SENSTAR®

Senstar Sensor Fusion

8

User Guide

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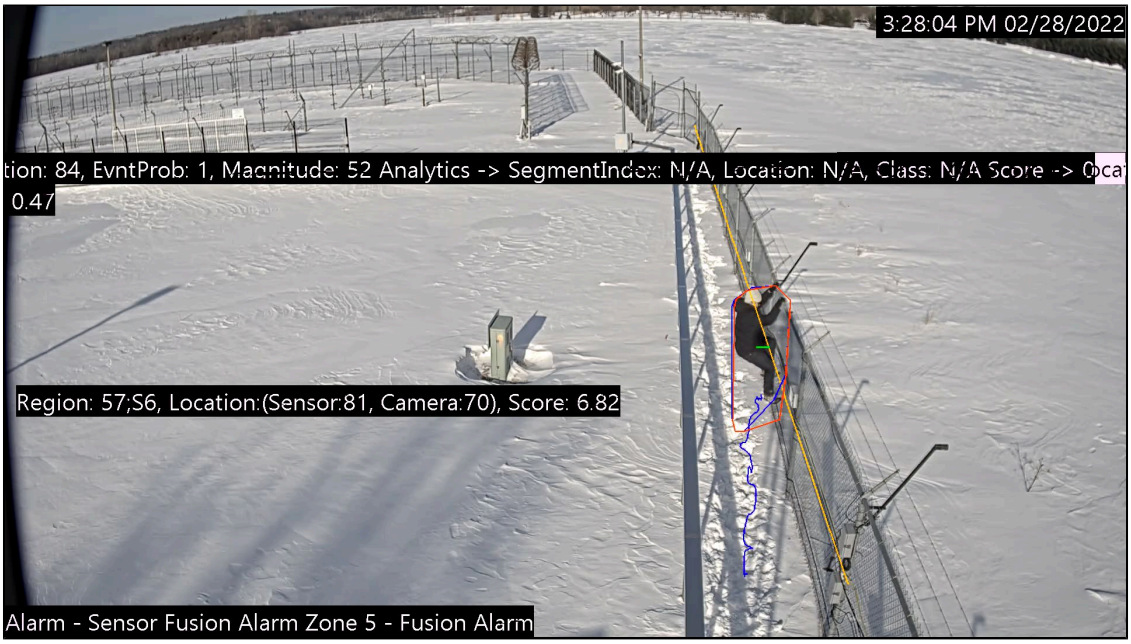
Senstar Sensor Fusion

The Senstar Sensor Fusion combines a perimeter intrusion detection system data with a dedicated video analytic to significantly improve perimeter intrusion detection while reducing false alarms from each individual sensor.

The Senstar Sensor Fusion uses a video analytic to analyze objects close to the fence and correlates the results with data from the perimeter intrusion detection system. The Senstar Sensor Fusion calculates a probability from the video analytic (data including time, object classification, history, and location) and the perimeter intrusion detection system (data containing time, location, magnitude, and frequency), and uses that probability to trigger an alarm with a higher accuracy than alarms triggered by each system individually.



In addition, the Senstar Sensor Fusion provides redundancy if one of the components experiences a failure. When one component experiences a failure, the Senstar Sensor Fusion shifts the weight of the probability to the functional component and triggers alarms based on that probability.

The Senstar Sensor Fusion currently supports the following Senstar perimeter intrusion detection system technology:

- Senstar FlexZone
- Senstar FiberPatrol

Requirements

In addition to the requirements of the Senstar Symphony Server, the Senstar Sensor Fusion requires the following items.

Requirement	Description
Hardware	• 3.0 GHz processor or greater • 16 GB of RAM or greater • 1 TB of storage or greater

Requirement	Description
Software	• Senstar Symphony Server 8.5.x or later • Senstar Symphony Analytics Pack 8.3.x or later • Senstar Network Manager 2.54 or later
Licenses	• VMS device license • Senstar Sensor Fusion license • Senstar Symphony V8 Network Manager Integration • Senstar Connection to ranging Sensor
Cameras	• Fixed camera • 1920 x 1080 resolution • 5 FPS minimum
PIDS	• Senstar FlexZone 60 with Ethernet communication (Silver network) • Senstar FiberPatrol

You must integrate the Senstar Network Manager with the Senstar Symphony Server to get data from the perimeter intrusion detection system for use with the Senstar Sensor Fusion. For more information on integrating the Senstar Network Manager. see the *Senstar Network Manager Introduction* and *Connect to Senstar Network Manager* topics in the Senstar Symphony Webhelp.

Camera placement

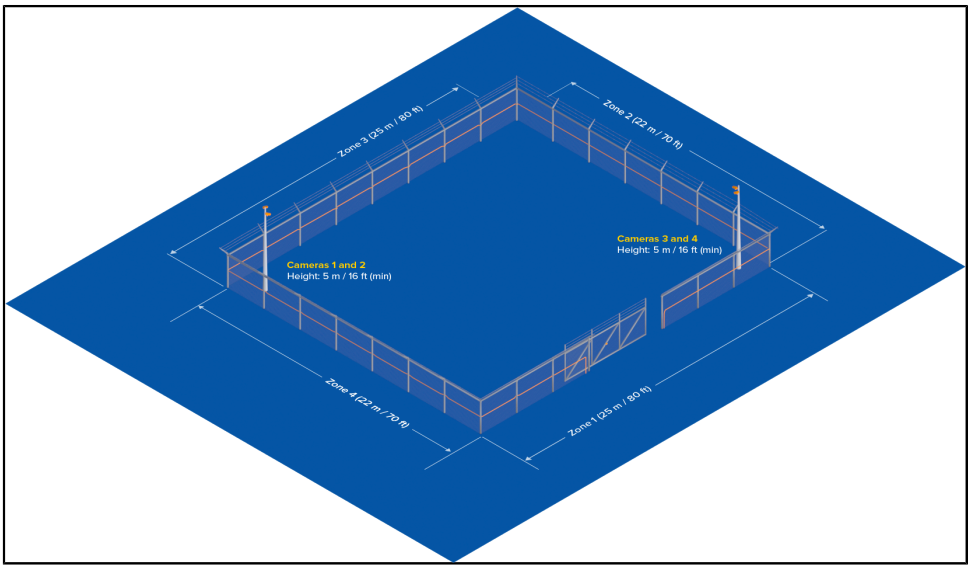
The proper placement of cameras is necessary for the Senstar Sensor Fusion to work correctly.

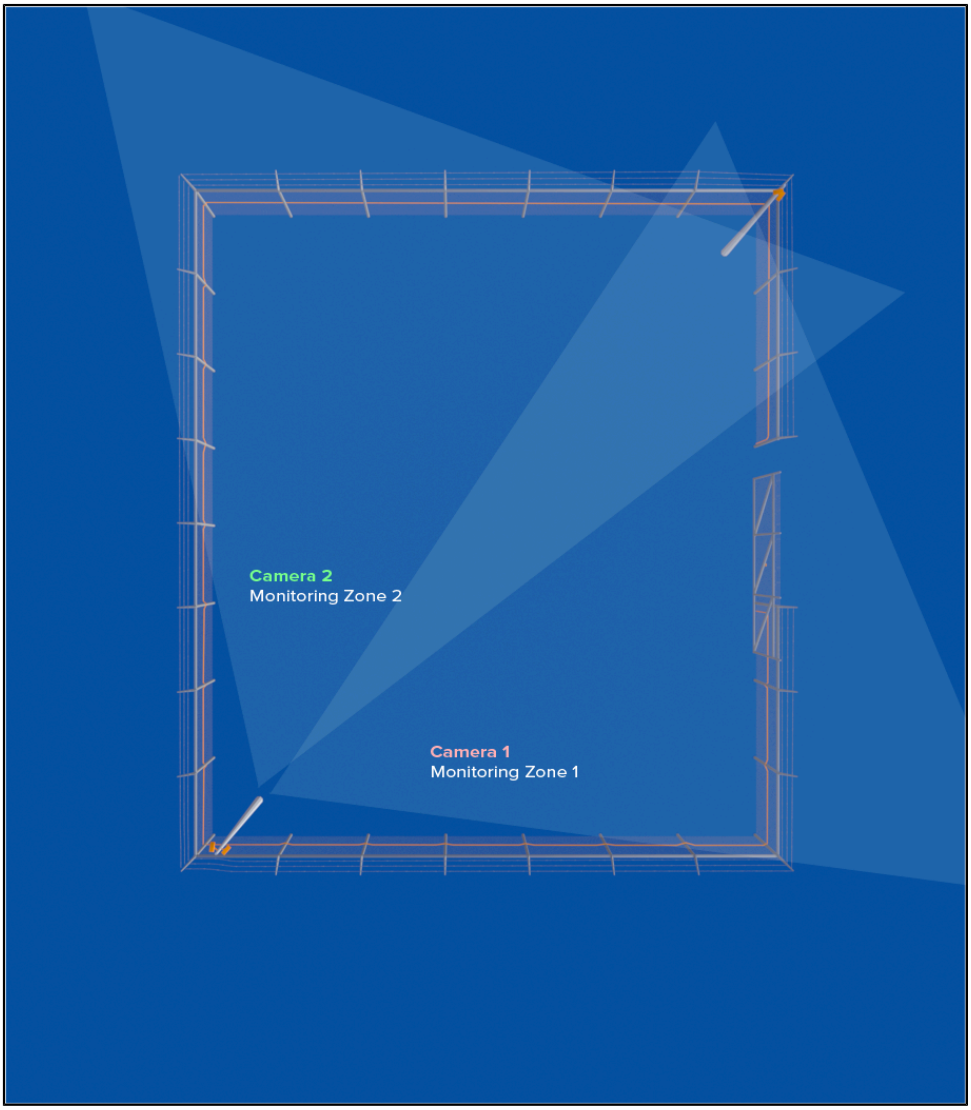
The effective range for a camera is between 4 meters and 40 meters from the fence segment that the camera monitors. At distances less than 4 meters and greater than 40 meters, the accuracy for determining the location of an object is too low . Follow these general guidelines when mounting cameras:

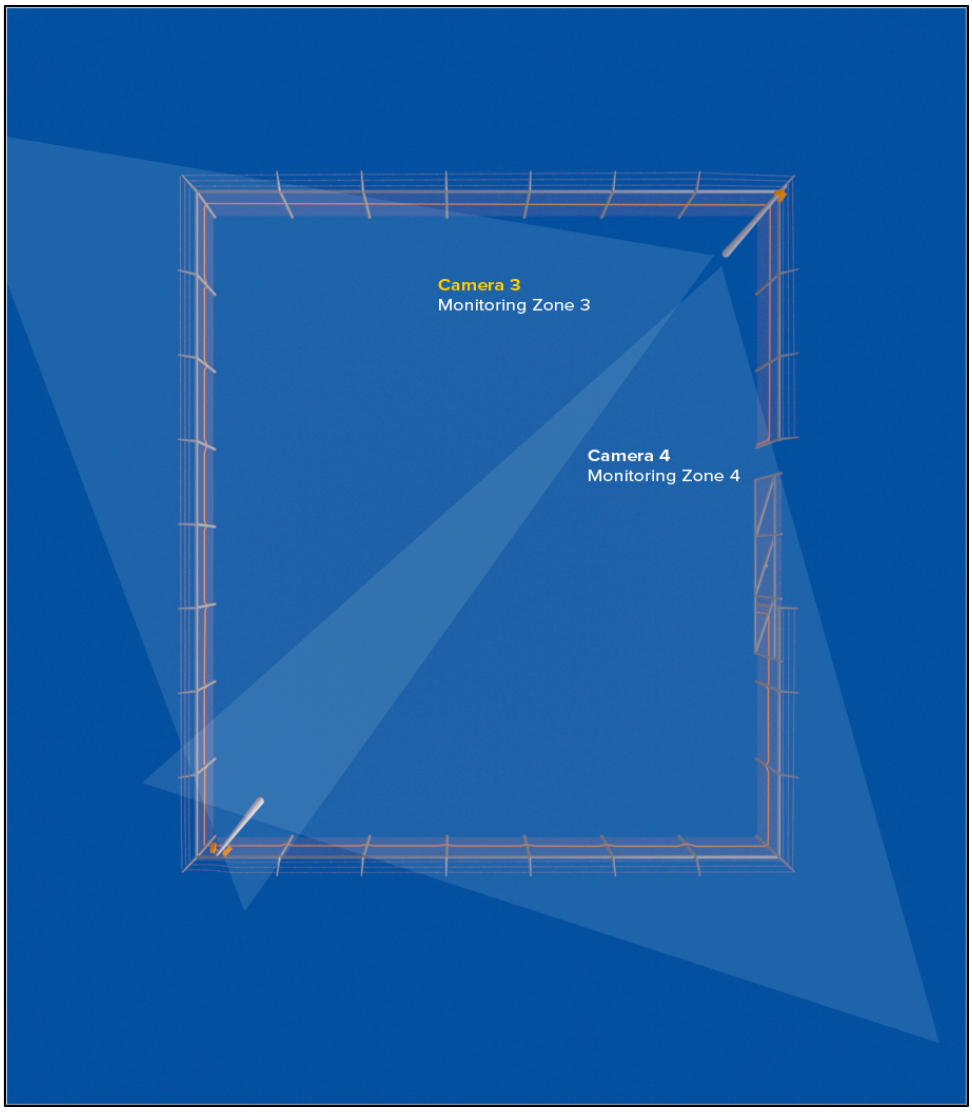
- Cameras should be mounted at 5 meters or higher.
- Cameras should be mounted at least 4 meters from the fence.

The fence segments that the Senstar Sensor Fusion monitors must have sufficient lighting for the camera. Depending on the camera, this could be infrared lighting for thermal cameras or lighting from the Senstar LM100.

The images below are an example of a Senstar Sensor Fusion deployment. In the example, four cameras monitor 94 meters of fencing.


Zone 3 (25 m / 80 ft)
Zone 2 (22 m / 70 ft)
Cameras 1 and 2
Height: 5 m / 16 ft (min)
Cameras 3 and 4
Height: 5 m / 16 ft (min)
Zone 4 (22 m / 70 ft)
Zone 1 (25 m / 80 ft)


Camera 2
Monitoring Zone 2
Camera 1
Monitoring Zone 1


Camera 3
Monitoring Zone 3
Camera 4
Monitoring Zone 4

Configuration

Configure the Senstar Sensor Fusion to associate a section of the perimeter intrusion detection system with an area in the camera view.

When you configure the video analytic component of the Senstar Sensor Fusion, you set the position of the camera in relation to the perimeter intrusion detection system, you define the area that the video analytic analyzes, and you set the approximate size of a person in the scene.

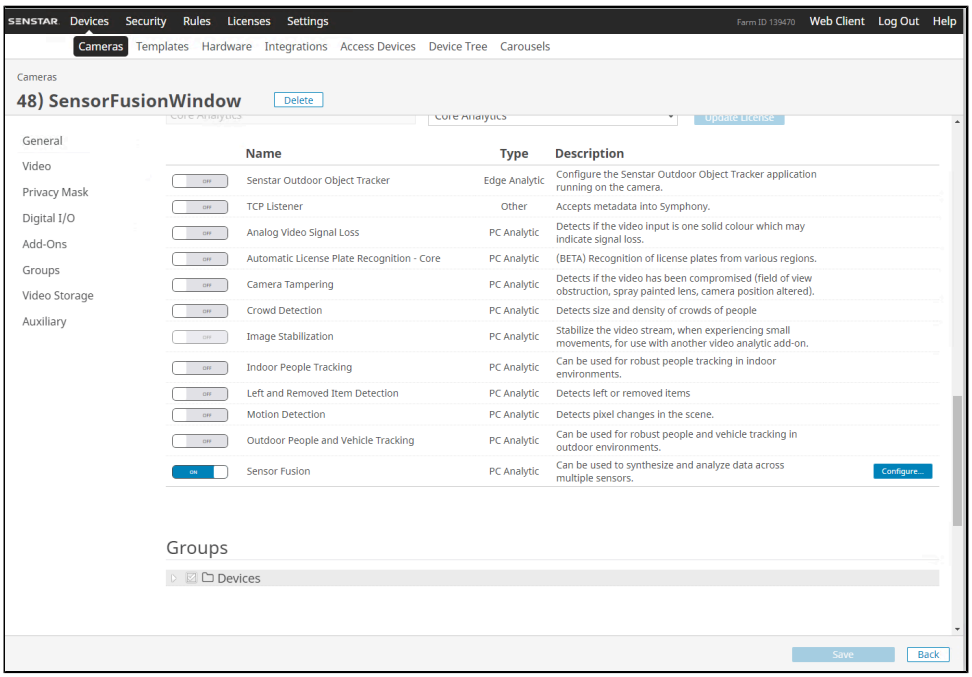
After you configure the video analytic component of the Senstar Sensor Fusion, you can create a rule. To create a rule, you create an event, action set, and schedule for the video analytic, and then add them to the rule.

Configure the Senstar Sensor Fusion

Configure the Senstar Sensor Fusion in the Senstar Symphony Server configuration interface.

For information about specific Senstar Sensor Fusion settings, see the Senstar Sensor Fusion settings topic.

1. In the Senstar Symphony Server configuration interface, click **Devices** > **Cameras**.
2. Select the camera and click **Edit**.
3. In the **Add-Ons** list, turn Senstar Sensor Fusion on and click **Configure**.



4. In the **Overview** section, configure the resolution and FPS for the camera.

5. In the **Processing Mask** section, set the areas in the image that the camera ignores or analyzes.

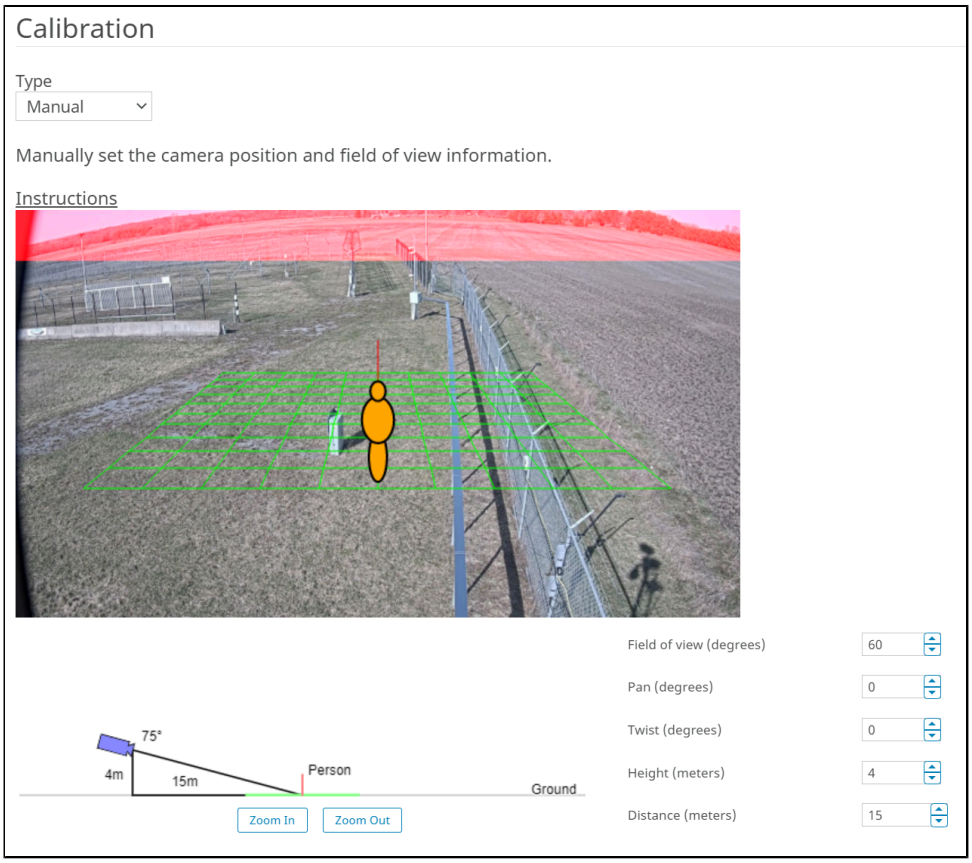
6. In the **Calibration** section, calibrate the camera to the scene.

   Select **Automatic** to have the video analytic automatically determine the camera position and view information.

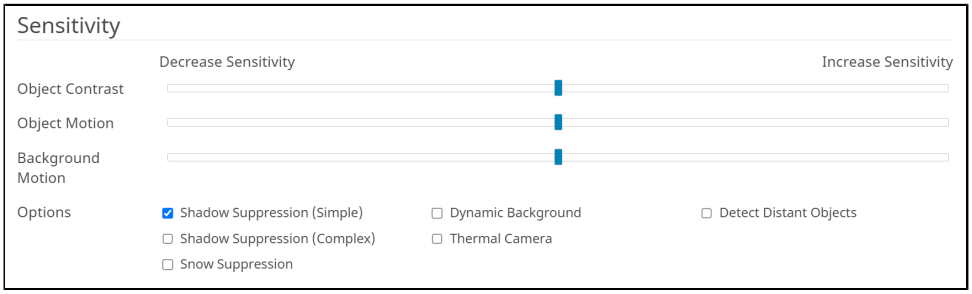
   Select **Uncalibrated** to run the video analytic without camera position and view information.

   Warning: Selecting this option greatly reduces the accuracy of the video analytic.

   Select **Manual** to manaully set the camera position and view information. You can drag the camera to the correct position or adjust the parameters in the applicable fields. The reference person in the image should match, as closely as possible, the size and position of a real person in the view.



7. In the **Sensitivity** section, set how sensitive the Senstar Sensor Fusion is to contrast and motion, and select which options to enable to optimize the camera for the environment.



8. In the **Sensor Segments** section, draw the segments of the of the perimeter intrusion detection system.

The sensor segments do not have to cover the entire perimeter intrusion detection system. The coverage of the Senstar Sensor Fusion does not depend on the perimeter intrusion detection system zone configuration; the sensor segments can be part of a single zone, part or multiple zones, or match a zone exactly.

a) In the image, click and drag to draw a sensor segment that matches both the position and location of the applicable perimeter intrusion detection system zone.

b) Select **Show Measures**.

Displaying measurements is optional, but the measurements make it easier to add sensor segments.

c) In the **Name** field, type a name for the sensor segment.

d) In the **Select a Device** list, select the perimeter intrusion detection system that provides information to the Senstar Sensor Fusion.

e) In the **Zone** list, select the perimeter intrusion detection system zone that the sensor segment matches.

f) Set the length of the sensor segment in the **Range** and **To** fields.

The **Range** value should match the starting point of the perimeter intrusion detection system zone.

Example settings

PIDS zone	PIDS length	Range value	To value
1	10	0	10
2	20	10	30
3	10	30	40

g) In the **Reference Points** field, select how many reference points you want on the sensor segment.

You should add as many reference points as there are fence posts in the perimeter intrusion detection system zone.

Warning: When you add additional reference points to the sensor segment, the yellow lines that mark the buffer zone will converge on the end of the sensor segment. The buffer zones lines will return to normal once you set the **Scale** value in the next step.

h) In the **Scale** field, adjust the scale of the sensor segment so that the reference points match the fence posts included in the length of the sensor segment.

Tip: To set the scale correctly, focus on two reference points and adjust the scale so that the reference points in the image match the fence posts.

i) In the **Confidence** field, set how confident the Senstar Sensor Fusion must be to raise an alarm.

j) In the **Buffer Zone Distance** field, set how far from the sensor segment (and the perimeter intrusion detection system zone) the video analytic looks for objects.

9. Click **OK**.
10. Click **Save**.

Senstar Sensor Fusion settings

Overview

Setting	Description
Analysis Resolution	Select the resolution that the Senstar Sensor Fusion uses to analyze video frames.
Analysis FPS	Select the number of frames per second that Senstar Sensor Fusion uses to analyze video.
Automatically Select Resolution Based on Calibration	Select to automatically set the analysis resolution based on the settings in the Calibration section.
Simple Mode	Select whether to hide or display the advanced settings. **Warning:** Changing the advanced settings can adversely affect the performance of the video analytic.

Processing Mask

Setting	Description
Drawing Mode	Select whether the paintbrush marks areas in the processing mask image to include (Analyze) or exclude (Ignore).
Size	Select the size of the paintbrush that you use to draw on the processing mask image.

Calibration

Setting	Description
Type	Select the type of calibration. Manual allows you to set the camera position. Automatic allows the video analytic to set the camera position and field of view. Uncalibrated runs the video analytic without camera position and field of view information.
Zoom In	Click to make the calibration diagram larger.
Zoom Out	Click to make the calibration diagram smaller.
Field of view (degrees)	Define the horizontal field of view (in degrees) for the camera.
Pan (degrees)	Define the rotation around the vertical axis of the camera in relation to the scene.
Twist (degrees)	Define the rotation around the horizontal axis of the camera in relation to the scene.
Height (meters)	Define the vertical distance from the camera to the ground.
Distance (meters)	Define the horizontal distance from the camera to the center of the scene.

Sensitivity

Setting	Description
Object Contrast	Use the slider to set how sensitive the Senstar Sensor Fusion is to differences between objects and the background.
Object Motion	Use the slider to set how sensitive the Senstar Sensor Fusion is to foreground motion when detecting objects.
Background Motion	Use the slider to set how sensitive the Senstar Sensor Fusion is to background motion when detecting objects.
Shadow Suppression (Simple)	Select to use simple shadow suppression. Simple shadow suppression is effective where there are light shadows in the scene. **CAUTION:** Do not use shadow suppression with thermal cameras.
Shadow Suppression (Complex)	Select to use complex shadow suppression. Complex shadow suppression is effective where there are dark shadows in the scene. **CAUTION:** Do not use shadow suppression with thermal cameras.
Snow Suppression	Select to have the video analytic ignore the motion of snow in the scene.

Setting	Description
Dynamic Background	Select to have the video analytic ignore periodic movement in the background of the scene. This setting is effective for outdoor scenes where weather can cause motion in the background.
Thermal Camera	Select if the camera is a thermal camera.
Detect Distant Objects	Select to have the video analytic attempt to detect objects in the distance.

Sensor Segments

Setting	Description
Show measures	Select to show the distance (meters) between reference points on the image.
Segment name	Type a name for the sensor segment.
Select a Device	Select the perimeter intrusion detection system that provides the data to the Senstar Sensor Fusion.
Select a Zone	Select the zone from the perimeter intrusion detection system that you want to configure the .
Range Start	Set the distance where the camera starts monitoring the fence. This value corresponds to the distance from the perimeter intrusion detection system.
Range End	Set the distance where the camera stops monitoring the fence. This value corresponds to the distance from the perimeter intrusion detection system.
Reference Points	Set how many reference points are on the sensor segment. The reference points need to map to equidistant fence posts or markers placed manually near the fence. The Senstar Sensor Fusion video analytic uses the reference points to generate accurate alarms.
Scale	Set the scale to adjust the distance between the reference points.
Confidence Level	Set how confident the video analytic must be to raise an alarm. The range for this setting is 1 to 10, where 1 is the lowest level of confidence and 10 is the highest level of confidence. A setting of 1 will generate more alarms and a setting of 10 will generate fewer alarms.
Buffer Zone Distance (m)	Set the distance (meters) from the sensor segment where the video analytic starts analyzing the scene. For example, if you set the buffer zone to 5 meters, the video analytic analyses any object that comes within 5 meters of the sensor segment.

Import / Export

Setting	Description
Import XML	Click this button to import a configuration XML file.
Export XML	Click this button to export the configuration XML file.

Advanced

The advanced settings are visible when the simple mode is off.

Warning: Changing the advanced settings can adversely affect the performance of the video analytic.

Setting	Description
Background learning duration	Set the time (seconds) that an object must be stationary before the Outdoor People and Vehicle Tracking video analytic considers it to be part of the background.
Normal Learning Rate	Set the background model leaning rate of the Outdoor People and Vehicle Tracking video analytic. The value range is 0.001 to 0.1. The default value is 0.01.
Background Sensitivity	Set how sensitive the Outdoor People and Vehicle Tracking video analytic is to differences between foreground objects and the background. If you set a low sensitivity, the Outdoor People and Vehicle Tracking video analytic might not detect foreground objects as objects to track. If you set a high sensitivity, the Outdoor People and Vehicle Tracking video analytic might use additional resources trying to track background objects.
Ignore Small Objects	Use the slider to set the size of the objects that the Outdoor People and Vehicle Tracking video analytic ignores. The value is a percentage of the size of a person in the scene. For example, if you set the slider to 10, the Outdoor People and Vehicle Tracking video analytic ignores objects that are 10% the size of person or smaller.
Use Person Detector	**CAUTION:** Do not use person detector with thermal cameras.
Track Slow Moving Objects—Minimum Object Speed	
Large Change Detection—Method	% of screen change Brightness change Spectrum change Combined change
Large Change Detection—Sensitivity	

Setting	Description
Large Change Detection—Time to wait before resuming tracking	
Shadow Suppression—Strength	Set the strength of the shadow suppression. If you set the strength too high, the Outdoor People and Vehicle Tracking video analytic might miss some objects. If you set the strength too low, the Outdoor People and Vehicle Tracking video analytic might mistake shadows for objects.
Size and Distances—New Object Min Size	Set the minimum size (pixels) of objects that the Outdoor People and Vehicle Tracking video analytic can detect and track.
Size and Distances—New Object Min Travel Distance (meters)	Set the minimum distance (meters) that an object must travel before the Outdoor People and Vehicle Tracking video analytic detects and tracks it.
Size and Distances—New Object Min Travel Distance (pixels)	Set the minimum distance (pixels) that an object must travel before the Outdoor People and Vehicle Tracking video analytic detects and tracks it.
Size and Distances—Inter-object Min Distance	
Size and Distances—Inter-object Min Distance	

Create an event

You can create an event that triggers a rule on the Senstar Symphony Server.

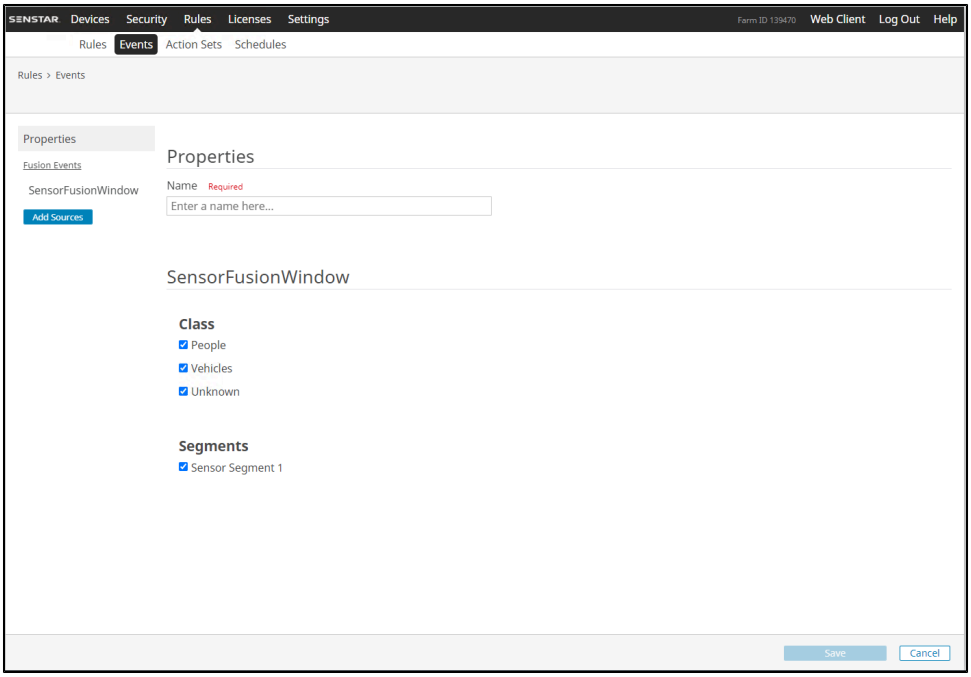
When the Senstar Symphony Server receives input from a device, it can trigger a rule. Different devices can trigger rules in different ways. For additional information on devices, see the manufacturer's documentation.

1. In the Senstar Symphony Server configuration interface, click **Rules** > **Events**.
2. Click **New Event**.
3. Type a name for the event.
4. To add a device, perform the following tasks:
   a) Click **Add Devices**.
   b) Select the device.
   c) Click **OK**.
5. Perform one of the follow tasks:
   - If you add a camera, select the video engine and configure how it triggers a rule.
   - If you add a metadata device, select the input and configure how it triggers a rule.
   - If you add an access control device, select the readers and inputs, and configure how they trigger a rule.
6. Click **Save**.

Senstar Sensor Fusion event settings

The following settings determine when the Senstar Sensor Fusion triggers events on the Senstar Symphony Server.

You can configure the Senstar Sensor Fusion to trigger events from the video analytic, the perimeter intrusion detection system, or both.



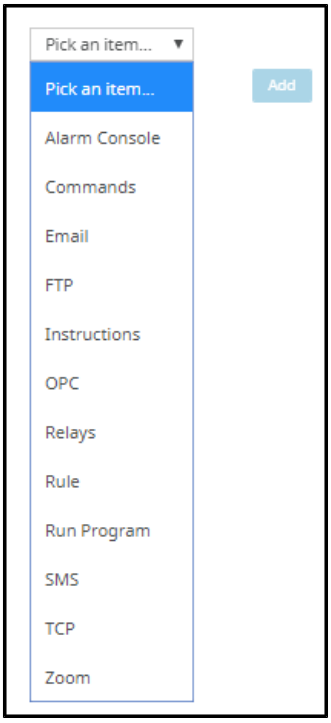
Setting	Description
People	Select if the Senstar Sensor Fusion should trigger events when it detects a person.
Vehicles	Select if the Senstar Sensor Fusion should trigger events when it detects a vehicle.
Unknown	Select if the Senstar Sensor Fusion should trigger events when it detects an unknown object.
Segments	Select the sensor segments for which the Senstar Sensor Fusion should trigger events.

Create an action set

You can create an action set to determine what actions the Senstar Symphony Server takes when rule is triggered.

1. In the Senstar Symphony Server configuration interface, click **Rules** > **Action Sets**.
2. Click **New Action Set**.
3. Type a name for the action set.
4. In the **Alarm** list, select the cameras to view when an alarm occurs.
5. To select where the alarm appears, perform one of the following tasks:
   - To associate the alarm with a camera and display the alarm in a camera timeline, select the camera in the **Choose a Camera** list.
   - To associate the alarm with a map and display the alarm on the map, select the map in the **Choose a Map** list.
6. In the **Record** list, select the cameras that record footage when an alarm occurs.

7. To add other actions, perform the following tasks:
   a) In the **Pick an item** list, select an action.



   b) Click **Add**.
   c) Configure the settings for the action.
8. Click **Save**.

Create a schedule

You can create a schedule to determine when a rule is active.

1. In the Senstar Symphony Server configuration interface, click **Rules** > **Schedules**.
2. Click **Add Schedule**.
3. Type a name for the schedule.
4. Define the active and inactive times for the schedule.
5. If required, add exceptions to the schedule.
   a) Select a date.
   b) Select whether to repeat the exception every year on that date.
   c) Click **Add Exception**.
   d) Define the active and inactive times for the exception.
6. Click **Save**.

Create a rule

You can create a rule to trigger the Senstar Symphony Server to perform actions.

1. In the Senstar Symphony Server configuration interface, click **Rules** > **Rules**.
2. Click **Add**.
3. Type a name for the rule.
4. Enable or disable the rule.
5. Add an existing event to the rule or create a new event to add to the rule.

6. If you add multiple events to the rule, select how the events must occur to trigger the rule.
   - Select **in sequence** to trigger a rule when the events occur in the order in which the Senstar Symphony Server configuration interface lists the events.
   - Select **within a time period of** and specify the number of seconds to trigger an rule when all of the events occur in the specified time period.
7. To add action sets to the rule, perform the following tasks:
   a) In the list, select the action set and click **Add**.
   b) In the **Delay** field, set how much time must elapse after the rule occurs before the action triggers.
   c) In the **Multiple Invocation behavior** list select **Append action sets** to trigger that actions for each occurrence of the rule or **Replace queued actions** to trigger the actions for only the most recent occurrence of the rule.

   You can add multiple actions to each rule.
8. Add an existing schedule to the rule or create a new schedule to add to the rule.
9. In the **Severity** field, select the severity for the alarm.
   - 1 is considered high severity in the
   - 2 and 3 are considered medium severity in the
   - 4 and 5 are considered low severity in the

   You can use alarm severity to sort alarms in the .
10. Click **Save**.

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