



# Designing a Site with Avigilon™ Self-Learning Video Analytics

Avigilon HD cameras and appliances with self-learning video analytics are easy to install and can achieve positive analytics results without ongoing software adjustments. Avigilon's patented self-learning video analytics automatically calibrate to the camera's field of view (FoV) requiring no configuration or adjustment.

For video analytics to perform effectively, the analytics camera (or camera connected to an analytics appliance) must be installed correctly. In typical applications, if human detection is effective for the field of view, vehicle detection will be equally accurate. Vehicle detection range may be farther than human detection range because vehicles are generally larger and more visible than humans.

The camera must be:

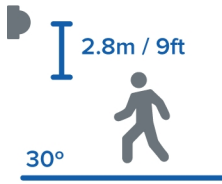
- Within the height and angle guidelines.
- Level to the horizon and ground plane (for outdoor or large indoor areas).
- Installed where there is sufficient light in the area of interest with no obstructions.
- Within range of the area of interest for the video analytics to identify objects.
- Monitoring a scene with enough contrast to classify objects in the scene. For example, a person walking in white clothes in a snow-covered FoV may provide poor results.

The following information provides a basic set of installation parameters. For site requirements that deviate from the listed recommendations, or when in doubt, consult with an Avigilon representative before installing the cameras.

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# Height, Angle and Perspective



## Outdoor Applications

Video analytics function most accurately when the camera is mounted 2.8 m (9 ft) or higher from the ground and tilted no more than 45 degrees down from the horizontal, with 30 degrees being the recommended angle. The camera should be mounted to a stable surface to minimize the vibration and movement.

Avigilon self-learning video analytics require the horizon to be level and expect people to be walking upright in the field of view. People and cars moving perpendicular to the FoV provide better results than objects moving to or from the camera.

## Indoor Applications

Avigilon video analytics devices support an Indoor Mode that is designed to detect only humans. Indoor Mode has additional appearance pattern data to compensate for the high number of potential occlusions in indoor environments (for example, furniture).

Guidelines for indoor applications are similar to outdoor applications. Human targets in the FoV should appear relatively upright and undistorted. Mounting heights may be lower, but the object or human that you wish to detect should not be larger than approximately 2/3 of the overall FoV height. For Indoor Overhead Mode, a torso in the FoV is not required.

**NOTE:** The use of wide-angle or fisheye/panoramic lenses are not supported at this time.

Be aware that Avigilon cameras mounted in Portrait Mode must be configured using Avigilon Control Center™ software.

## Reflected Light



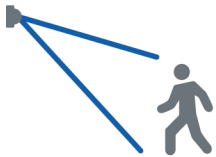
Position the camera so that the sun, headlights or other light sources do not shine directly into the lens. The camera may be temporarily blinded if bright light sources shine directly at the camera. Be conscious of indirect light sources to avoid lens flares and loss of contrast in the image. Cameras with wide dynamic range (WDR) may be able to overcome this issue in some instances, but direct light sources should always be avoided.

## Adaptive IR



Adaptive IR functions by adjusting the IR output dynamically to prevent oversaturation in the scene as the light changes throughout the night. However, this may also blur the outline of objects and negatively impact the accuracy of the video analytics.

## Lux on Target



< 121 m / 400 ft

For video analytics to work well, there must be a minimum illumination of 8 lux on target at a distance of 121 m (400 ft) from the camera.

For third-party cameras that are connected to the video analytics appliance, the required lux on target may vary but a minimum illumination of approximately 2 lux on-target per 30 m (100 ft) is generally sufficient. More light is required if the third-party camera does not have an IR cut filter or a monochromatic night mode.

## Obstructions



To identify objects accurately, the scene must be clear. When designing for outdoor applications, avoid placing a camera where the FoV includes foliage, terrain, or large objects which occlude the subjects of interest.

When the video analytics appliance or camera is installed indoors, a person may be detected using Indoor Mode as long as their upper body, including head and shoulders, is visible.

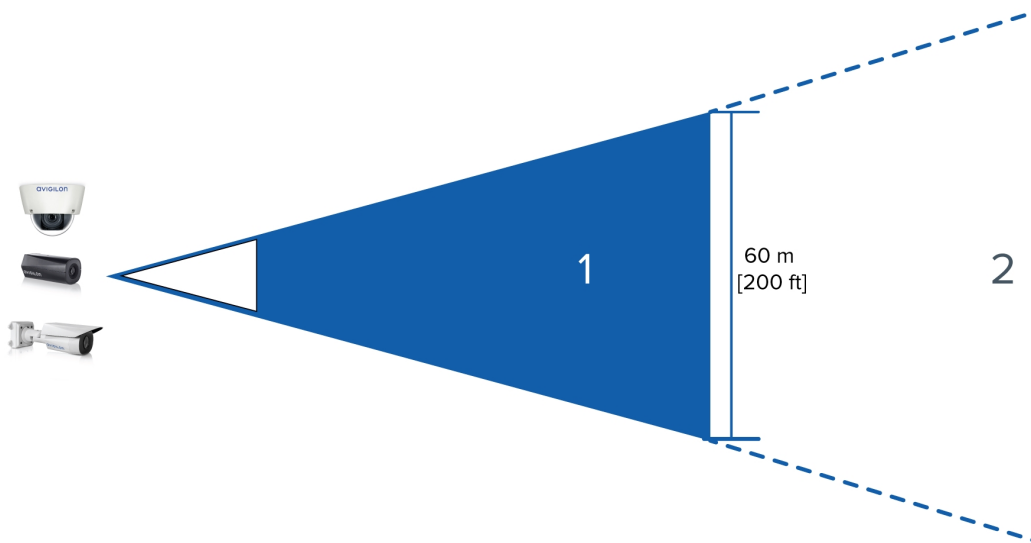
# Coverage Area

Use the camera's horizontal field of view (HFOV) to determine the camera's maximum video analytics detection area. Advanced users may choose to calculate the coverage area by pixels per distance.<sup>1</sup>

## Outdoor Applications

For outdoor video analytics applications, cameras should be installed no more than 120 m (400 ft) from the areas of interest or targets. The HFOV should be no more than 60 m (200 ft) wide regardless of the camera resolution and lens size. If the coverage area is too large, objects may become obscured by rain or fog even when there is enough lighting and contrast.

For example, to cover a 244 m (800 ft) fence line, four cameras are required. Each analytics camera would cover a width of 60 m (200ft) of the fence.



**Figure 1:** (1) 60m (200ft) of analytics object detection area in the camera's HFOV. (2) Maximum camera FoV.

## Indoor Applications

While indoor video analytics applications rarely exceed the recommended coverage size, make sure the coverage area is not too small. Low ceilings or confined spaces (such as a man-trap area between secured doors) may pose problems with establishing a scene that fits the recommended criteria. Overall the width of the HFOV should typically be 9 m (30 ft) wide at a minimum, even if the detection area or zone of concern is much smaller.

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<sup>1</sup>The minimum resolution for detecting video analytics activity is 24 pixels per meter (7 pixels per foot) or approximately 20 pixels high. Maximum target size is 2/3 of FoV height.

# Object Velocity

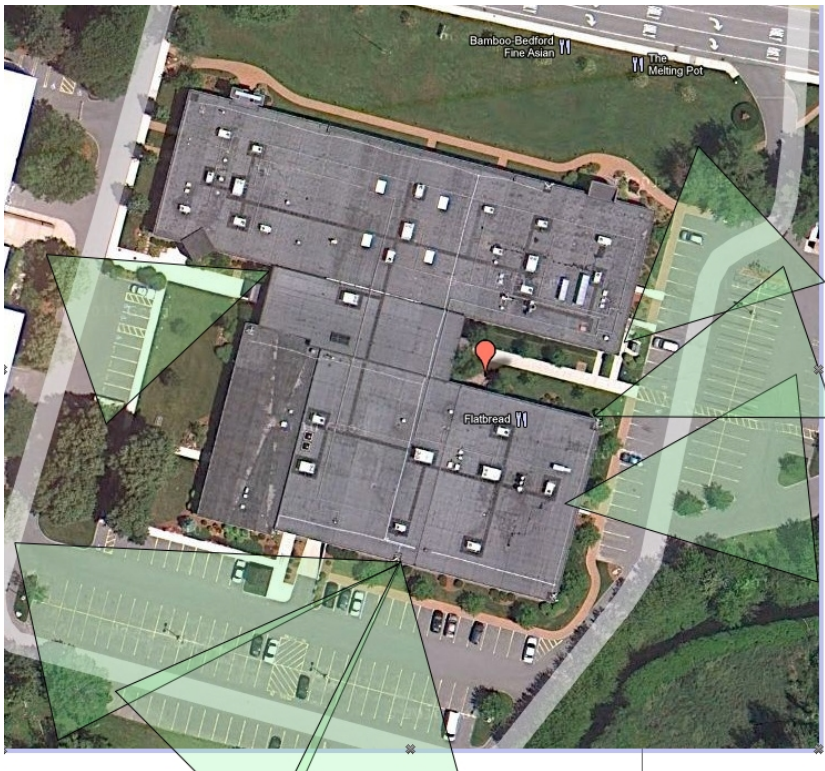


< 00:00:02

Video analytics devices must be able to observe a moving object for a minimum of 2 seconds before they can classify the object — 5 seconds or more is recommended.

If fast, lateral-moving vehicles are expected, use a design with a wider field of view to increase the available observation time.

# Camera Placement



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In most situations, the recommended mounting position is on an interior building or structure looking out towards the perimeter.

Cameras can be mounted on the perimeter when covering exceptionally large areas, or if there is no suitable interior mounting location. An interior mounting location may be unsuitable if the interior space is occupied by objects or equipment that obscure key parts of the FoV. Make sure the camera FoVs overlap to ensure adequate coverage in the blind spot immediately below a camera.



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## Self-Learning

Avigilon video analytics work by observing human activity in the scene and performing a self-learning process. If the self-learning process does not have enough human activity during the initial analytics calibration period, increased false positives may result and the teach by example (TBE) process must be used.

If classified objects are not highlighted because self-learning did not start or started but turned itself off, you can choose to re-enable self-learning but that is not required. If you receive many false negatives while self-learning is enabled, turn it off and see if that helps. If it does, keep the self-learning feature disabled.

## For More Information

For site requirements that deviate from the listed recommendations, or if in doubt, consult with an Avigilon representative before installing the cameras.

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