. This is useful if you want to create an alarm Rule where the trigger is a Hardware Alarm input (I/O device selected from the list of devices on the Alarm tab). For example, perhaps a motion detector or even a fixed camera caused an alarm, you could force the PTZ camera to automatically move to its location for further investigation. This will not work if the Trigger Rule element is not region specific (such as a Cord Cut alarm).</p>
Instructions	You can bind specific instructions to a Rule. This tells a monitoring agent or operator what to do in case of alarm. When an alarm occurs it appears in the Alarm Log of the Main Console.
Rule	After an alarm occurs, one of the Actions can be set to automatically enable or disable other Rules.
OPC	Symphony can interact with OPC servers on alarm by configuring this tab.
SMS	Symphony can send messages via SMS as a result of the alarm by configuring the COM Port, Baud Rate and adding a Phone Number as required.

Schedule

Schedule, or time period, is the last rule element you define. The **Schedule** dialog box allows you to specify on a weekly basis when the new Rule should be active or inactive. You set different alarm schedules for different Rules.

If the Rule is disabled (in the **Rules Summary**), the schedule is ignored and Actions for that Rule will not be triggered.

The alarm schedule is set in 30 minute intervals only. By default, the schedule is completely red (armed).

Procedure

To modify the alarm schedule:

1. Give the new Schedule a descriptive name in the **Name** field, or reuse an existing Schedule by selecting it from the **Create new schedule** drop-down field.
2. If a new schedule is being created, select the **Armed** or **Unarmed** option, and drag the alarm schedule over to set the schedule.
3. Click **View Exceptions** to set an exception to this weekly schedule. An example might be holidays.
 - a. To set exceptions, mark each half hour increment in red or green. Red means it is armed, green means it is disarmed.
 - b. If a day already has exceptions it will be displayed in bold in the calendar. The current day is highlighted in blue.
4. Click **OK** to save your changes, or the X at the top of the form to close it without saving changes to the current day.
5. Click **Next** to move to the next dialog in the Rule Wizard. The **Summary** displays the essential elements of the rule you created.



Note: You can re-use Rule elements between rules. For example, if you have 2 rules, both may use the same Schedule or Action. Do not, for instance, create 2 schedules that are both 24/7.

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