



VCA (Video Content Analysis) Package User Guide

For package revision 3.1.3 and later

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Rev. 1.1

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Overview

The VCA package is an embedded software application package installed and runs on VIVOTEK cameras. It benefits staff planning, customer flows, shop arrangement, and evaluation of marketing decisions. It is cost-efficient, flexible, and the calculations take place on the camera without the need for another computer. The VCA package comes with the following features:

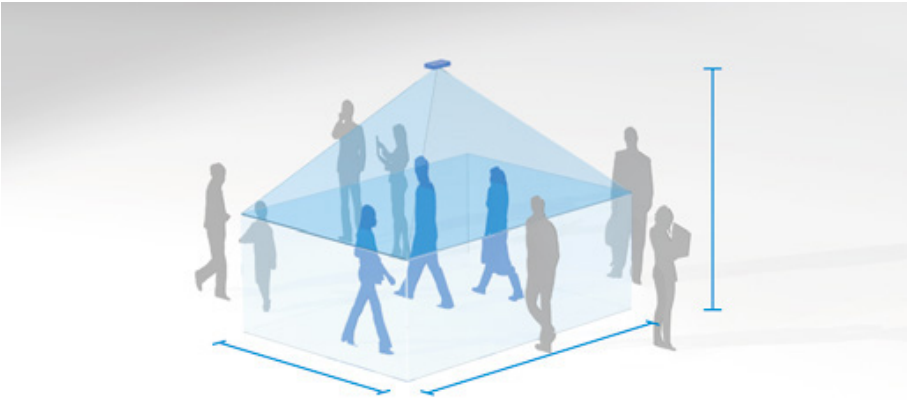
- 1. Line crossing detection:** Bi-directional line crossing detection of objects moving across lines.
- 2. Field detection:** Events will be triggered with objects moving into or out of a configurable field of interest.
- 3. Loitering detection:** Objects that linger in a detection zone for longer than a configurable threshold will trigger an alarm.



NOTE:

After you upload a license, you should stop and re-start the VCA. Most cameras come with a pre-loaded package and license.

FoV Tables



* All numbers are measured in centimeters.

CC8370-H(S)V			FD8166A-S		
Camera Height	HFOV	VFOV	Camera Height	HFOV	VFOV
200	314	212	200	122	51
220	394	322	220	182	74
240	494	452	240	242	99
260	590	572	260	303	124
280	687	682	280	364	148
300	764	785	300	424	173
320	890	912	320	485	197
340	960	1005	340	545	221
360	1054	1104	360	606	246
380	1168	1221	380	667	270
400	1263	1331	400	727	295
			420	789	319
			440	849	344
			460	909	369
			480	971	392
			500	1031	417

1. Starting the Feature



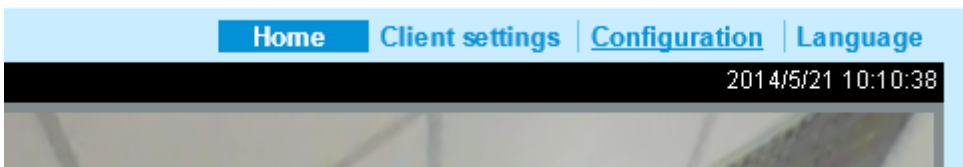
IMPORTANT:

A web console with the camera can only be made using IE10 or IE11 browser.

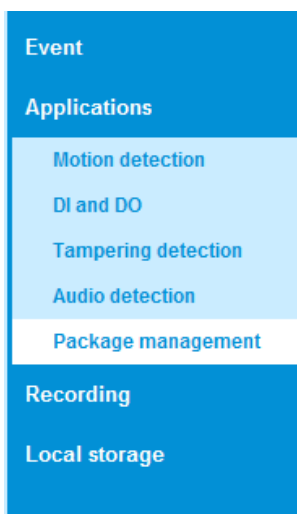
1. Open a web console with camera. You may use the Shepherd utility for searching the camera within a network.



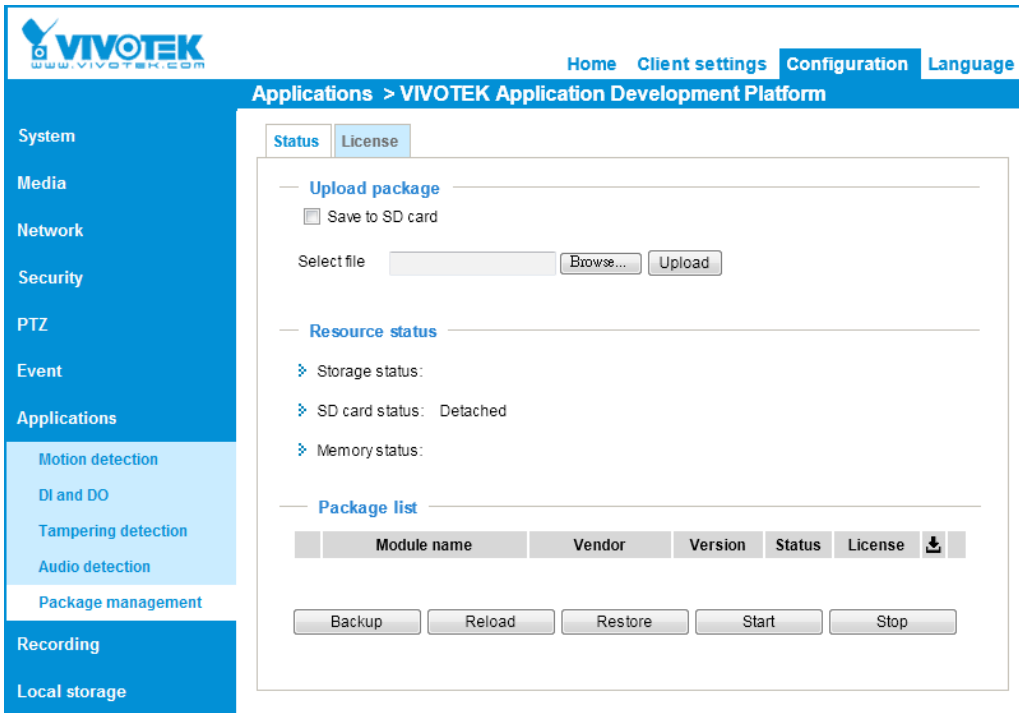
2. Click on the **Configuration** tab to open the main configuration window.



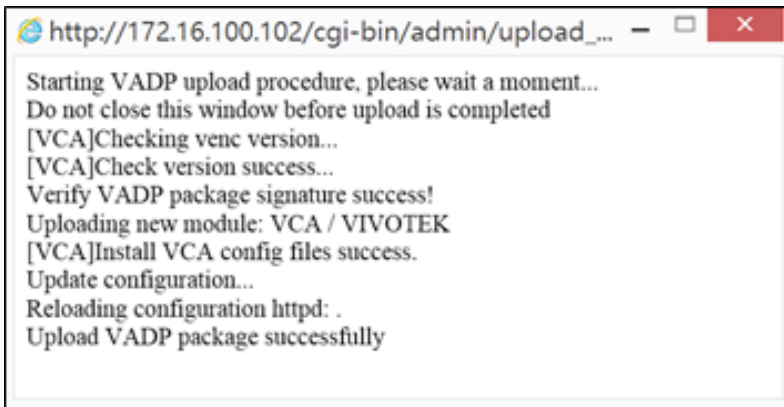
3. When in the main configuration window, open the **Applications > Package management** window.



4. You can download the VCA package from VIVOTEK's website or acquire it through your distributor or sales. Acquire the package files and click the Browse button to locate the VCA package you received. The web address is: <https://www.vivotek.com/standard-vca/#downloads>.



5. Click the **Upload** button to upload the VCA package. For a package file, the file extension name is ".gz." The screen message for a successful upload is shown below:



6. Below is the screen showing when the package is successfully loaded.

The screenshot displays the VIVOTEK web interface for Package management. The left sidebar contains navigation options: System, Media, Network, Security, PTZ, Event, Applications, Recording, and Local storage. The 'Applications' section is expanded, showing sub-options like Motion detection, DI and DO, Tampering detection, Audio detection, and Package management. The main content area has tabs for 'Status' and 'License'. Under 'Upload package', there is a 'Select file' input with a '瀏覽...' button and an 'Upload' button. Below this is a 'Resource status' section with expandable items for CPU Status, Storage status, and Memory status. The 'Package list' section contains a table with the following data:

	Module name	Vendor	Version	Status	License		
<input type="radio"/>	Trend Micro IoT Security	VIVOTEK	1.0.2	Installed	N/A		
<input type="radio"/>	GENETEC	VIVOTEK	1.0a.a0.0.0	ON	N/A		
<input type="radio"/>	VCA	VIVOTEK	6.0.28	ON	N/A		
<input type="radio"/>	StandardVCA	VIVOTEK	3.1.3.04028	ON	Pass		

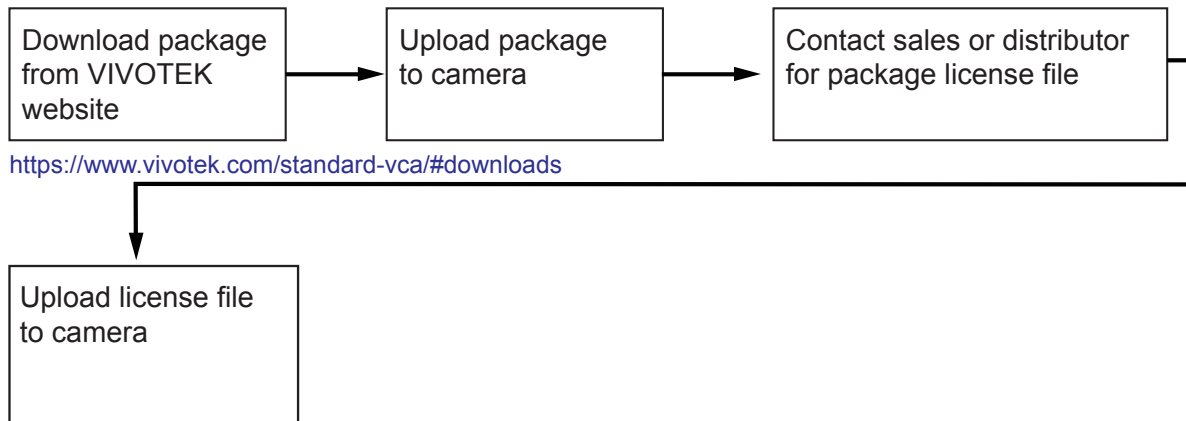
At the bottom of the package list, there are buttons for 'Start', 'Stop', and 'Schedule'. The footer of the interface shows 'Version: 0101d_49'.



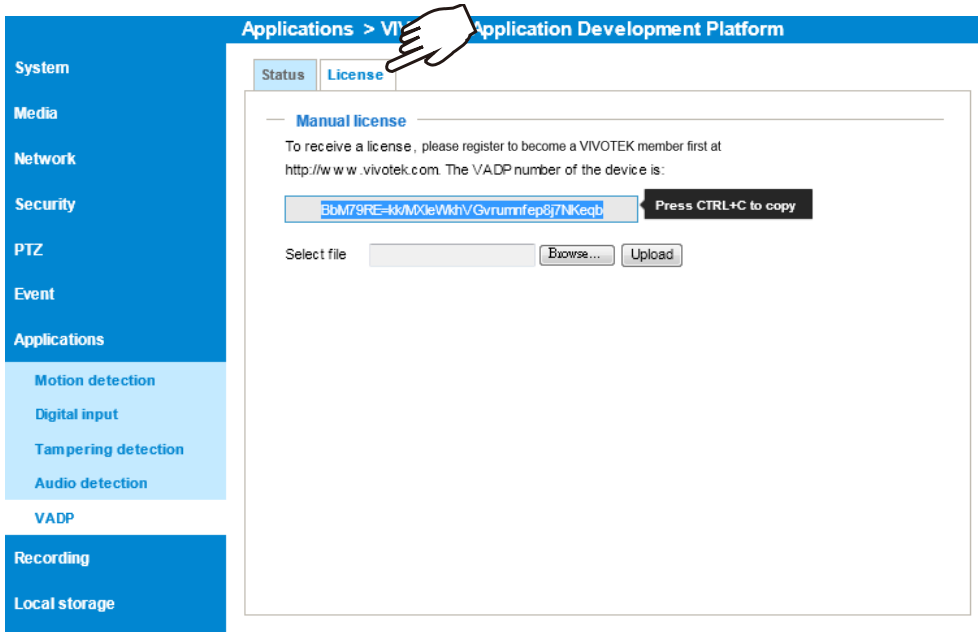
NOTE:

Removing a package will also clean all reports and associated configurations.

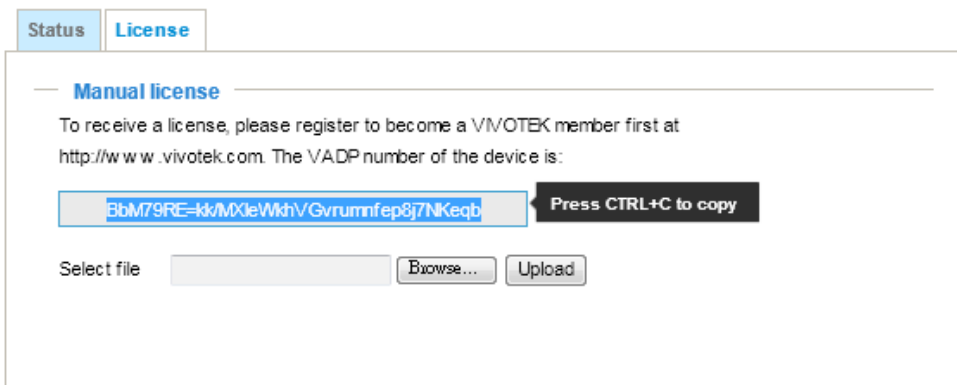
2. Manual Licensing



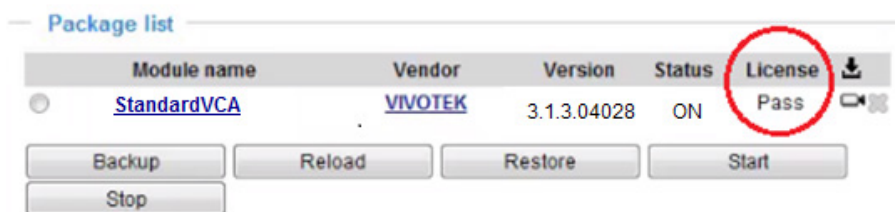
2-1. Click on the License tab (on the web console with the camera) to open the License window.



2-2. On the License page, use the Browse and Upload buttons to upload the license.



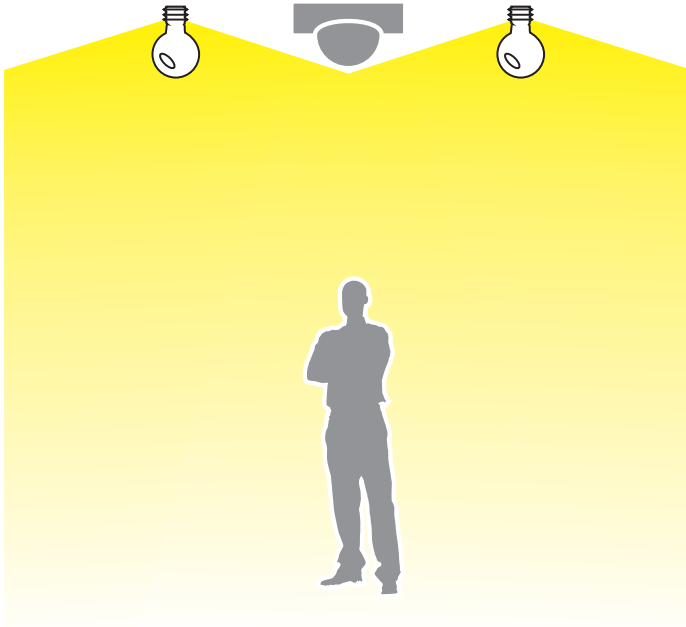
2-3. On the Status page, you can see the license status is indicated as Pass.



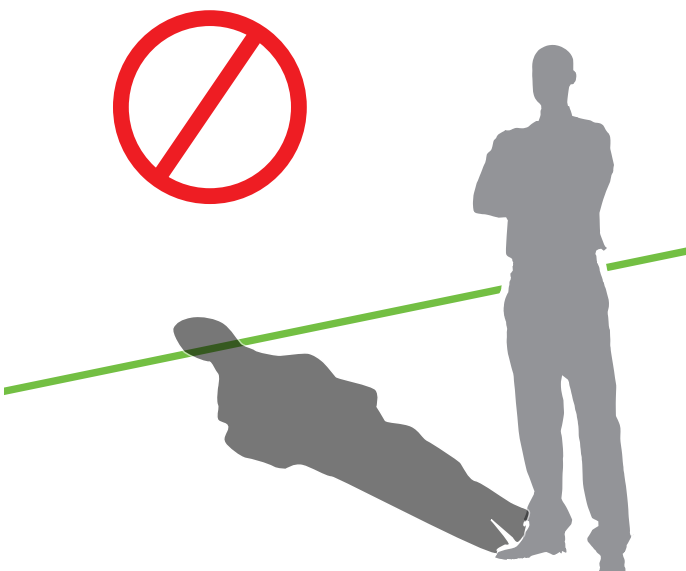
3. Applicational Considerations

Note the following when planning the camera installation:

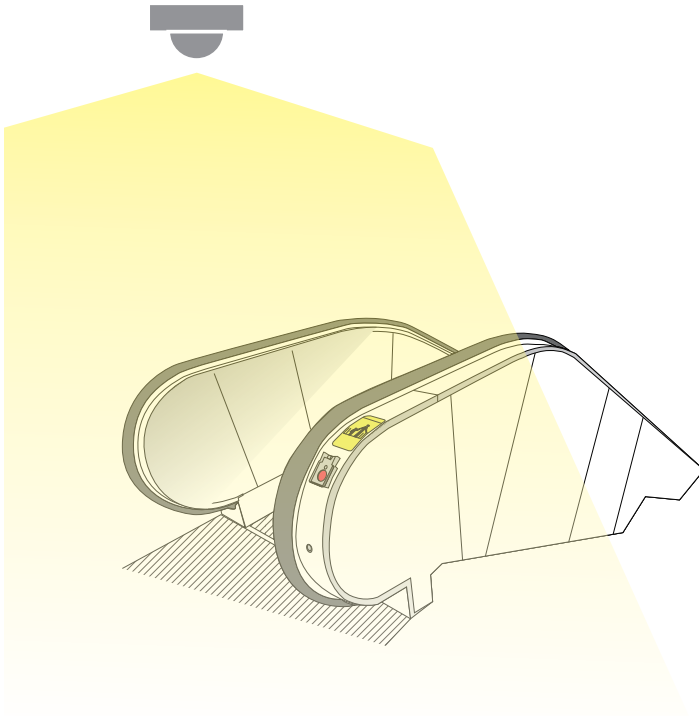
1. The installation site must be adequately lighted for optimal accuracy with video analysis.



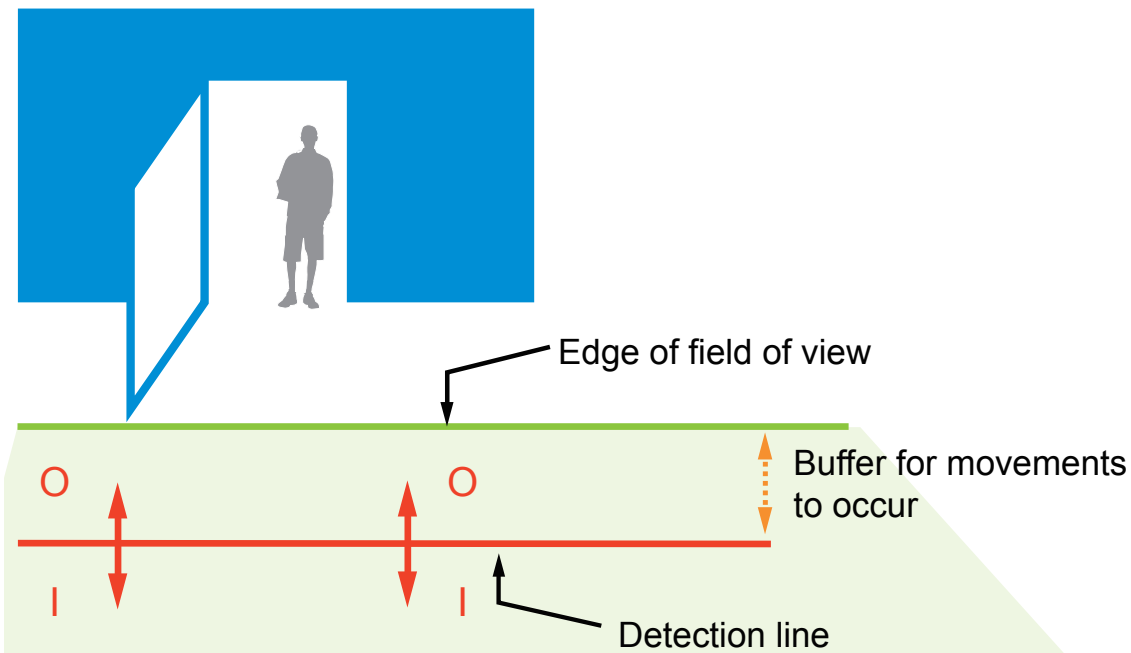
2. Light sources from the sides should be avoided. For example, shadows can cause the VCA to mistakenly count the shadow as a moving object. Mistakes can also happen by shadows of clouds floating by a window, or reflected images on a polished floor.



3. For Line Crossing and Field of Interest configuration, unnecessary objects should be avoided. A door, a floating curtain, and moving objects such as an escalator can cause mistakes with calculation.

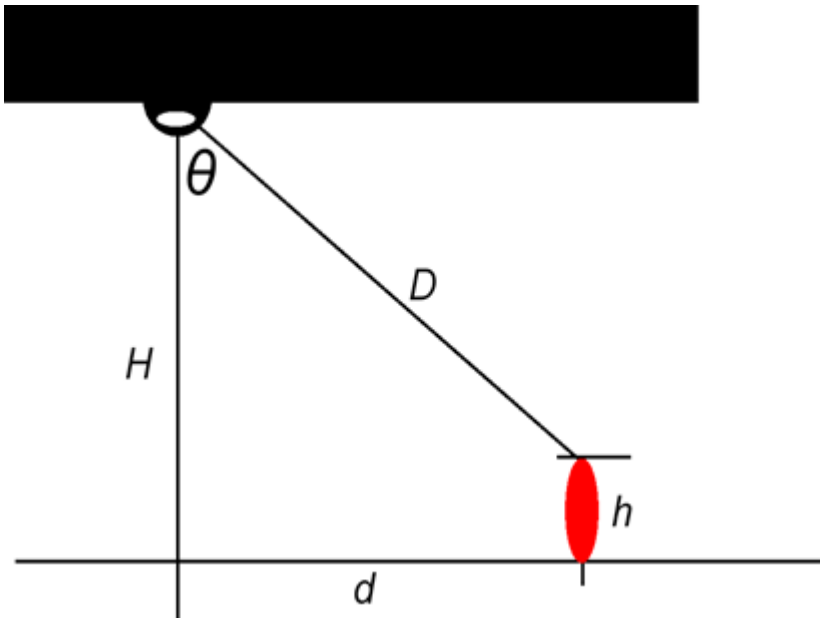


4. Also note that a detection line should be placed so that an object can appear at least one or two seconds in the field of view before crossing a detection line. Otherwise, the move in and move out actions will not be correctly detected.



5. If the VCA package is applied on a fisheye camera, the effectiveness of the field of interest should be taken into consideration. Due to the nature of the fisheye lens, image distortion can occur near the edge of the field of view. Also, the number of effective pixels decreases from the center to the edge of the field of view.

It is recommended to place the field of interest within or around an approximate 60° view angle, but not exceeding it.



6. Many factors can affect the video analytics:

6-1. The scene must be well-lighted.

6-2. The area of interest must be planned to best identify objects making unusual motions.

6-3. The motions need sufficient contrast, e.g., a man walking in black clothes against a dark background may yield a poor detection result.

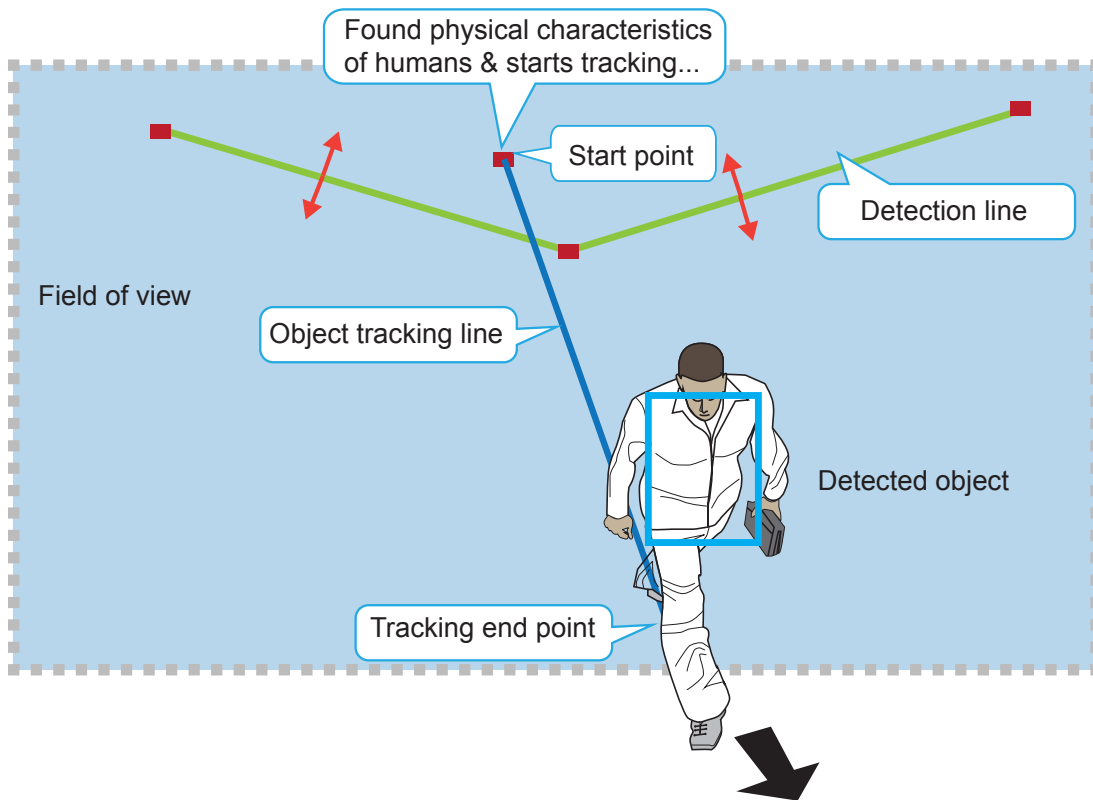
6-4. People crawling, sitting, squatting on the ground may not be detected.

6-5. Drastic changes in lighting conditions throughout a day or night can cause inconsistent detection results.

6-6. Large objects or dense vegetation that may occlude the subjects of your interest should be avoided.

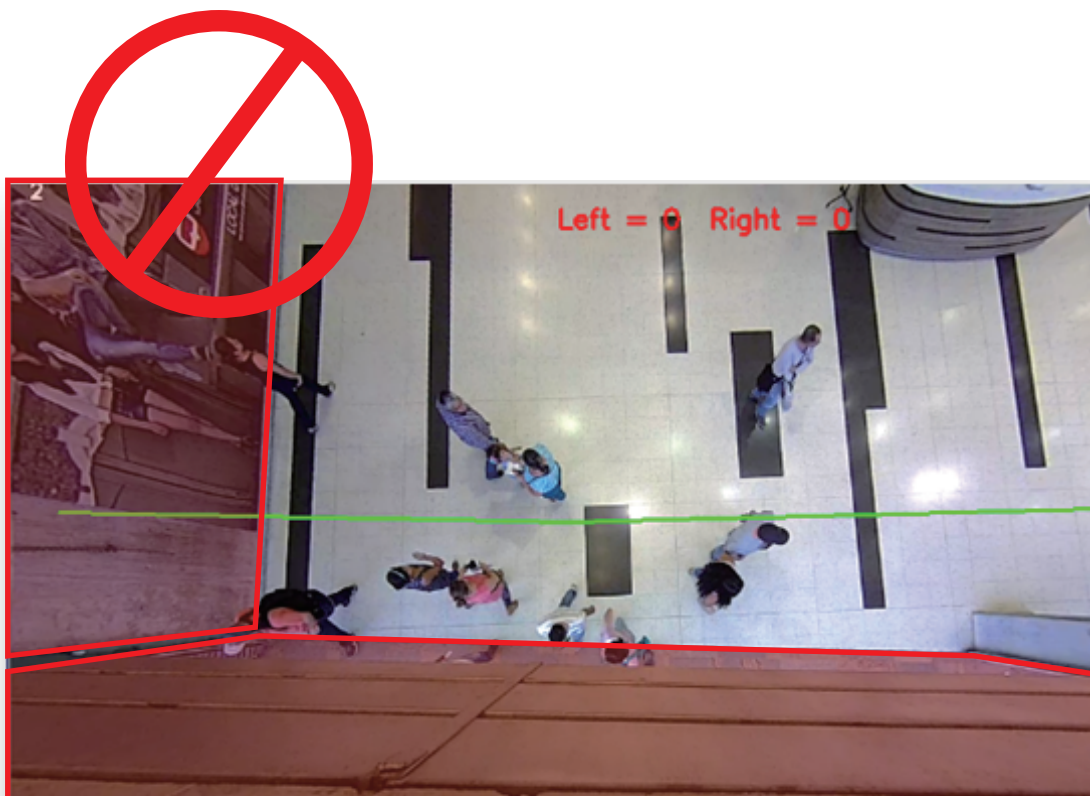
6-7. Please avoid using analytics in very crowded areas where people's silhouettes can be overlapped. Blocking people's profiles can cause incorrect results.

6. Below are the configuration elements for line crossing:

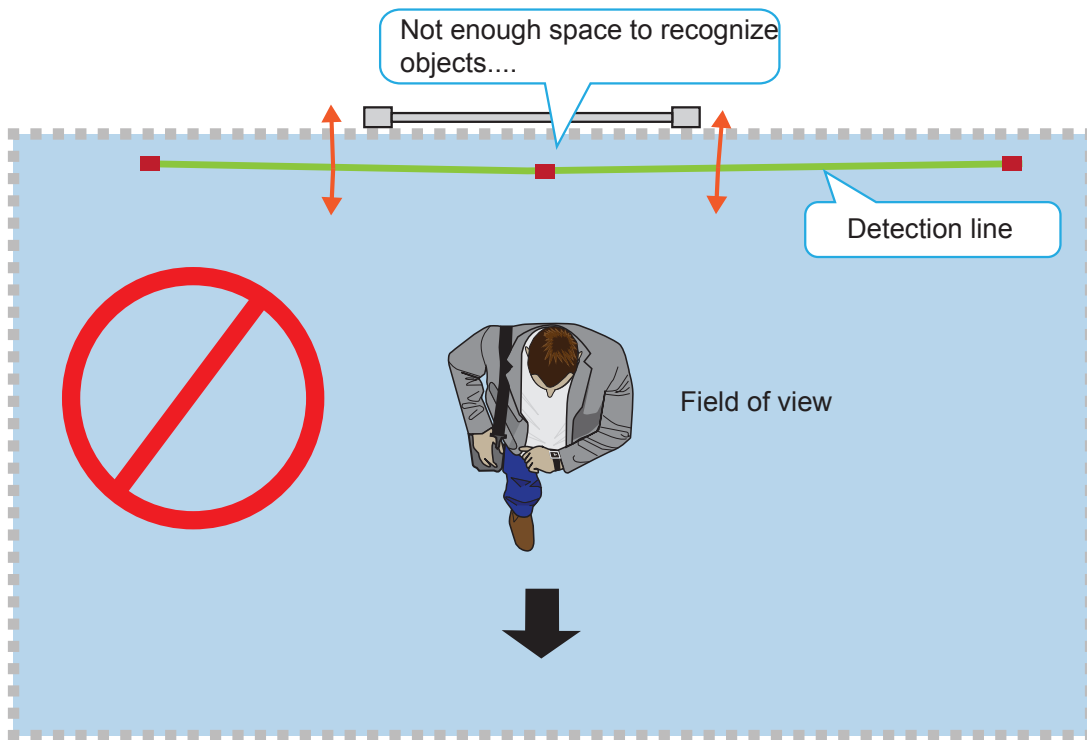


The line-crossing detection takes place when a moving object appears in the detection area and moves across the detection line.

7. For detection to work properly, you should avoid having the view covering a large portion of irrelevant materials such as walls as shown below.

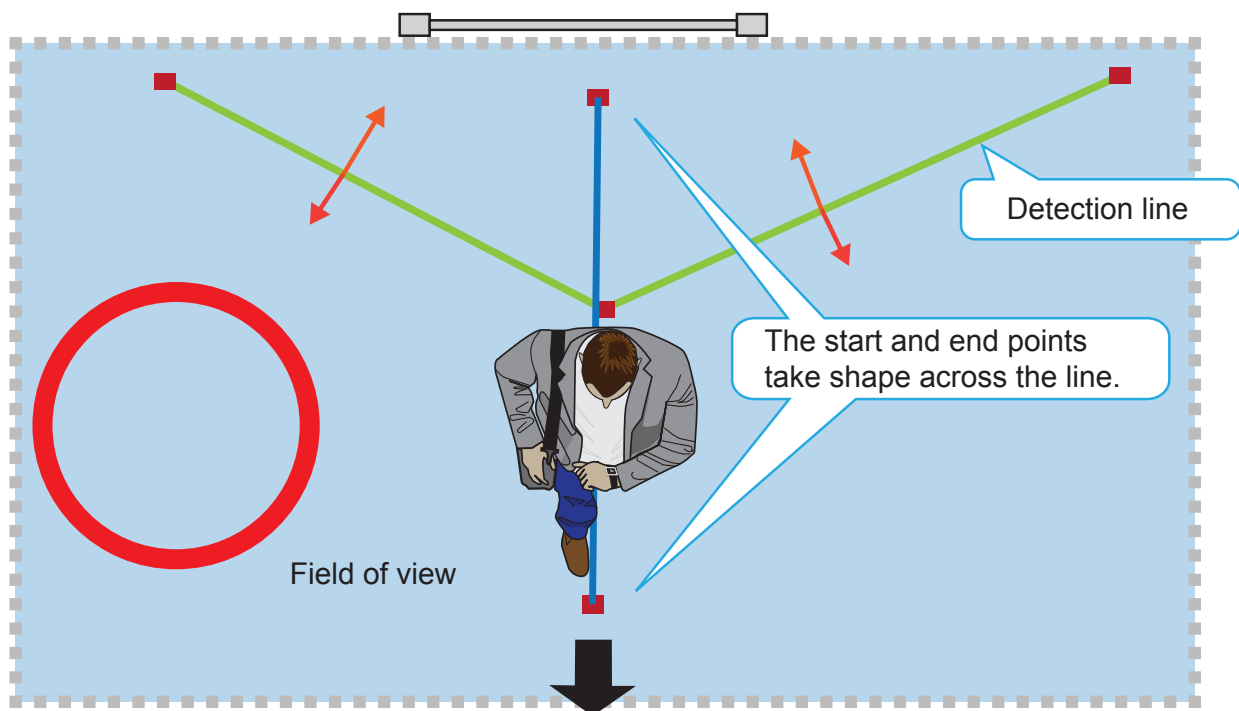


9. An effective detection requires an object to be detected, and then moves across the detection line. Avoid setting the line too close to the edge of detection area.

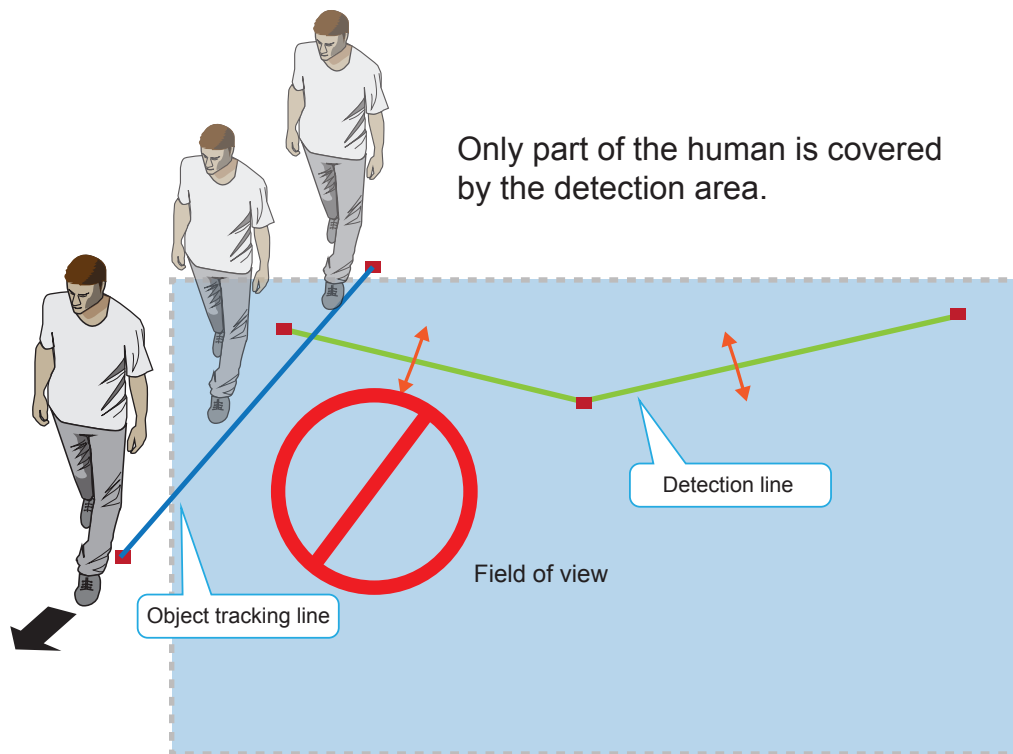


10. By drawing the detection line slightly away from the place where people make their appearance allows enough space for recognition to take place. A start and an end point across the line enable the movement to be considered as an effective detection.

The stop point is where the object vanishes from the scene.



11. Always configure the coverage of the detection area in that the complete silhouette of objects can be contained. If only part of the moving object is covered, the detection will fail. The entire object needs to appear in the detection area for the camera to acquire its information.



NOTE:

Users can store and execute VIVOTEK's or 3rd-party software modules onto the camera's flash memory or SD card. These software modules can apply in video analysis for intelligent video applications such as license plate recognition, object counting, or as an agent for edge recording, etc.

- Users can also run VIVOTEK's VADP packages as a means to access updated functionality instead of replacing the entire firmware.
- Note that for some cameras the flash is too small to hold VADP packages. These cameras will have its "Save to SD card" checkbox selected and grayed-out for all time.
- The file system of SD card (FAT32) does not support soft (symbolic) link. It will return failure if your module tries to create soft links on SD card.

4. Applications > Using VIVOTEK Intelligent Video Analysis VCA (Video Content Analysis)

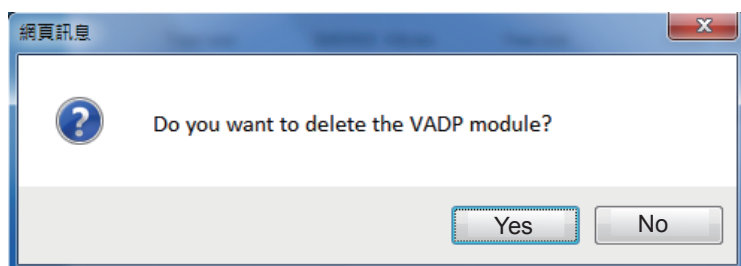
To start a module, select the checkcircle in front, and click the **Start** button.



If you should need to remove a module, select the checkcircle in front and then click the **Stop** button. By then the module status will become **OFF**, and the **X** button will appear at the end of the row. Click on the **X** button to remove an existing module.



When prompted by a confirm message, Click **Yes** to proceed.



IMPORTANT:

Note that the actual memory consumed while operating the module will be indicated on the **Memory status** field. This helps determine whether a running module has consumed too much of system resources.

Executing the VCA module will increase system load, and if there are concurrent live viewing or recording, you may need to terminate the other live streaming, 3DNR, or Motion Detection setting. Some applications, such as Motion Detection and 3DNR also consume system resources. System overstress can be observed from the reduced frames per second on the live view.

The first VCA module provides intelligent video analysis functions including functional rules for **Line crossing detection**, **Field detection**, and **Object counting**.

To enable a VCA module,

1. Go to the Configuration > Applications > Package Management page
2. Start the VCA module.
3. Click on the module name to start the VCA interface.

Applications > VIVOTEK Application Development Platform

Status License

Upload package

Save to SD card

Select file

Resource status

Storage status:

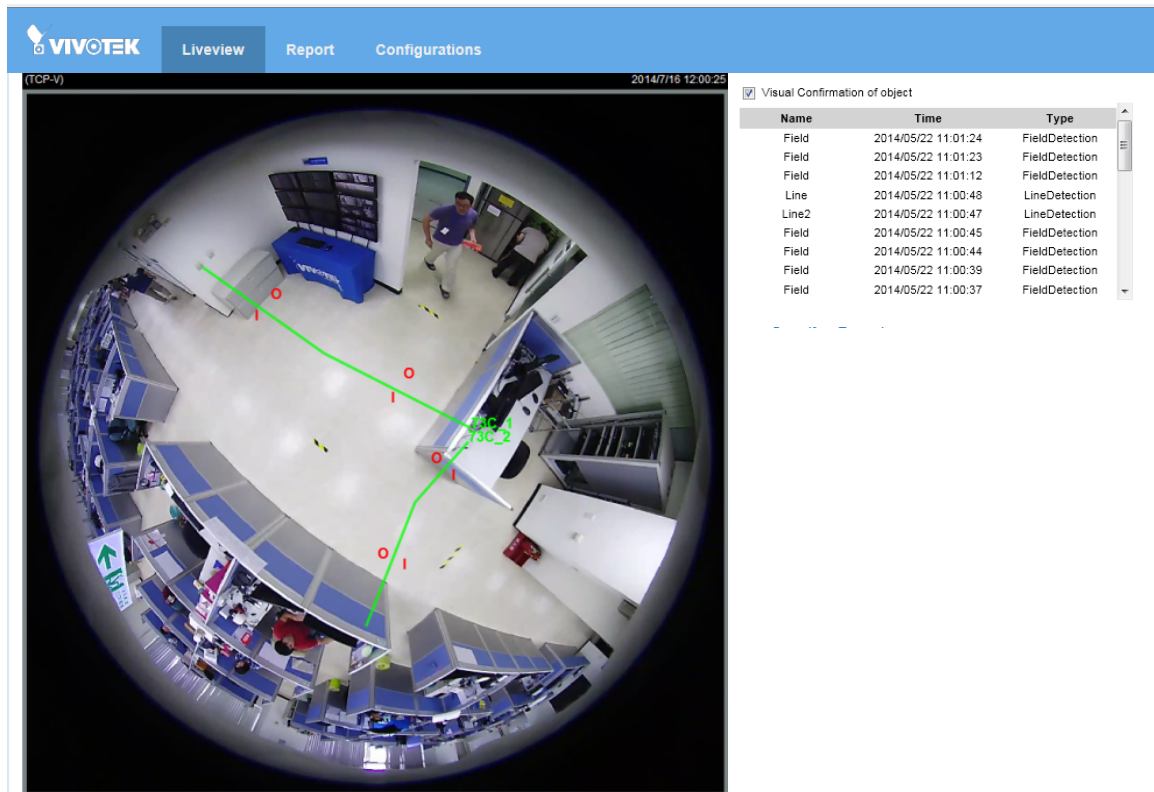
SD card status: Detached

Memory status:

Package list

	Module name	Vendor	Version	Status	License	
<input checked="" type="checkbox"/>	VCA	VIVOTEK	2.0b	ON	Pass	

The VCA window will appear. Default is the **Liveview**. The others are the **Report** and **Configuration** pages.



The latest detected instance is displayed on top.

Visual Confirmation of object: When selected, the intruding objects will be highlighted by a red color block. The region of interest where the event occurs will also change its color to the semi-transparent red.

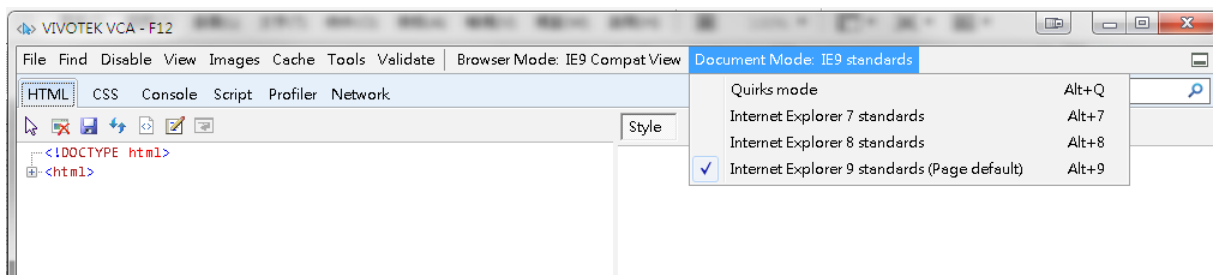
Report: In this window, you can search for the accumulated events for Field detection, Line detection, and Loitering detection.

Search results: Field, line detection, and Loitering events will be listed with the detection type and their time of occurrence. The latest 30 events will be listed on screen.



NOTE:

If the VCA configuration page does not display properly, press the **F12** key to display the Document mode options. The VCA package supports IE8, IE9 and IE10.

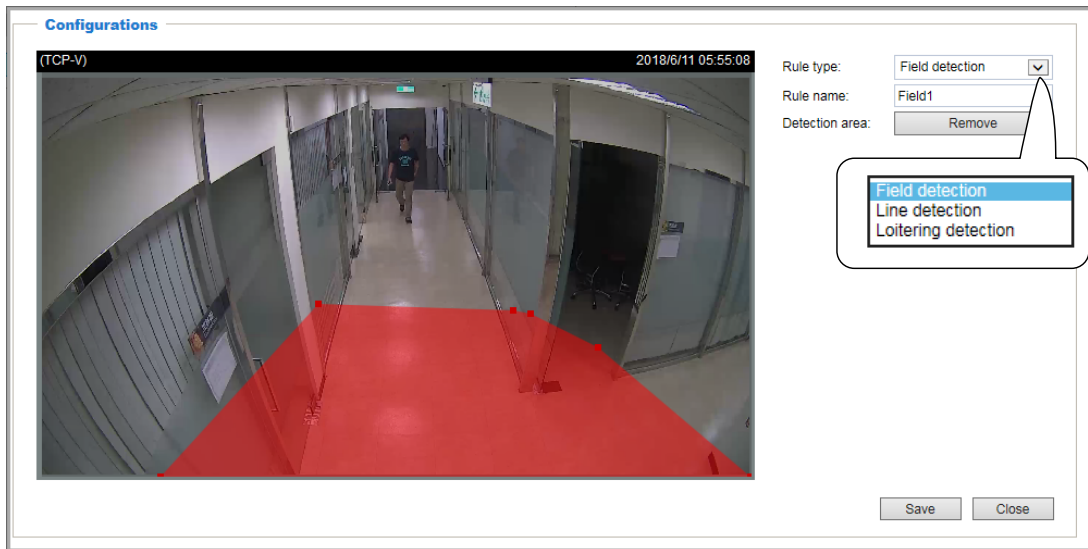


5. Configuration

5-1. Analytics rules

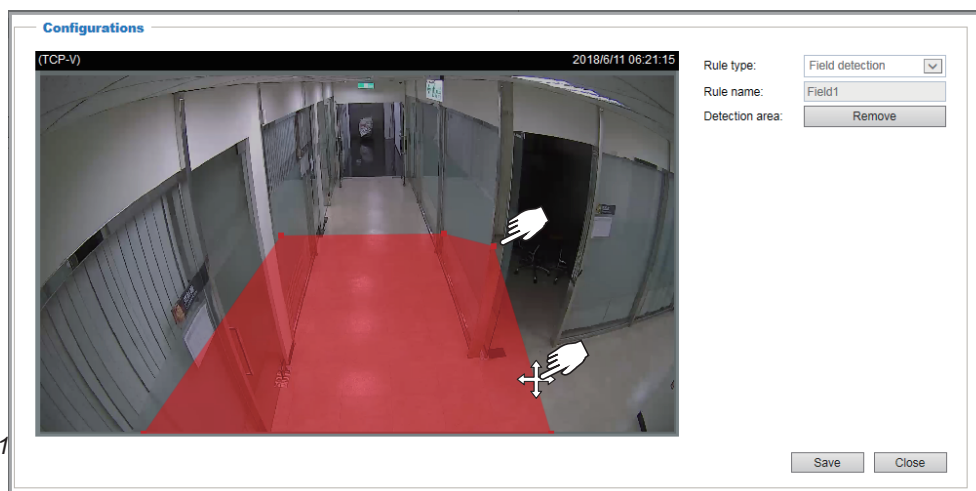
Click the **Add** button to begin,

Select from the pull-down menu to configure Field detection, Line detection, or Loitering detection. You can create up to 7 detection fields, 3 line crossing rules, and 1 Loitering area.



Field detection

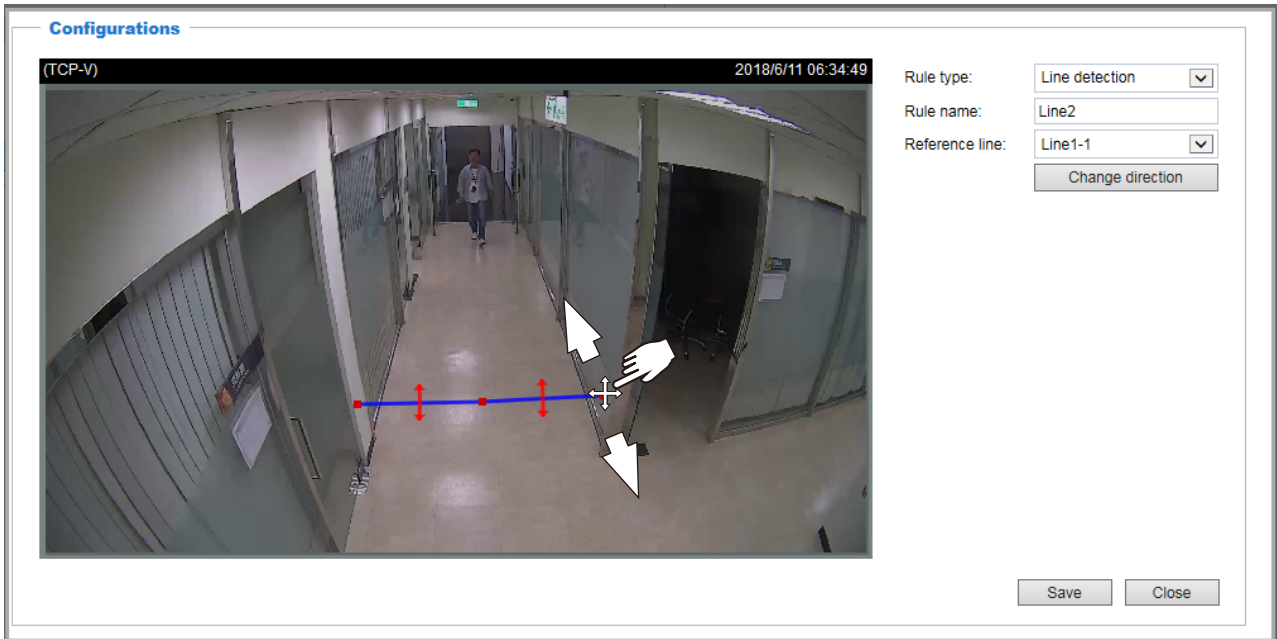
1. You can create multiple polygonal detection fields using up to 20 mouse clicks. At least 3 clicks are required. Conclude the detection fields by clicking on the initial point the second time. You can also double-click on the last corner point to complete a field.
2. Click the **Add** button, and then click on the screen. Each click creates a border mark (as a solid red square). After you configure a field, you can fine-tune the field. Mouse over any of the border mark to reveal the four-arrow-mark, and then you can move the border marks by clicking and holding the left mouse button to drag the border mark to a preferred position.
3. You can enter a name for the field. Click **Save** to preserve your setting or click the **Remove** button to remove a configured field.
4. When done, click the **Close** button.



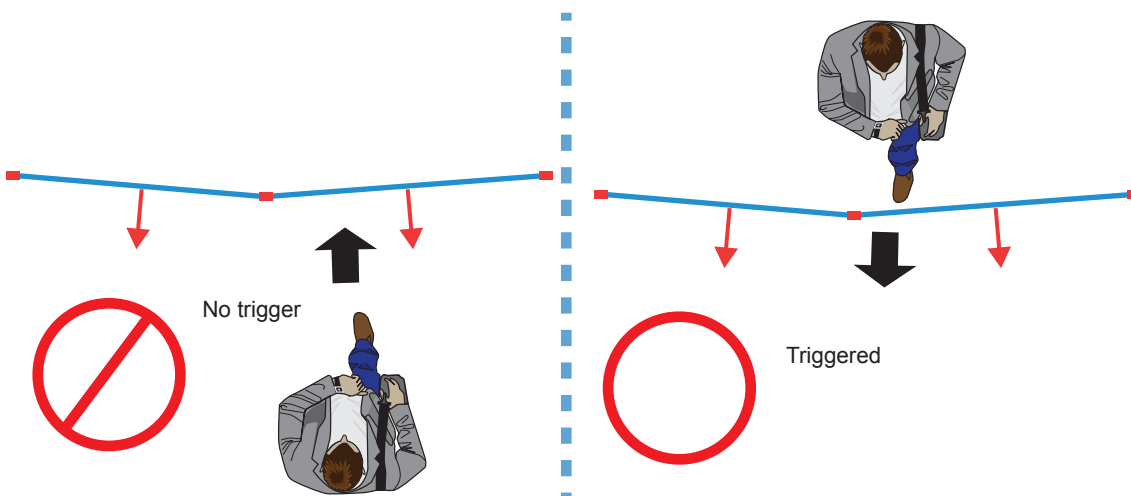
Line detection

To configure a Line detection,

1. Select **Line detection** from the pull-down menu.
2. Enter a name for the detection line, and click the **Add** button. The configuration window will appear at the bottom.



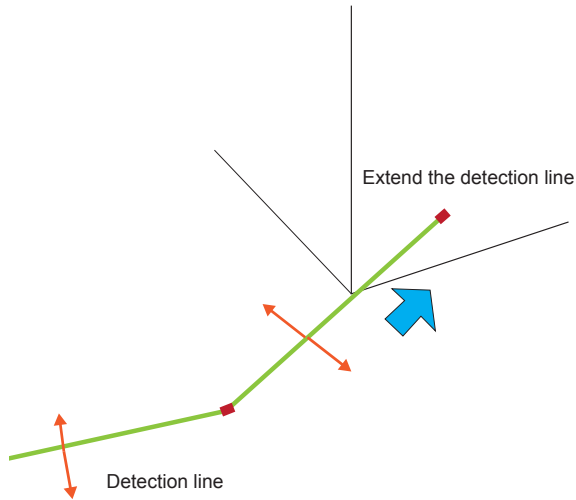
3. A detection will appear on screen. You can also select a line that was previously configured as the reference line. Mouse over the end points of the detection line, and pull the red-square end points to change the position of the line.
4. You can click the **Change direction** button to change the direction of the red arrow marks. This will determine what type of movements will trigger the event, either for objects moving in one direction or those in both directions across the line. An object passing the one-direction line from the opposite moving direction will not trigger an event.



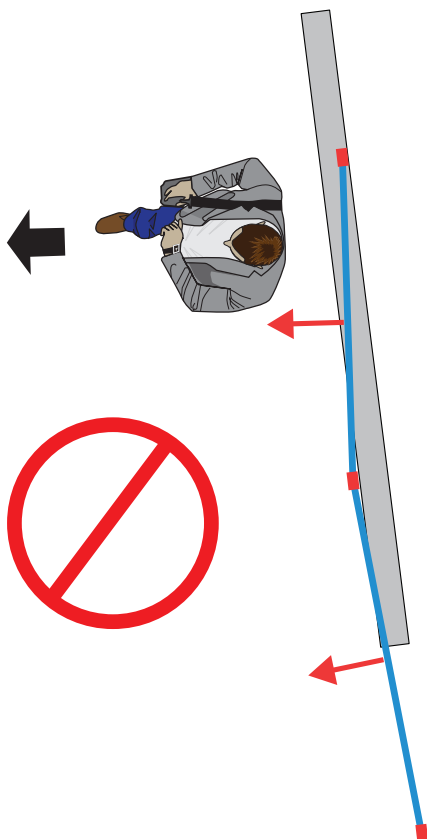
5. When done, click on the **Save** button, and click **Close** to leave the configuration window.

When applicable, always place the detection line at the ground level. Placing the detection line in the mid air will not take effect. The position of the detection line can be observed from the live view. You should not place a line at the waist position when people walk by.

If a detection line is near a corner, you can try extending the line a little farther to the corner. From the camera's perspective, some part of the People's torso tend to lean toward the turn direction. The extended line can increase the time of presence when crossing the line.

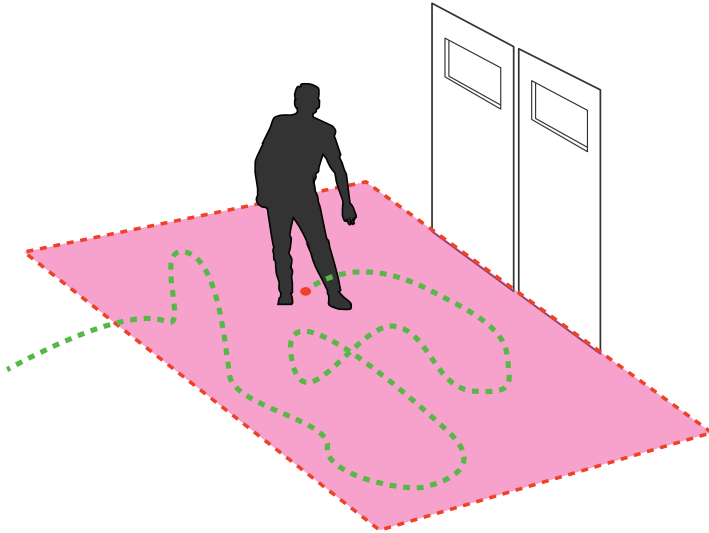


Do not place the detection line on a material or structure that people travel underneath, such as a pole or beam. Moving objects must physically pass the virtual line. If a man walks through something that blocks out the view of him and the detection line is placed on top, the detection will fail.



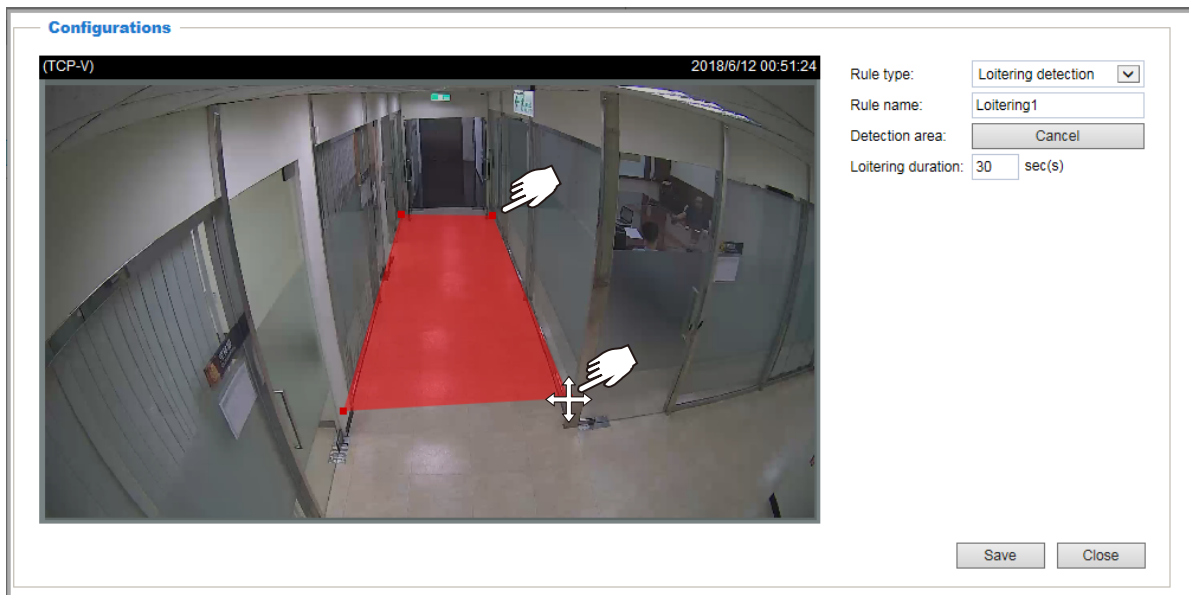
Loitering detection

A time threshold can be configured, e.g., in seconds, with a Loitering detection area. If someone stays within for a time longer than the preset threshold, an event can be delivered to the administrator for keeping the video record and taking appropriate actions.



To configure a Loitering detection area,

1. Select **Loitering detection** from the pull-down menu.
2. Enter a name for the Loitering detection area, and click the **Add** button.



1. You can create one polygonal detection field using up to 20 mouse clicks. At least 3 clicks are required. Conclude the detection field by clicking on the initial point the second time. You can also double-click on the last corner point to complete a field.
2. Click the **Add** button, and then click on the screen. Each click creates a border mark (as a solid red square). After you configure a field, you can fine-tune the field. Mouse over any of the border mark to reveal the four-arrow-mark, and then you can move the border marks by clicking and holding the left mouse button to drag the border mark to a preferred position.

- Configure a time threshold in seconds as the Loitering duration. This time value determines how long an object must stay or linger in the detection area before it is considered as a loitering act. The applicable time value is from 10 to 360 seconds.
- When done, click the **Save** button to preserve your configuration, and click **Close** to leave the configuration window.

Report

Search Result

Click on the Report tab to enter the event search window. You can then use the Search panel to recover past events. You can click on the present date to bring up a calendar. The parameters are listed below:

	Options	NOTE
Rule type - (left pane)	Select Field detection , Line detection , or Loitering	-
Show: No. of entries	10, 25, 50, 100 entries in the current display window	-
Filter	Enter the name of a pre-configured detection, e.g., Field1. If so configured, only the Field1 results will display.	-
Time	Time of occurrence	camera's RTC
Name	Names of the pre-configured detections. Click on the name to display the related live view.	-

* Note that you can click the event entry name to enter the viewing window. However, the viewing window is not the recorded footage of the event in the time of occurrence.

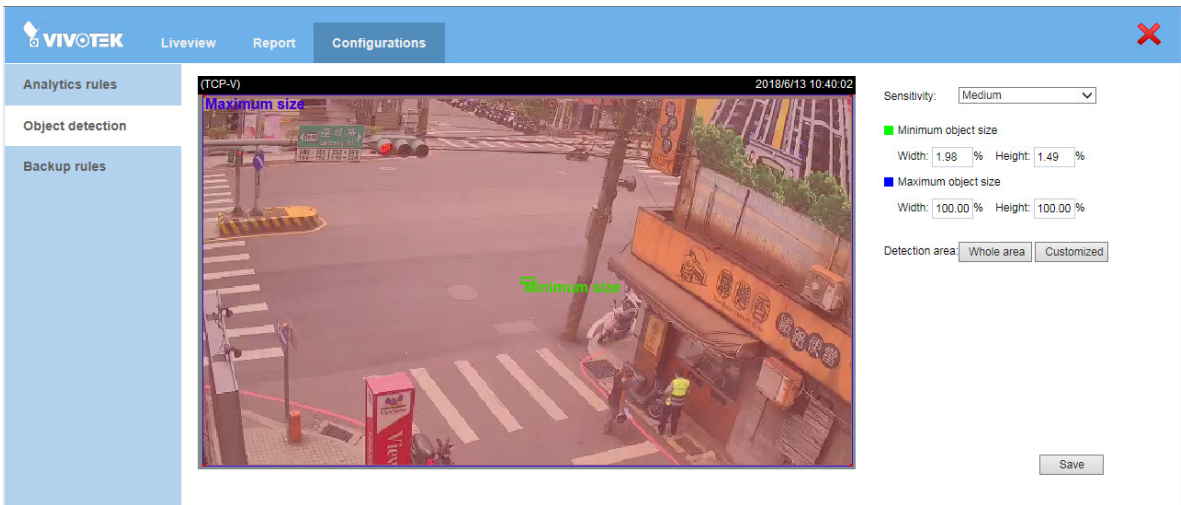
Due to the network transaction efforts, polling past events can take several minutes.

The screenshot displays the VIVOTEK web interface. At the top, there is a navigation bar with the VIVOTEK logo and three tabs: "Liveview", "Report", and "Configurations". The "Report" tab is currently selected. Below the navigation bar, the main content area is titled "Field detection". On the left side, there is a vertical sidebar with three options: "Field detection", "Line detection", and "Loitering detection". The "Field detection" option is highlighted. In the main content area, there is a search interface with a "Date:" field containing "2018/06/12" and a "Stop search" button. Below this, a "Search result" section is visible. It includes a "Show" dropdown menu set to "10" entries and a "Filter:" input field. The search results are presented in a table with two columns: "Time" and "Name". The table contains 10 rows of data, each with a timestamp and a field name. At the bottom of the table, there is a "Showing 1 to 10 of 138 entries" message and two buttons labeled "Previous" and "Next".


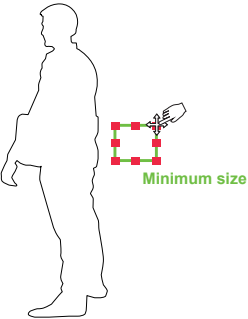
Time	Name
2018/06/12 00:01:30	Field2
2018/06/12 00:01:31	Field2
2018/06/12 00:01:32	Field1
2018/06/12 00:01:32	Field1
2018/06/12 00:01:33	Field2
2018/06/12 00:01:33	Field2
2018/06/12 00:01:35	Field1
2018/06/12 00:01:50	Field1
2018/06/12 00:01:51	Field1
2018/06/12 00:01:51	Field1

5-2. Object detection

The Object detection window provides important options with analytics parameters.



The configurable options include:

<p>Sensitivity</p>	<p>The higher the sensitivity, the better chance of detecting events. However, the chance of false alarms also increases. If the light changes in the scene is high, you may want to tune down the sensitivity to reduce the chance of false alarms.</p> <p>You can also customize the sensitivity level using a provided slide bar.</p> <p>Sensitivity: <input type="text" value="Customize"/> <input type="text" value="60"/></p> 
<p>Minimum object size</p>	<p>Only objects larger than the Minimum size can trigger an event. Depending on the sizes of moving objects observed through the live view, you can manually adjust the Minimum object size. Use the green scalable box in the middle of the screen to adjust the size.</p>  <p>You can also fine-tune the Min. size using the percentage number on the pane.</p>
<p>Maximum object size</p>	<p>Objects that are larger than the Maximum size will not trigger an event. For example, you may want to detect human activities, but not the vehicles. By default, the maximum object size is the whole FOV.</p>

Detection area	<p>By default, the Detection area is the whole FOV. You may customize the Detection area where analytics takes effect by manually drawing a Detection area. You may want the video analytics to take place at only a portion of the FOV. For example, the area of your interest is located near a busy road section, and the traffic on the road is not of your interest.</p> <p>Draw a Detection area by clicking on the screen. Each click creates a border mark (as a solid red square). You can mark out a region using up to 20 clicks, and then double-click on the screen to end the mark-out. You can move the border marks by clicking and holding the left mouse button to drag the border mark to a preferred position. When done, the Detection area will be marked out in a semi-transparent color.</p>
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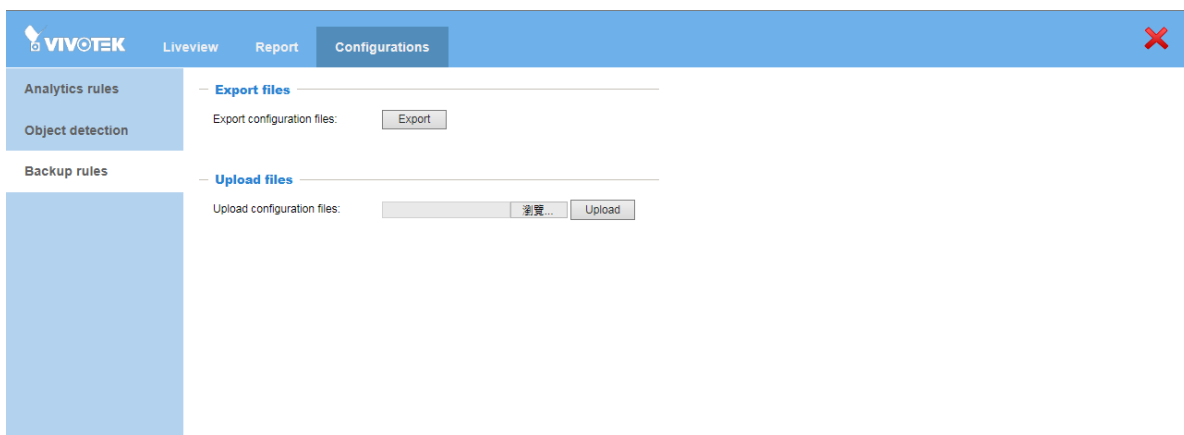


NOTE:

1. Objects larger than the max. object size will be excluded. Movements of any objects within a Field detection area will be marked out by an enhanced color or a blue square on the detected objects.
2. If using a line-crossing detection, and the line is placed right at the border of a **Region of interest**, the move-in or move-out actions may not be detected. Lack of reference can occur for the objects may move instantly out of the region.

5-3. Backup rules

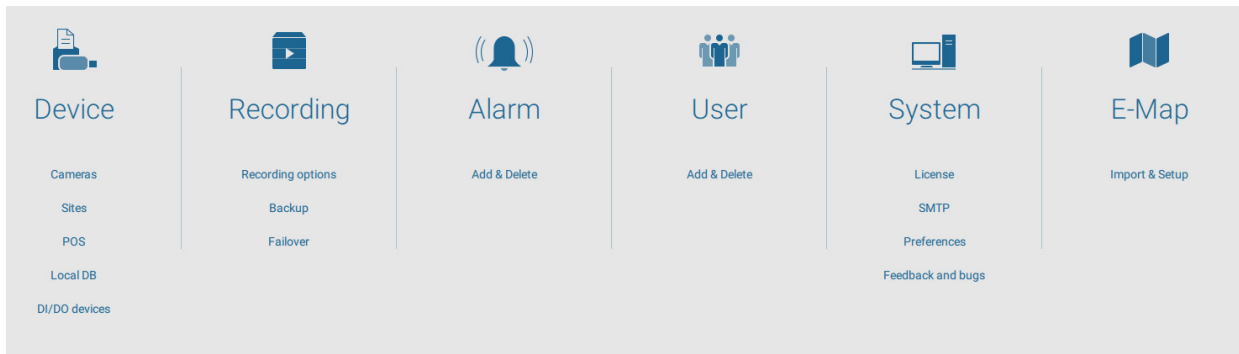
The Backup rules window allows you to export or import a configuration file.



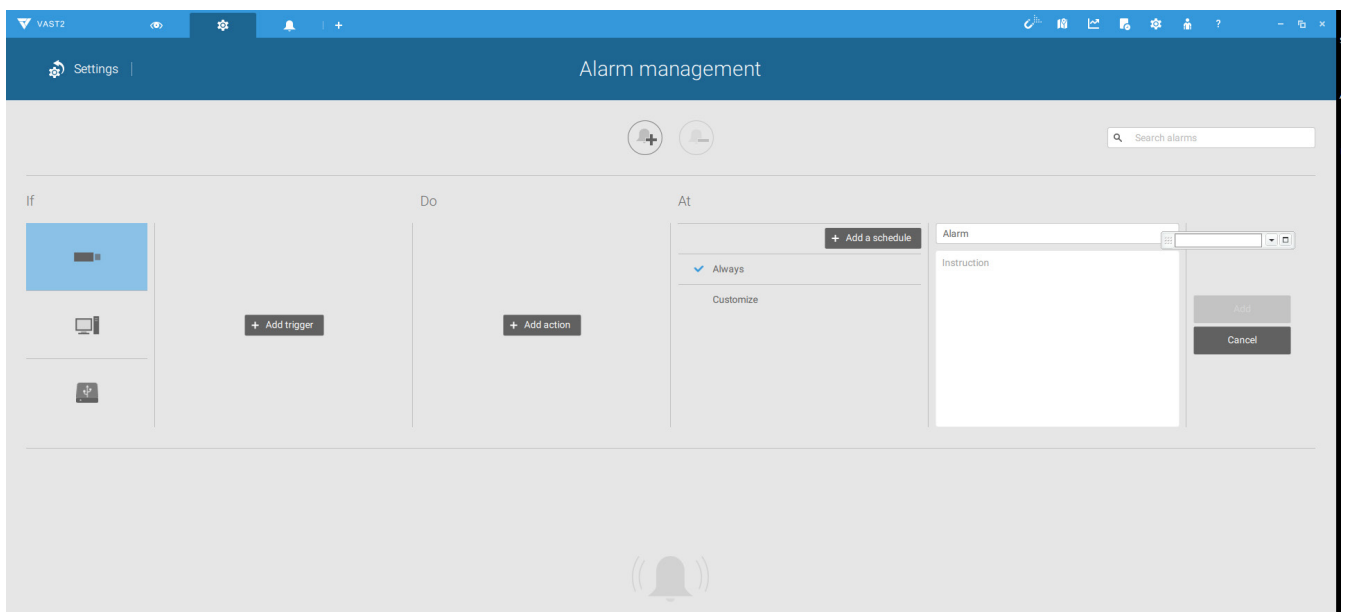
6. Receiving VCA Events from VAST

To receive VCA events and record event-related recordings on VAST,

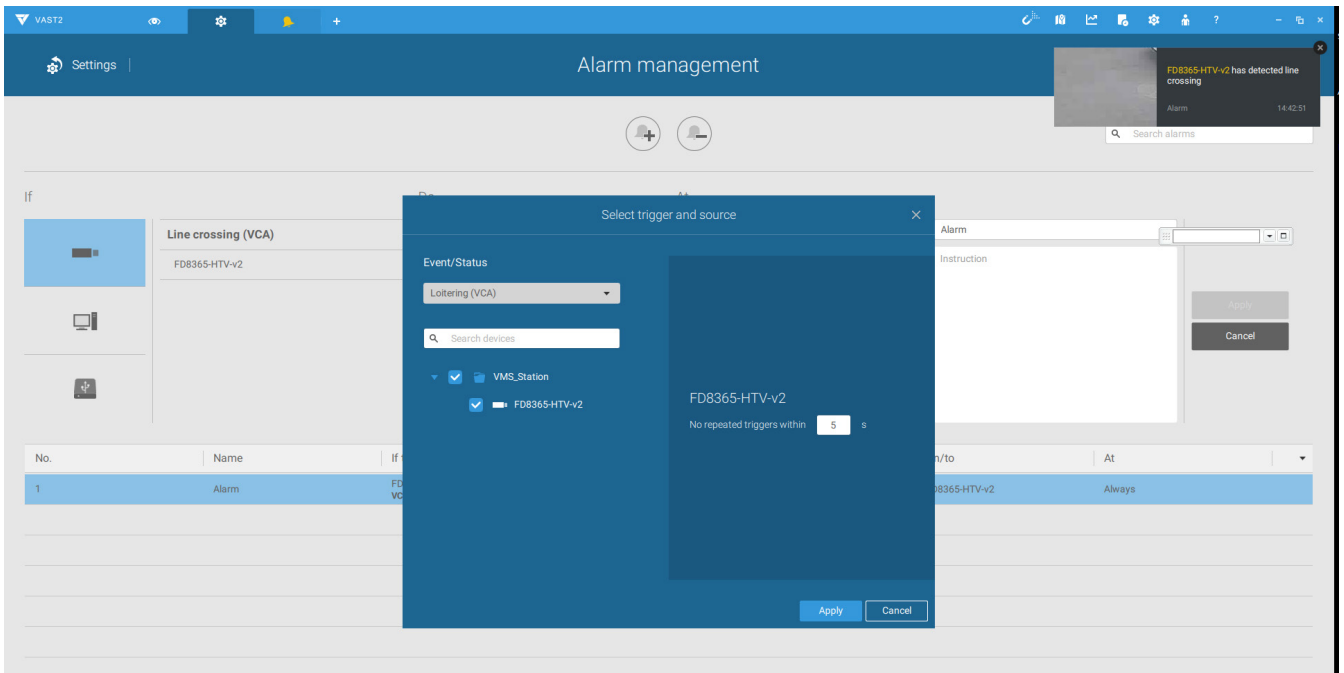
1. Add the camera configured with VCA detection rules to a VAST server.
2. Create an Alarm configuration. Click on the Settings tab on the VAST2.
3. Click on Alarm.



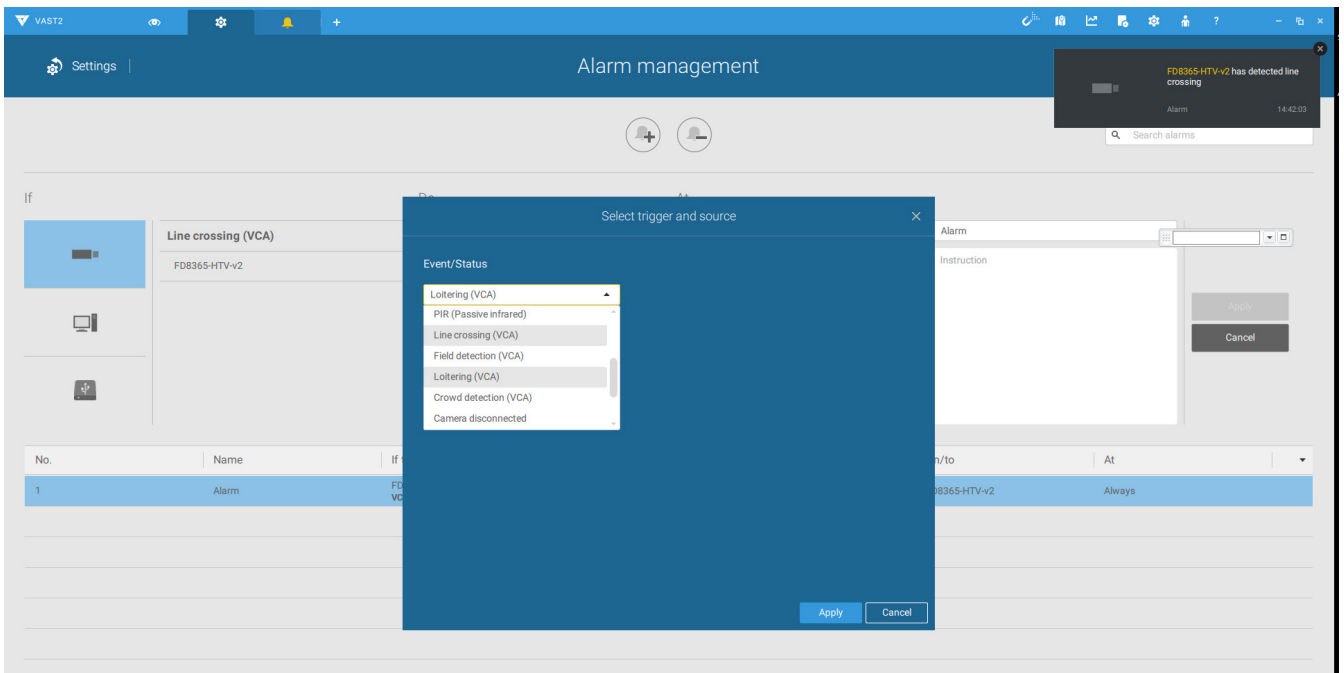
4. Click on Add trigger.



4. Click to select the VCA-enabled camera.

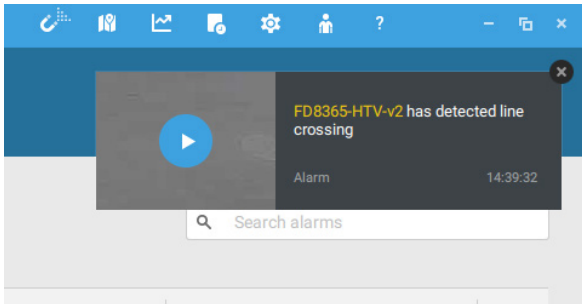


5. Use the pull-down menu to select Line crossing (VCA), Field detection (VCA), or Loitering (VCA) as your triggering conditions.



6. You can then specify the Alarm action as Start to record videos, etc.

7. Once a VCA-related alarm is triggered, the alarm icon will swing and change its color. An event prompt will display on the upper-right of the screen. You can then click on the alerted window for an immediate review. A single click on the alarm icon will also bring up a view of the recent alarm-triggered recordings.



8. You can also use the Alarm search to scan through the recorded alarms.

