



Capturing the best image in different lighting conditions

White Paper



Lighting is one of the most important factors in surveillance. However, it is also one of the most challenging aspects because your environment is likely to experience a wide variety of lighting conditions, changing based on the time of day and the area that is being recorded. For example, a retail store may be bright during the day, but dark at night; a commercial entrance might experience both dark and light portions in the same scene; a restaurant may have low ambient lighting all the time; and a parking lot may be pitch black at night with bursts of light from vehicle headlights. In order to capture the best evidentiary detail in each of these conditions, it is absolutely critical to ensure that the surveillance camera selected is equipped with the right technology for the lighting conditions of the imaging area.

Avigilon cameras combine a multitude of advanced technologies, each targeting a specific type of lighting condition.

Using the best technology for your environment

Lighting Conditions	Environment	Avigilon Technology	Types of Avigilon Cameras with the technology
Consistent bright lighting conditions	Cash registers Large retail stores Stadiums	All Avigilon cameras including color only cameras	All Avigilon cameras including the HD Micro Dome and the JPEG2000 Panoramic and Pro cameras
Mostly bright lighting conditions with detection needs in low light / night time	Retail Commercial	Avigilon cameras with Day/Night technology	Most Avigilon H3 cameras including HD and HD Dome cameras, HD Bullet, and HD PTZ cameras
Extreme low-light conditions	Parking lots Back-alleys Entrances	Avigilon cameras with Adaptive Infrared (IR) technology	Avigilon H3 “-IR” cameras including HD Dome and HD Bullet cameras
High range of lighting conditions simultaneously	Garages Commercial Entrance Outdoor	Avigilon cameras with Wide Dynamic Range (WDR) technology	Avigilon H3 cameras with WDR including HD, HD Domes, and HD Bullet Cameras
Ambient lighting conditions	Hotel lobbies Restaurants Hospitality	Avigilon cameras with LightCatcher™ technology	Avigilon H3 cameras including HD and HD Dome cameras

Leading edge technologies such as Avigilon’s LightCatcher™ technology can make a drastic difference in the quality and level of evidentiary detail that is recorded in your specific environment. In light-constrained environments, capturing a crisp image in color can have a large impact in your ability to respond to potential threats effectively. This paper provides an overview of these technologies so that integrators and end-users understand the tools available to capture the best evidence in their specific environments.

Day/Night

The most basic lighting technology provided in most surveillance cameras, is commonly referred to as Day/Night capability. Avigilon cameras marked as Day/Night use a mechanical infrared (IR) cut filter to capture high quality images in both daytime and nighttime settings. When there is adequate lighting, for example outdoors during daytime, the mechanical IR cut filter blocks unwanted IR light, enabling the camera to provide true color depiction within clear images. As the light level decreases, the image will become noisy and evidentiary details can be lost. At this point, the camera switches from color to monochrome, removing the IR cut filter, and using all sources of illumination available to capture as much detail as possible, in black and white.



A color-only camera will be limited in the amount of detail it can capture in dark environments. As the light level decreases, the image becomes noisy and evidentiary detail can be lost.



As the light level decreases, Avigilon cameras with Day/Night technology remove the infrared (IR) cut filter in order to use all sources of ambient light to capture as much detail as possible in monochrome (black and white).

Adaptive IR

In many circumstances, such as outdoor spaces, dark parking areas, or back alleys, there isn't enough ambient lighting to capture strong evidentiary detail, even in "night" mode. In these extreme low-light conditions, Avigilon cameras equipped with Adaptive IR technology use the built-in invisible infrared (IR) illuminators to provide the additional illumination required to capture crisp monochrome images. Avigilon's patent-pending Adaptive IR technology automatically adapts the built-in IR illuminators to the specifics of the environment and the changes in the scene. For example, when set-up in dark parking areas or back alleys, Avigilon's Adaptive IR technology captures clearly legible license plate on moving vehicles and never oversaturates details of a potential intruder, regardless of their distance to the camera. For more information on Avigilon's Adaptive IR technology see avigilon.com/white-papers/adaptive-ir/



Left • In extreme low light environments, such as the back of a restaurant, cameras with Day/Night technology alone may not be able to capture clear images.

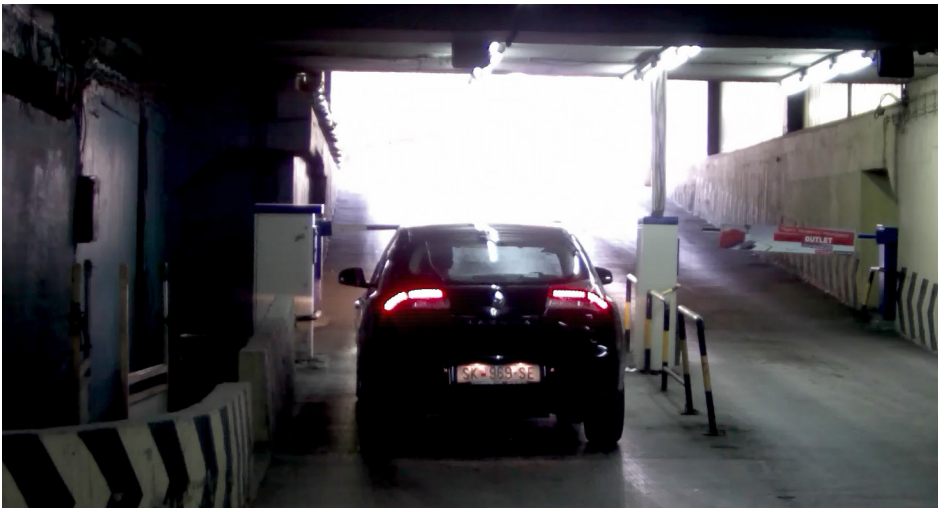
Right • Avigilon cameras with Adaptive IR technology use the built-in invisible IR illuminators to provide the additional illuminator required to capture crisp monochrome images.



Avigilon's Adaptive IR technology adapts the camera to the specifics of the environment and the changes in the scene, resulting in consistent illumination throughout the scene at all zoom positions, clearly legible license plates, and never oversaturating faces and other important details.

Wide Dynamic Range (WDR)

Some environments, such as garages and commercial entrances, can experience both dark and bright lighting conditions simultaneously within one imaging area. Avigilon cameras with Wide Dynamic Range (WDR) technology seamlessly combine multiple exposures within each frame. A longer exposure is used to capture details in the darker regions of the imaging area, while a shorter exposure reduces oversaturation in the brighter areas. By seamlessly combining the best exposure setting for each pixel, every frame delivers clear and detailed evidence in all portions of the scene. When used in a garage setting, every detail of cars and people is captured clearly, whether they are illuminated by direct sunlight or shaded. In a commercial entrance, detail is captured of the individuals walking to the entrance as well as those inside.



In environments experiencing a high range of illumination, cameras without WDR technology will not be able to detect details in portions of the image, as bright parts will be oversaturated, and dark parts will be too dark (left corner).



Avigilon cameras with WDR technology seamlessly combine multiple exposure within each frame to capture details throughout the image.

LightCatcher™

Some environments, such as hotel lobbies and restaurants, experience consistent low light or ambient lighting conditions. In such environments, capturing a crisp image in color can have a large impact in the security professional's ability to recognize, identify, and respond to a potential threat effectively. Targeting these specific environments, Avigilon's LightCatcher™ technology is capable of collecting significantly more detail in color from a low-light scene than any other technology, producing a higher quality color image with less noise. So how does Avigilon's LightCatcher™ technology work?

The amount of evidentiary information captured by a camera is a function of the amount of information (signal) that camera is able to capture given the lighting conditions. However, this information is also obscured by the noise inherent to every electrical appliance.

Evidentiary information = Information (Signal) captured from the scene – Noise that obscures the information

Avigilon's LightCatcher™ technology works in two ways. First, it captures much more information (signal) in any given lighting conditions. Second, it reduces the noise that obscures the information. The result is that it captures clear evidence under conditions where other cameras would capture very little.



In environments experiencing consistent ambient lighting conditions, cameras without LightCatcher™ technology will capture very little.



Avigilon cameras with LightCatcher™ technology capture clear images in color under the same lighting conditions.

Avigilon's portfolio of HD cameras offer different combinations of the above technologies, enabling customers and integrators to pick the appropriate camera for their security needs. Inside business environments, color cameras such as the discrete Avigilon HD Micro Dome can cover well-lit areas such as cash registers and meeting rooms effectively with a small footprint that comfortably blends into its surroundings. Avigilon Day/Night cameras such as the Avigilon HD Dome and PTZ cameras are well suited for areas that are well-lit during business hours but require situational awareness outside of those hours. These cameras provide detailed color footage of customers and transactions during operating hours, as well as black and white images that capture potential intruders or other threats outside of business hours. Business environments experiencing extreme low light conditions should take advantage of Avigilon's patent-pending Adaptive IR technology available in the Avigilon HD Dome and Bullet cameras. These cameras offer the same amazing color footage during business hours but are also equipped with integrated IR technology that provides additional illumination in extreme low light conditions and captures detailed evidence of subjects and license plates without ever oversaturating. Finally, Avigilon's latest LightCatcher™ technology captures drastically more detail in color, under low light conditions. It is ideal for businesses with consistent ambient lighting conditions such as hotel lobbies and restaurants, allowing security professionals to identify and respond to any situation quickly and efficiently.

Avigilon's variety of lighting technologies offers system integrators and customers the tools to address the wide range of lighting conditions experienced in their businesses and local environments.

