

Optera IMM Series

User Guide



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Important Notices

Regulatory Notices

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Radio and Television Interference

This equipment has been tested and found to comply with the limits of a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Changes and modifications not expressly approved by the manufacturer or registrant of this equipment can void your authority to operate this equipment under Federal Communications Commission's rules.

CAN ICES-3 (A)/NMB-3(A)

Warranty Statement

For information about Pelco's product warranty and thereto related information, refer to www.pelco.com/warranty.

Audio Notice

NOTE: Improper use of audio/visual recording equipment may subject you to civil and criminal penalties. Applicable laws regarding the use of such capabilities vary between jurisdictions and may require, among other things, express written consent from the recorded subjects. You are solely responsible for insuring strict compliance with such laws and for strict adherence to any/all rights of privacy and personality.

Video Quality Caution

Frame Rate Notice Regarding User Selected Options

Pelco systems are capable of providing high quality video for both live viewing and playback. However, the systems can be used in lower quality modes, which can degrade picture quality, to allow for a slower rate of data transfer and to reduce the amount of video data stored. The picture quality can be degraded by either lowering the resolution, reducing the picture rate, or both. A picture degraded by having a reduced resolution may result in an image that is less clear or even indiscernible. A picture degraded by reducing the picture rate has fewer frames per second, which can result in images that appear to jump or move more quickly than normal during playback. Lower frame rates may result in a key event not being recorded by the system. Judgment as to the suitability of the products for users' purposes is solely the users' responsibility. Users shall determine the suitability of the products for their own intended application, picture rate and picture quality. In the event users intend to use the video for evidentiary purposes in a judicial proceeding or otherwise, users should consult with their attorney regarding any particular requirements for such use.

Open Source Software

This product includes certain open source or other software originated from third parties that is subject to the GNU General Public License (GPL), GNU Library/Lesser General Public License (LGPL) and different and/or additional copyright licenses, disclaimers, and notices. The exact terms of GPL, LGPL, and some other licenses are provided to you with this product. Please refer to the exact terms of the GPL and LGPL at <http://www.fsf.org> (Free Software Foundation) or <http://www.opensource.org> (Open Source Initiative) regarding your rights under said license. You may obtain a complete corresponding machine-readable copy of the source code of such software under the GPL or LGPL by sending your request to digitalsupport@pelco.com; the subject line should read Source Code Request. You will then receive an email with a link for you to download the source code. This offer is valid for a period of three (3) years from the date of the distribution of this product by Pelco.

Accessing the Camera

By default, users do not have to log in to view video; anyone who accesses the camera can view live video. If you want to prevent users from viewing video without logging in, you must change the permissions for public users.

The recommended browsers for your camera are Internet Explorer® or Mozilla® Firefox® for Microsoft® Windows® operating systems, and Firefox for Mac® operating systems.

1. Open a web browser.
2. Type the camera's IP address (192.168.0.20) or host name in your browser's address bar, and then press Enter.

NOTE: You can obtain your camera's IP address or access the camera using the Pelco Device Utility software. If DHCP is enabled but a DHCP server is not on the network, the camera automatically assigns itself both an IPv4 link local address (169.254.x.x, where the lower two octets are random) and a 192.168.0.20 address. Additional cameras will assign themselves different IPv4 link local addresses and the next available 192.168.0.x IP addresses in sequential order. For example, if three cameras are connected to a network without a DHCP server, the first camera to connect assigns itself the IP address 192.168.0.20, the second camera assigns itself 192.168.0.21, and the third camera assigns itself 192.168.0.22.

Accessing Camera Settings

Initially, anyone can access the camera settings until the Admin role is created.

1. Click Settings.
2. Select the setting you want to change. Place your mouse pointer over any tab on the page to reveal submenus.









Live Video Page

The live video page provides access to video streams and PTZ controls (where applicable). If user permissions for the camera allow public users to view video, the live video page will be available to all users with network access to the camera.

By default, the camera displays the panoramic image at the top of the page. Below is an immersive view of the camera which supports electronic PTZ using a mouse (default). You can also select the Flat Projection option to show a single flat projection of everything the camera sees if your browser does not support WebGL. The arrangement of the flat projection view is dependent on your camera model.

Live Video Controls

Viewable controls are based on camera model and user permissions.

	Select Stream: Click to select stream, transmission type, and player settings for your live view stream.
	Maximize Viewing Area: Scales the video stream to the full size of the browser.
	Return to Normal View: Returns the video stream to normal size. This icon is only available after the video stream has been maximized.
	Open Stream in New Window: Opens the video stream in an independent window.
	Take a Snapshot: Captures a still image from the video stream and saves it as a JPEG file.
	Center Viewing Area: ¹ Engages click-to-center functionality. Click the icon, and then click within the video stream to center the camera's field of view.
	Pan and Tilt: Engages pan and tilt functions. Click the icon, and then click and drag the mouse within the video stream to pan and tilt the camera.
	Resize Viewing Area: Allows you to zoom in on an area of interest. Click the icon, and then click and drag over the area in the video on which you want to center the camera's field of view and zoom in.

¹ These icons are always available when using the Pelco Media Player. If you are using QuickTime®, these icons are available only when the QuickView Stream is selected.

System Menu

The System menu contains general system time settings, and on screen display settings. It also provides access to basic system information, and the backup, restore, and restart functions. Options may vary dependent on your camera model.

From the System menu, you can also access snapshots generated by event handlers.

Information Settings

The information settings page includes read-only fields for the firmware version, hardware version, model number, and serial number of the camera. This information is typically required by Pelco Product Support for troubleshooting purposes.

Snapshot Viewer

The Snapshot Viewer page displays a list of snapshots saved to the SD card when a “Write JPEG to SD Card” event handler is activated. From this page, you can open, download, or delete snapshots from the SD card. There are 100 snapshots displayed per page.

NOTE: Snapshot Viewer is not available when recording video to local storage.

Changing the Camera Name

Providing a user-friendly name might help you and other users identify the camera on the network, and within other applications. The camera name is the friendly name that appears both in the Web interface and within other applications that can find the device.

1. Select General Settings from the System menu.
2. Provide a user-friendly name in the Device Name box (2 to 63 characters).
3. Click Save.

Enabling and Disabling LEDs

You can turn your camera’s LEDs on or off. By default, your camera’s LEDs are on. LED settings do not affect your camera’s network status and activity LEDs.

1. Select General Settings from the System menu.
2. Select On or Off beside Enable LEDs.
3. Click Save.

Configuring the SMTP Server

Providing the address of an SMTP server enables your camera to send email notifications when using the Send Email event handler.

1. Select General Settings from the System menu.
2. Type the address of your SMTP server in the SMTP Server box.
3. Click Save.

Optera Compatibility Mode

Optera Compatibility Mode determines the type of stream(s) the camera sends to your Video Management System, recorders, and clients. You should set the compatibility mode based on the panomersive integration with your VMS. Check with your integrator to determine the panomersive implementation within your VMS or client.

Panomersive mode is for classic, typical panomersive/Optera integrations. The camera produces multiple streams representing the cube faces used by the Panomersive Toolkit; the toolkit then assembles the streams as a single view at the VMS or client. Use this mode for typical panomersive integrations, especially in VMS environments representing Optera as multiple physical cameras.

Tiled mode is for VMSes or clients that do not have a panomersive integration to dewarp and assemble Optera streams. In this mode, the camera outputs “tiled” streams that the user can assemble in a client to resemble a panorama. (For example, a 180 camera would output 3 “tiled” streams; the user would place the streams next to each other in order at the client, producing the semblance of a panorama across the three tiles or cells. You cannot use virtual PTZ controls when in tiled mode.

NOTE: Switching to or from tiled mode clears all analytics and window-blanking settings.

Panomersive Uni-stream mode is for panomersive implementations that recognize Optera as a single camera or stream. The camera outputs a single video stream that the Panomersive Toolkit integration dewarps and allows users to access. The dimensions of the uni-stream are larger than allowed by h.264 specifications; this may result in issues with decoders expecting streams that strictly comply with dimensions defined by the h.264 specification.

To set change your Optera compatibility mode:

1. Go to the System page.
2. Select your *Optera Compatibility Mode*.
3. Click *Save*.

Tiled Mode (Assembling Panoramic Scenes)

Tiled Mode produces multiple “flat” streams, each representing a fraction of the camera’s panoramic view. Each stream appears as a video source or “camera” within your client or VMS. You can either assemble the video sources to represent a panorama, or you can watch the individual streams as necessary to get a view from the camera.

Endura and integrations using the Pelco API to discover cameras should recognize Optera streams/tiles in the following order:

- 1) Mosaic Stream (full, low-quality panorama)
- 2) Right Stream
- 3) Front Stream (center)
- 4) Left Stream
- 5) Bottom stream (for 270 models only)

If a VMS does not use the Pelco API to discover Optera cameras, then the sequence by which the VMSes connects to Optera tiled streams may not necessarily be the order in which streams are numbered by the camera. For example, stream 2 as determined by the VMS might not always represent the left-most stream in the panorama. If this is the case, you may need to rearrange your Optera camera’s streams in adjacent cells so that they appear in order. If your VMS or client allows you to assign friendly names to the streams, you may want to rename the streams to better represent their orientation; you cannot rename or order the streams through the Optera interface or API.

NOTE: For best results in an Endura environment (using a WS5080 or better), use a 2x2 layout to display the full panorama of Optera tiles side-by-side. You must be running a version of the Workstation software later than 2.7.0 to use a 3x2 layout, allowing you to piece together a full 180°/360° tiled panorama.

Table A: Optera Tiled Panoramas

Optera Camera	Streams	Expected Tile Layout in VMS (for Endura/Pelco API Stream Discovery)						
180°	4	<table border="1"><tr><td>4</td><td>3</td><td>2</td></tr></table>	4	3	2			
4	3	2						
270°	5	<table border="1"><tr><td>4</td><td>3</td><td>2</td></tr><tr><td></td><td>5</td><td></td></tr></table>	4	3	2		5	
4	3	2						
	5							
360°	4	<table border="1"><tr><td>4</td><td>3</td><td>2</td></tr></table>	4	3	2			
4	3	2						

Hardware Requirements for Tiled Mode

Optera’s tiled mode is resource intensive. Depending on your hardware, you may not be able to display all tiles belong to a panorama at one time. Tiled mode was tested against Endura WS5070 and WS5080 products; use the following guidelines to determine how many tiled streams you can display simultaneously.

NOTE: Attempting to exceed the limitations of your hardware may cause poor performance or dropped streams.

Table B: Tiled Stream Hardware Requirements

	1 tile (1x1 layout - WS5070)	4 tiles (2x2/3x3 layout - WS5080)
Processor	Intel® Xeon® X3220	Processor Intel® Xeon® E3-1275 v3
Memory	2 GB	8 GB DDR3 ECC

Adjusting the Image Angle

The Corridor Mode and Install Angle settings enable a VMS to display views optimally. These settings are only available for 180° models.

Corridor Mode

Corridor Mode directs a VMS or client to rotate the camera image, providing a natural immersive view of a portrait scene. Use Corridor Mode when monitoring corridors, hallways, shopping aisles, railway platforms, and other scenes in which the area of interest is tall rather than wide.

Select *On* to rotate the image to portrait mode. Select *Off* to return the camera image to the standard landscape mode.

Install Angle

The Install Angle setting directs a VMS or client to tilt the camera image to provide a more natural immersive view for scenes that are not strictly horizontal, similar to parking lots.

Drag the slider to set the install angle, or enter the specific image angle value.

Example: If the camera is mounted with the lens plane horizontal, the Install Angle setting is 0°. Change the Install Angle to -30° to tilt the lens downward when viewing a parking lot.

Configuring Time Settings

You can set your camera to discover a network time server (NTP) automatically, manually provide the address of your network time server, or determine time based on the camera's internal clock.

1. Select General Settings from the System menu.
2. Select your time server setting:
 - **Auto:** Allows your camera to discover and synchronize with your network time server (over IPv4 or IPv6).
 - **Manual:** Requires you to provide the address of your network time server.
 - **None:** The camera will determine time from its internal clock. If you select None, you must also set your time zone. Cameras that are not synchronized with a time server can exhibit time drift.
3. Click Save.

Customizing the Onscreen Display

You can set various informational overlays for video produced from your camera, and you can determine the location of overlaying information using the Text Overlay settings. By default, all text overlays are hidden. The text overlays available for your camera are dependent on your model.

1. Select General Settings from the System menu.
2. Determine the text overlays you want to appear:
 - **Date/Time Overlay:** Displays the date and time in the live view overlay.
 - **Camera Name Overlay:** Displays the camera name in the live view overlay.
 - **Pan/Tilt Overlay:** Displays pan, tilt, zoom, and direction positions when using PTZ controls.
3. Select the display position and format for the overlay from the Position and Overlay Format drop-down menus.
4. Click Save.

Restoring All Camera Defaults

Restoring default settings will overwrite all of your existing settings with device defaults.

NOTE: If your device has been configured with a static IP address, restoring factory defaults will remove the static IP and set the device to obtain an address over DHCP.

1. Select General Settings from the System menu.
2. Click Restore All Camera Defaults.

Generating a System Log

If technical difficulties should occur, a system log might help Pelco Product Support troubleshoot problems with your camera. You can contact Pelco Product Support at 1-800-289-9100 (USA and Canada) or +1-559-292-1981 (international).

1. Select General Settings from the System menu.
2. Click Generate System Log.
3. Select the location in which to save the log file.
4. Click Save.

Restarting the Camera

If you are recording video from your camera, restarting the camera will cause a gap in video recording. It is important that you schedule maintenance before restarting the camera.

1. Select General Settings from the System menu.
2. Click Reboot Camera.

Backing Up and Restoring Settings

You can backup your camera configuration, and restore the configuration, should you ever change a setting in error or need to recover from a factory reset. Camera backup files are stored in bin format.

The restore feature is not intended to automatically configure multiple cameras or to recover settings following a firmware upgrade.

Backing Up Camera Settings

1. Select Backup and Restore from the System menu.
2. Click Download Now, and then specify the directory in which to save your backup file.
3. Click OK to save the backup file.

Restoring Camera Settings from a Backup

1. Select Backup and Restore from the System menu.
2. Click Browse, locate your camera's backup file, and then click OK.
3. Click "Upload and Restore"; the camera will restart and restore your camera's settings.

Network Menu

The Network menu contains network configuration settings and options for your camera; from this menu, you can set static IP addressing, enable SSL, enable SSH, configure 802.1x port security, and point your camera to an SNMP manager. By default, your camera receives an address over DHCP, and all other network features are disabled.

Changing General Network Settings

The General page, under the Network menu, contains standard network address settings for your camera.

1. Select General from the Network menu.
2. Set your host name and change port settings (if necessary).
3. Set your IPv4 settings; if you set DHCP to Off, set your IP Address, Subnet Mask, Gateway, and DNS Server settings.
4. *(Optional)* Set IPv6 to On and configure IPv6 address settings.
5. Click Save.

General Network Settings

Host Name

You can configure a host name for your camera containing up to 63 alphanumeric characters. At least one character in the host name must be a letter.

Port Settings

Port settings determine the ports over which users communicate with the camera.

HTTP: Do not change the HTTP when connecting to a Pelco video management system (VMS); doing so may prevent you from viewing or recording video from your imaging camera. The default HTTP port is 80.

HTTPS: Set SSL to Optional or Required and install a security certificate before altering the HTTPS port. The default HTTPS port is 443.

RTSP: Cameras communicate with video management systems over RTSP. Do not change the RTSP port unless you are sure your VMS does not use the default setting. The default RTSP port is 554.

Link Speed: Auto-Negotiate is the default setting for configuring the camera throughput speed automatically. Selecting 100 Mb ensures the throughput speed to 100 Mb. When using Optera with VideoXpert, use the 100 Mb mode to ensure clients can playback video at high framerates.

IPv4 Settings

By default, cameras are configured to obtain network settings over DHCP. If a DHCP server is not available, the camera defaults to an address of 192.168.0.20 on a 255.255.255 subnet. If 192.168.0.20 is already in use on the network, the camera will increment the address by one until it finds an unused address (for example, 192.168.0.21 if 192.168.0.20 is in use).

Set DHCP to Off to configure a static address and manually set the subnet mask, gateway, and DNS Server settings.

IPv6 Settings

Your camera supports IPv6 configurations in conjunction with IPv4; the device does not support IPv6-only network deployments. The camera will accept up to sixteen IPv6 addresses, three IPv6 DNS servers, and three IPv6 gateways.

There are two configuration modes for IPv6 address assignment:

Auto: Enables automatic configuration using router advertisement. Additional configuration can be provided over DHCPv6 (if available on your network). Selecting Auto still allows you to manually configure additional address, DNS servers, and gateways.

Manual Only: Provides a link-local address for the device, and it requires you to manually configure all other IPv6 address settings for the camera. Manually specified addresses require a prefix and must be input in the format *prefix/IPv6Address*. The camera will reject addresses that do not contain prefix information.

NOTE:

- Cameras do not accept multicast, localhost, or undefined IPv6 addresses.
- Manually specified DNS servers are not validated by the camera and supersede automatically discovered DNS servers; verify your DNS addresses before saving IPv6 settings.
- Manually specified gateways must be on the same network as the camera's IPv6 addresses. Behavior for a gateway that is not on the same network as the camera's IPv6 addresses is undefined.
- Some video management systems (VMS), including Pelco systems, do not support connections to cameras and encoders over IPv6.

Configuring SSL

The SSL settings page includes SSL configuration modes and certificate generation. The camera can generate a certificate signing request (CSR) that can be sent to a certificate authority for a signature (for example, VeriSign®), or it can generate a self-signed certificate using the Generate Self-Signed Certificate option.

SSL is disabled by default. You must enable SSL to access the camera over HTTPS.

1. Select SSL from the Network menu.
2. Select your SSL mode:
 - **Disabled:** Disables HTTPS communications with the device.
 - **Optional:** Requires that you install a signed SSL certificate and enables HTTPS access to the camera; however, the camera will still be available over HTTP.
 - **Required:** Requires that you install a signed SSL certificate and enables HTTPS access to the camera. When attempting to access the camera over HTTP, users will be automatically redirected to the HTTPS URL.

NOTE: Beginning with firmware version 1.8.2, the Required option cannot be enabled or disabled through the Web interface. To enable or disable Required SSL operation, you must use the ONVIF or Pelco APIs. This prevents the camera from entering a state in which it no longer works with a VMS.

Enabling SSH

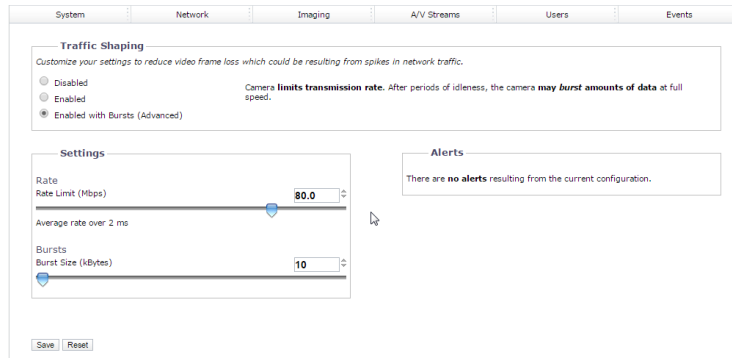
Advanced troubleshooting for problems that cannot be addressed through the camera interface can be performed by establishing an SSH connection into the camera. By default, SSH is off. The user name for SSH connections is *root*, and cannot be changed.

1. Select SSH from the Network menu.
2. Provide a password for the root user. Passwords are case-sensitive.
3. Confirm your password.
4. Click Save.

Shaping Traffic

You may want to use the traffic shaping function if the framerate at your client is significantly lower than you would expect from the camera.

Optera cameras produce large I frames, producing a traffic burst within each group of pictures as the camera transmits the frame; if your network infrastructure does not have the buffering capacity to smooth out the traffic, you may experience slow or jittery video. From the Traffic Shaping page, you can control the average transmission rate over a 2ms period and limit traffic bursts coming from the camera to help you prevent frame losses at your client resulting from traffic bursts produced by the camera.



1. Go to the *Traffic Shaping* page from the *Network* menu.
2. Enable *Traffic Shaping* with or without bursts, depending on your need.
3. Set the average transmission rate over a 2 ms period in Mbps.
4. If you enabled traffic shaping with bursts, set the maximum size of bursts coming from the camera in kilobytes.
5. Click *Save*.

Configuring 802.1x Security

By default, 802.1x security is off. Cameras support EAP-MD5, EAP-TLS, EAP-TTLS, EAP-PEAP, and EAP-FAST protocols.

1. Select 802.1x from the Network menu.
2. Select On for 802.1x port security.
3. Select the (EAP) method from the Protocol drop-down menu.
4. Provide the authentication information for the EAP method you selected.
5. Click Save.

SNMP

Your camera supports SNMP V2c and V3, and it can be configured to send traps. The MIB file for your camera is available at www.pelco.com.

NOTE: SNMP V2c and SNMP V3 configuration settings are independent of each other, but only one SNMP mode can be active.

Configuring SNMP V2c

1. Select SNMP from the Network menu.
2. Select SNMP V2c.
3. Provide the community string for your SNMP manager. The default community string is "public."
4. Provide the address and community string for your trap server under Trap Configuration.
5. Click Save.

Configuring SNMP V3

1. Select SNMP from the Network menu.
2. Select SNMP V3.
3. Enter the SNMP user name the camera will use to authenticate with the SNMP server.
4. Select the encryption algorithm for authentication from the Authentication drop-down menu. If using MD5 or SHA authentication methods, enter your authentication code in the box provided.
5. Select the privacy protocol setting from the Privacy drop-down menu. If using DES or AES protocols, enter your privacy key in the box provided.
6. Enter the host name or IP address of your trap server in the Address box under Trap Configuration.
7. Click Save.

Imaging Menu

The Imaging menu contains image quality, exposure, white balance, and window blanking settings for your camera.

Digital Processing Settings

Digital processing settings adjust the color and detail of captured video. The availability of settings might change based on your camera model.

Image Enhancement: The Temporal Noise Filter reduces video noise between frames. The default setting is Off.

Quick Setup: Contains presets for digital processing settings. You can use any of the quick setup modes as starting points for custom settings; changing sharpness, saturation, contrast, or brightness settings automatically engages the Custom mode.

- **Normal:** A baseline setting in which sharpness, saturation, contrast, and brightness are all set to zero.
- **Vivid:** A setting that enhances color quality, lightens whites, and darkens blacks.
- **Custom:** Allows you to set your own, unique image quality settings.

Sharpness: Controls the clarity of detail in the scene. Increasing video sharpness increases video noise.

Saturation: Controls the intensity of colors in the scene.

Contrast: Controls the gradation between the darkest and lightest portions of the scene.

Brightness: Controls the lighting detail of the scene.

Configuring Exposure Settings

Exposure settings help ensure that video contains an adequate level of detail and contrast between light and dark values.

Exposure Modes: Determines the exposure behaviors for your camera.

Flicker Correction: Lessens rolling shutter flicker in images with reduced dynamic range. The default setting is Off. When selecting On, **Frequency Hint** provides options for None, 50Hz, and 60Hz.

Day/Night Mode: Controls the IR cut filter, determining whether or not your camera captures color (day) or black and white (night) video. You can set the Day/Night position manually, but it is recommended that you engage the auto mode if lighting around your camera is expected to change drastically at any time.

1. Select Exposure from the Imaging menu.
2. Select your camera's Exposure Mode.
 - **Auto:** Allows you to specify maximum Exposure Time and maximum Gain, while retaining the full range of Day/Night controls.
 - **Manual:** Allows you to fix the Exposure Time setting and adjust the maximum Gain limit. You should only engage this mode if fixed exposure time is a priority.
3. Set the Max Exposure Time or the Exposure Time, depending on the exposure mode you selected. The maximum exposure time determines the time, in milliseconds, that the imaging sensor is exposed to light. Decreasing the maximum exposure time reduces motion blurring; increasing the maximum exposure time could help capture more detailed still images in low light.
4. Set the Max Gain or the Gain, depending on the exposure mode you selected. Increasing the gain allows for better sensitivity in low-light scenes, but also increases video noise.

5. Select the Flicker Correction Mode.
 - **On:** Reduces rolling shutter flicker in all scenes, also reducing the overall dynamic range in the image. You may specify the **Frequency hint** at None, 50 Hz, or 60 Hz if you are unsure.
 - **Off:** (Default) Maintains the maximum amount of dynamic range in the image, but it can produce rolling shutter flicker in scenes with florescent or other oscillating light sources.
6. Set your Day/Night Mode.
 - **Auto:** Engages day or night mode based on the Transition Level setting; this allows you to capture color video (Day) when enough light is available, and automatically switch to black and white video (Night) when light is unavailable.
 - **Manual:** Requires you to choose a Day or Night mode. Day captures color video; night captures gray scale video.
7. *(Optional)* Set your camera's Transition Level, determining when the camera switches from Day to Night mode. Lighter settings cause the camera to change modes at higher lux values.

Setting White Balance

Each Sensor has its own white balance settings. Auto mode is the default setting for each sensor. Selecting Manual mode allows you to adjust white balance settings for the sensor.

Auto: the default white balance mode. It has a color temperature range from 7,500K to 2,500K. It can be used to properly balance scenes illuminated by daylight to warm white sources.

Manual: Allows for several options. Use Manual mode to set Basic, White Patch, and Color chart adjustments.

To set white balance:

1. Select White Balance from the Imaging menu.
2. Select a sensor to configure its white balance. Click Manual mode to adjust that sensor's white balance manually.
 - **Basic:** Adjusts the red and blue range. Move each slider to increase or decrease the color level.
 - **White Patch:** Select White Patch to adjust the white balance in a similar manner as if using a white piece of paper to adjust the white balance. After selecting White Patch, the scene from the camera is presented. If there is an area that should be white, click in that area of the scene, and then drag the mouse to select that portion of the scene to adjust the white balance. If no white area exists, temporarily use a white piece of paper to adjust the camera's white balance.
 - **Color Chart** Allows adjustment of the following color options: Dark Skin, Bluish Green, White, and Black. Using the X-Rite ColorChecker® Classic 24 patch target, place the target in the camera's field of view, following the on-screen instructions.

Using the Window Blanking Feature

Blanked areas persist in all video produced from the camera, whether viewing video directly through the camera's interface or from a higher-level recording device or system.

1. Select Window Blanking from the Imaging menu.
2. Select On to enable Window Blanking.
3. If necessary, maneuver the video preview to find the region you want to blank.
4. Drag the mouse across the video area that you want to blank. Select an existing blanking region to delete it, or edit its size and position.
5. Click Save.

Realigning the Camera Sensors

The camera's sensors are factory-aligned with an optimal field of view between 4 to 30-meters (12 to 98-feet) from the camera. You should only realign the camera if it is obvious that the camera's factory alignment is inadequate for your use, i.e. if there is noticeable duplication between sensors. You may need to realign the camera if it becomes misaligned as a result of physical shock, or if you need to capture a scene containing objects closer than 4 meters. Adjusting for objects closer than 4 meters will increase parallax errors for objects farther from the camera.

Find the current camera's sensor alignment configuration under *Sensor Alignment*. There are three alignment modes:

- **Automatic Align** mode initiates an automatic operation in which the camera determines the best points to align the sensors. Automatic alignment may take up to 5 minutes to complete. Navigating away from the Alignment page does not interrupt automatic alignment; you can continue to configure the camera.
- **Manual Align** mode allows you to select the specific point pairs used to align the camera's sensors. You must select at least three point pairs per sensor pair to successfully align the camera.
- **Restore Factory Alignment** mode restores the camera's sensors to the original factory alignment.

Manually Aligning the Camera Sensors

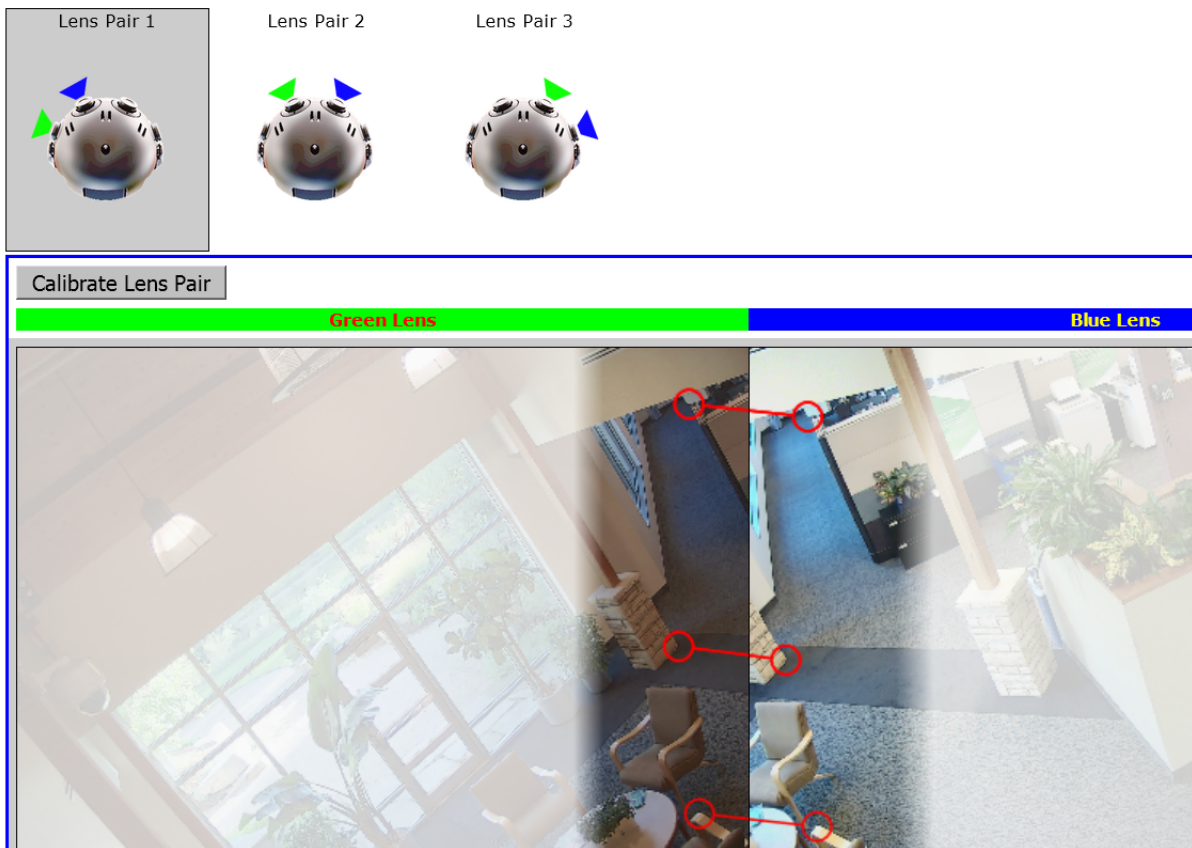
NOTICE: Each lens thumbnail includes an area of focus indicated by an unshaded region. You will select a minimum of three point pairs from this unshaded area for each lens pair. Spread the point pairs apart to ensure the best result.

1. Select Alignment from the Imaging menu.
2. Click *Manual Align*.



3. Identify identical points in the unshaded area between the green and blue lenses. Click a point in the Green Lens thumbnail; the scene zooms in so that you can select the exact point for the pair.
4. Click the identical point in the blue thumbnail. The scene again zooms into the point selected.
NOTE: If you select a point by mistake, click in the shaded area to restart the process.
5. From within the magnified scenes select identical points for the point pair. Move your mouse from the focused area to zoom out and continue creating point pairs.
If a point pair is undesirable, you can click the point pair to delete it.

- When you have created at least three point pairs, click **Calibrate Lens Pair**. You are automatically advanced to the next camera lens.



- Repeat the previous steps until all sensors are aligned.
- When you have calibrated all sensors, review the camera's sensor alignment from the Live page to verify the alignment results.

A/V Streams Menu

The A/V Streams menu contains settings for your camera's video and audio streams.

Configuring Custom Video Streams

The Video Configuration page contains settings for customizing your camera's Mosaic and Full video streams.

The Mosaic video stream is a low resolution composite of the video streams. You can create a custom configuration of the Mosaic video streams.

Full video streams must have the same configuration. Depending on the model, the camera produces between two and five full resolution video streams.

The compression standard, resolution, image rate, bit rate, and I-frame interval settings are dependent on each other. You must first decide the setting you want to take priority before you configure a stream. For example, if you want an image rate of 30 ips, set the image rate before you configure the other settings.

Depending on your camera, by default all fields on the Video Configuration page are populated with settings from your Video Presets. You can clear all fields, or use the default settings as a starting point for your custom stream. Configure the Mosaic stream before the Full stream. The Mosaic stream should be the most resource-intensive video stream.

1. Select Video Configuration from the A/V Streams menu.
2. Select the maximum frame rate (e.g. 10 fps, 12 fps, or 12.5 fps). These settings affect both the Mosaic and Full resolution configurations.
3. Select the Compression Standard, Resolution, Image Rate, and Bit Rate. For H.264 encoding, select I-frame Interval, profile, QoS (DSCP) Codepoint, Endura Signing, and rate control for the Mosaic stream.
4. Select the Image Rate. For H.264 encoding, select I-frame Interval, profile, QoS (DSCP) Codepoint, Endura Signing, and rate control for the Full stream.
5. *(Optional)* Provide a user-friendly name for your custom streams in the Name box (2 to 64 characters).
6. Click Save.

Video Configuration Settings

Compression Standards: Available compression standards depend upon the model of the camera that you are using.

- **H.264:** The most processor-intensive compression standard but requires the least amount of bandwidth.

Resolution: The quality of the video stream, rendered in pixels for both width and height. Higher values result in greater video quality but consume more bandwidth.

Image Rate: The number of frames per second (fps) available for the video stream configuration. Available frame rates depend upon the model of the camera. The maximum frame rate affects the options for the image rate of each stream.

NOTE: The maximum image rate setting might not be obtainable due to the compression standard and the resolution of the stream.

Bit Rate: The quality of the video stream, rendered in kilobits per second. Higher values result in greater video quality but consume more bandwidth.

NOTE: When you change video stream configuration settings, the camera automatically adjusts the bit rate. Choosing a bit rate below the camera's automatic setting might reduce video quality and limit stream configuration options.

I-Frame Interval: Determines the number of partial frames that occur between intra-coded frames (I-frames) in your video stream. I-frames are complete images, used as a reference for change in the following video frames. Following an I-frame, the camera will capture and encode only video data in the scene differing from the I-frame until the next I-frame. This setting is only available for H.264

video streams. Increasing the I-frame interval can improve video compression rates and reduce the size of video data; however, higher values are recommended only for highly-reliable networks.

Profile: Defines the subset of bit stream features in an H.264 stream, which includes color reproduction and additional video compression. It is important you select a profile that is compatible with your recording device(s) to ensure that your camera's video stream can be decoded and viewed.

- **Baseline:** A simple profile with a low compression ratio. A baseline profile is compatible with more recorders but uses more bits to compress video than the other profiles. This profile supports I-frames and P-frames only. Use the baseline profile in applications with limited scene changes, an indoor scene with a single, unchanging primary light source and minimal motion.
- **Main:** An intermediate profile with a moderate compression ratio. This profile is compatible with most recorders and uses fewer bits to compress video than the baseline profile, but more bits than the high profile. The main profile supports I-frames, P-frames, and B-frames.
- **High:** A complex profile with a high compression ration. This is the primary profile for high-definition television applications. The high profile supports I-frames, P-frames, and B-frames.

Quality of Service (QoS) for Different Services Code Point (DSCP): A mechanism for prioritizing network traffic. This setting is available only with H.264 and MPEG-4 compression standards. Your network must be QoS-aware to take advantage of this setting. If you are unsure if your network is QoS-aware, contact your network administrator.

Endura Signing: Allows an Endura® system to authenticate recorded video streams. This setting is available only with H.264 and MPEG-4 compression standards.

Rate Control: Determines the bit rate and quality of each frame in the H.264 video stream. Each rate control setting is a compromise between image quality and the resources required for video storage. The availability of rate control settings depend upon the model of the camera that you are using.

- **CBR:** The constant bit rate (CBR) streams video at a fixed number of bits per second. CBR uses the full capacity of the bit rate setting for scenes with or without motion. Video is always streamed at the user bit rate setting.
- **CVBR:** The constrained variable bit rate (CVBR) provides high-quality video and long recording time of variable bit rate while limiting variations in recording capacity consumption.

Configuring Audio

Not all camera models are equipped with an internal audio device. If your camera does not support audio natively, you must connect an audio device to the accessory port to capture audio. You can only enable audio through the primary video stream.

Audio is disabled by default, but you can enable and configure audio streams from the Audio Configuration page.

Audio and video might not be synchronized when viewing the primary stream through a Web browser. You might experience up to a 3-second delay in video when viewing the primary stream with audio enabled.

NOTE: Improper use of audio/visual recording equipment may subject you to civil and criminal penalties. Applicable laws regarding the use of such capabilities vary between jurisdictions and may require, among other things, express written consent from the recorded subjects. You are solely responsible for ensuring strict compliance with such laws and for strict adherence to any/all rights of privacy and personalty.

1. Select Audio Configuration from the A/V Streams menu.
2. Enable Audio.
3. Select your audio device.
 - **Native Line In:** (Only available for products with built-in audio support.) Enables audio from a microphone connected to the audio-in connector.
4. Select your sample rate. The sample rate is the quality of the audio stream (measured in hertz per second).
5. Select the encoding method.

6. Set the Input Level. Input sensitivity is measured on a scale from 0 to 100 (low to high).

NOTE: If the camera is installed in a noisy environment or the connected microphone has a built-in line amplifier, you should lower audio sensitivity.

7. Click Save.

Managing Local Recording

This device is capable of recording and storing video and audio to an SD card through the ONVIF API. To ensure reliable local storage, it is recommended that you use a 32 GB SanDisk Extreme® PLUS microSDHC™ UHS-I card. For more information about local storage capabilities, refer to the ONVIF Profile G specification.

NOTICE:

- You must use a new SD card to ensure reliable local storage. If the card has previously been used or reformatted, the local storage feature may not function properly.
 - Do not enable local storage if you are using the “Write JPEG to SD Card” event handler. Writing JPEGs to the SD card disables local storage of video and audio.
1. Place your mouse pointer over the A/V Streams tab, and select Local Recording from the drop-down menu.
 2. Click the REC button to enable or disable local recording. The following colors indicate the status of the local recording feature:
 - **Red:** Recording enabled.
 - **Gray:** Recording disabled.
 - **Yellow:** An error has occurred, typically caused by a missing SD card, an SD card that was previously used or reformatted, or the camera's time settings being improperly configured.

Local Recording Storage Limits

The number of hours of video you can store on the SD card depends on several factors besides the capacity of the SD card. The bit rate is an important factor. For example, with the recommended 32 GB card at 1080p with a maximum controlled variable bit rate (CVBR) of 7 Mbps, you can store over 10 hours of video. Scenes with lower complexity and less motion, which allow for lower resolutions and frame rates with lower bit rates, result in longer recording times. You can, for example, record more than 48 hours of video at standard definition of 1.5 Mbps CVBR.

There is, however, a limit on the total number of frames that can be stored on the SD card. Below a bit rate of 1.5 Mbps, you can store a maximum of 48 hours of video at 30 fps regardless of resolution. You can increase the maximum available hours of storage by decreasing the frame rate.

NOTE: The numbers listed above do not include audio. With audio enabled, the number of hours you can record decreases. The impact is minimal above bit rates of 2.25 Mbps. At bit rates below 2.25 Mbps, the number of hours you can record may drop by approximately 40 percent.

Users and Groups

The Users menu contains settings determining how your camera authenticates users (locally or remotely) and an interface for managing local user accounts.

Access Levels and User Roles

User permissions are governed by the role assigned to a user. When authenticating users locally, you will assign a role to each individual user. When authenticating users remotely, users will be assigned roles based on their CN and DN assignments. Your camera supports the following four roles:

- **Admins:** Can access and change all camera settings.
- **Managers:** Can access and change all settings, except user permissions. Managers are also unable to restore factory default settings.
- **Operators:** Can view video, use PTZ functions (where available), and use the API.
- **Viewers:** Can view video and use the API.

Enabling Local User Management

Local Mode is enabled by default, and it sets the camera to manage user accounts and access locally.

1. Select General Settings from the Users menu.
2. Select Local Mode under User and Group Management.
3. Click Save.

Configuring Local Users

Initially, the camera authentication is open to view and configure without a user name and password. Once the Admin role is created and Local Mode User Management is enabled, your camera will authenticate local user accounts. You can configure additional local users from the Users page. If you are a user with Admin permissions, you can delete local user accounts at any time.

1. Select Users from the Users menu.
2. Click New User or select the user whose permissions and settings you want to edit.
3. Select an Access Level for the user.
4. Provide a user name between 2 and 32 alphanumeric characters for the user. User names are not case-sensitive and are saved in lowercase characters.
5. Provide a password between 4 and 64 alphanumeric characters for the user. Passwords are case-sensitive.
6. Re-type your password in the appropriate box to confirm your password.
7. Click Save.

Events and Analytics

The Events tab contains settings for camera events and analytics.

An **event** is a user-defined occurrence, consisting of a source and a handler. A **source** defines the trigger for an event; a **handler** defines the action your camera will take when the event source occurs. When configuring a source, you can link the source to multiple handlers, providing multiple outcomes for the event; when configuring a handler, you can link the handler to multiple sources, providing a single outcome for multiple events.

Analytics are specialized event sources that are triggered by the user-defined behaviors or scenarios occurring within your camera's field of view. Analytics are compatible with Endura® or third-party systems that support alarms using Pelco's API. The analytic behaviors available for your camera are dependent on your model and firmware version.

Event Stream

The Event Stream displays a list of alerts triggered by an active analytic behavior. The alert includes a screen capture, the profile that was triggered, and the zone in which the event was detected.

Sources

An event source defines the trigger for an event, something that must occur before your camera takes action (defined by a handler).

Configuring an Alarm Event Source

An alarm source triggers an event upon a signal from external signaling devices, such as a door contact or a motion detector. If the Pelco Alarm accessory is connected to the camera's accessory port, the camera can support up to four alarm sources.

1. Select Sources from the Events menu.
2. Click New Source or select the source you want to edit.
3. Provide a name, between 2 and 23 alphanumeric characters, for the event source in the Name box.
4. Select Alarm from the Type drop-down menu.
5. Select your relay bank. Relay bank options might include GPIO (General Purpose Input/Output), PCP, or the serial number of your relay device; relay bank options might change depending on your model or accessories attached to your camera.
6. Select the alarm you want to trigger when an event occurs from the Alarm drop-down menu.
7. Set the dwell time for the alarm between 1 and 25 seconds. Dwell time is the amount of time that the source will remain active during an alarm event.
8. Select the polarity of your alarm input (normally open or normally closed).
9. Select either True or False from the Supervised drop-down menu.
10. Click Submit.

Configuring an Analytic Event Source

An analytic event source triggers an event when a behavior defined by a video analytic occurs.

1. Select Sources from the Events menu.
2. Click New Source, or select the source you want to edit.
3. Provide a name, between 2 to 23 alphanumeric characters, for the event source in the Name box.
4. Select Analytics from the Type drop-down menu.
5. Select the analytic that will trigger the event from the available boxes. If you haven't configured an analytic profile yet, the "any" box, indicating that any analytic will trigger the event, is selected.
6. *(Optional)* If available, select the handler(s) that you want to associate with this source.
7. Click Submit.

Configuring a System Event Source

A system source triggers an event when your camera boots.

1. Select Sources from the Events menu.
2. Click New Source, or select the source you want to edit.
3. Provide a name, between 2 and 23 alphanumeric characters, for the event source in the Name box.
4. Select System from the Type menu.
5. *(Optional)* If available, select the handler(s) that you want to associate with this source.
6. Click Submit.

Configuring a Timer Event Source

A timer event source triggers an event at specified intervals of time.

1. Select Sources from the Events menu.
2. Click New Source, or select the source you want to edit.
3. Provide a name, between 2 and 23 alphanumeric characters, for the event source in the Name box.
4. Select Timer from the Type drop-down menu.
5. Configure the frequency of the event.
6. *(Optional)* If available, select the handler(s) that you want to associate with this source.
7. Click Submit.

Deleting an Event Source

1. Select Sources from the Events menu.
2. Select the source that you want to delete.
3. Click Delete Source to remove the event source.

Handlers

Event handlers are the actions that your camera takes when an event source occurs. The availability of handlers might change based on your camera model.

Configuring an Event Handler: Send Email

You must have provided your camera with the address of an SMTP mail server on the General Settings page (available under the System menu) for your camera to send email notification for events.

The Send Email event handler sends an email from your camera when a source event is triggered.

1. Select Handlers from the Events menu.
2. Click New Handler or select the handler you want to reconfigure.
3. Provide a name, between 2 and 23 alphanumeric characters, for the event handler in the Name box.
4. Select Send Email for the handler Type.
5. Provide the necessary information for your email in the To, From, Subject, and Message boxes.
6. *(Optional)* Select the JPEG Snapshot box if you want to send a JPEG snapshot as an attachment to the email.
7. *(Optional)* Select the Attach Raw Event Data box if you want the email to include extra data about the event. For example, select this box if the event is triggered by an alarm and you want to receive data about the state, time, or type of alarm.
8. *(Optional)* Set time filters to determine the days and times during which the handler will be active. If you do not select any filters, the handler will remain active at all times. All time values must be formatted in 24-hour notation.
9. *(Optional)* If available, select the source(s) that you want to trigger this event handler.
10. Click Submit.

Configuring an Event Handler: Write JPEG to SD Card

This event handler captures and saves a JPEG to an SD card when an event source is triggered. JPEG files are named according to the date and time at which they are recorded; although, you can determine the order of factors in the date-and-time filename.

NOTICE: Do not use the "Write JPEG to SD Card" handler if you enabled local storage through the ONVIF API. Writing JPEGs to the SD card disables local storage.

1. Install an SD card in the slot located on the back of the camera.
NOTE: The SD card must be formatted as FAT32.
2. Select Handlers from the Events menu.
3. Click New Handler or select the handler you want to reconfigure.
4. Provide a name, between 2 to 23 alphanumeric characters, for the event handler in the Name box.
5. Select the Write JPEG to SD Card handler type.
6. Select a time standard from the File Name menu. The JPEG files saved to the SD card will be given file names corresponding to the date and time of the event.
7. Provide a size limit for the JPEG images. Do not select a size limit that exceeds the available memory on the SD card.
8. *(Optional)* Set time filters to determine the days and times during which the handler will be active. If you do not select any filters, the handler will remain active at all times. All time values must be formatted in 24-hour notation.

9. *(Optional)* Select one or more sources that you want to trigger this event handler.
10. Click Submit.

Configuring an Event Handler: Upload JPEG to FTP Server

This event handler captures and uploads a JPEG to an FTP server when an event source is triggered. JPEG files are named according to the date and time at which they are recorded; although, you can determine the order of factors in the date-and-time filename.

1. Select Handlers from the Events menu.
2. Click New Handler or select the handler you want to reconfigure.
3. Provide a name, between 2 to 23 alphanumeric characters, for the event source in the Name box.
4. Select the Upload JPEG to FTP Server handler type.
5. Provide the address of your FTP server in the Server box.
6. Provide the credentials the camera will use to authenticate with the FTP server; the user name must be between 1 and 32 alphanumeric characters, and the Password must be between 4 and 16 alphanumeric characters.
7. Provide the path in which to store JPEG files on your FTP server in the Base Path box.
8. Select the File Name for your JPEG snapshots. JPEG files are named according to the date and time at which they are recorded.
9. *(Optional)* Set time filters to determine the days and times during which the handler will be active. If you do not select any filters, the handler will remain active at all times. All time values must be formatted in 24-hour notation.
10. *(Optional)* If available, select the source(s) that you want to trigger this event handler.
11. Click Submit.

Configuring an Event Handler: Open/Close Relay

Some models require the Pelco Alarm accessory be connected to the camera's accessory port for Open/Close Relay to function.

The Open/Close handler opens or closes a relay when a source event occurs.

1. Select Handlers from the Events menu.
2. Click New Handler or select the handler you want to reconfigure.
3. Provide a name, between 2 and 23 alphanumeric characters, for the event handler in the Name box.
4. Select the Open/Close Relay handler Type.
5. Select your relay bank. Relay bank options might include GPIO PCP (General Purpose Input/Output) or the serial number of your relay device; relay bank options might change depending on your model or accessories attached to your camera.
6. Select the individual relay you want to trigger when an event occurs from the Relay drop-down menu.
7. Use the On Time controls to set the amount of time the relay will remain open, up to 200 seconds.
8. Use the Off Time controls to set the amount of time the relay will remain closed, up to 200 seconds.
9. Set the pulse count for the relay. The pulse count is the number of relay pulses (number of on and off cycles).
10. *(Optional)* Set time filters to determine the days and times during which the handler will be active. If you do not select any filters, the handler will remain active at all times. All time values must be formatted in 24-hour notation.
11. *(Optional)* If available, select the source(s) that you want to trigger this event handler.
12. Click Submit.

Deleting an Event Handler

1. Select Handlers from the Events menu.
2. Select the handler that you want to delete.
3. Click Delete Handler.

Analytic Configuration

Analytic configurations are contained within profiles; you must create a profile to enable analytic behaviors. An analytic **profile** consists of profile settings calibrating to maximize the accuracy of analytic detection, the analytic behaviors you want to enable, and the zones within the field of view that your camera will monitor for each enabled behavior.

You can configure multiple profiles and multiple behaviors per profile. However, the complexity of each profile, including active behaviors and zones per behavior, increases the processing load on your camera; if the camera cannot support the processing requirement of a profile, either due to the complexity of the profile itself, or because other profiles are also running, you will not be able to run the profile.

Once configured, your camera will monitor your defined zones for activity violating the parameters of the behavior. You can view analytic events through your camera's event stream. However, analytic alarms are only transmitted through Pelco's API, and are therefore only available with compatible VMS systems or through direct integration.

For information on how to receive analytic alerts for Object Video Suites, refer to the Object Video Web Console User Guide.

Profile Settings

Profile settings: Define the attributes of a normal scene within the field of view of your camera, providing context for analytic behaviors. Properly configured profile settings help ensure the accuracy of analytic behaviors. Each profile contains the following profile settings:

Camera Preset: Selects a camera preset for the profile.

Scene Type: Determines whether or not the scene is indoor or outdoor.

Background: Determines the expected amount of background movement in the scene; the background can be still or noisy. A stable background with few moving objects should be set to Still. A busy background, with many moving objects should be set to Noisy.

Fine Tuning: Defines zone violation sensitivity. Available settings include Conservative, Normal, or Aggressive. The Conservative setting is the least sensitive setting, reducing the number of false alarms, but might prevent the camera from detecting zone violations. The Aggressive setting is the most sensitive setting, detecting all suspect violations, but might cause the camera to trigger more false alarms.

Sensitivity: Defines the relative amount of motion, between 1 (low) and 10 (high), that will trigger a behavior. The higher the setting, the greater the chance for false alarms; lower settings will reduce the chance of false alarms, but might result in missed violations.

Behaviors

Behaviors: Analyze the camera's field of view to detect and trigger events or alarms when specific activity occurs. You can configure multiple analytic behaviors per profile. However, each analytic behavior has its own settings; many analytic behaviors also require you to configure zones that the camera will monitor for activity. The analytic behaviors available to your camera are dependent on the your model and firmware version.

Behavior Settings

Each analytic behavior contains a number of settings determining the conditions under which events are triggered. The settings available are dependent on the analytic behavior that you are configuring.

Enable Alarm: Enables a zone alarm. Analytic events for the zone will appear in the event stream when viewing live video, and trigger event handlers if the Analytic Event source is enabled.

Direction: Determines the direction of motion a zone should track. Events will only be triggered when your camera detects motion in the specified direction.

Alarm severity: Defines the severity of alarms triggered. Alarm severity helps you and other users prioritize alarms.

Dwell time: Defines the amount of time that an alarm will remain active when an alarm-triggering object exits the field of view or the zone.

Delay before alarm: Defines the amount of time an object must remain in a zone before triggering an alarm. For the Camera Sabotage behavior, this defines the delay between a scene violation and the trigger of an alarm.

Alarm at (Object Counting): Determines the number of objects entered into a zone that will trigger an alarm.

Follow Options: Determines whether an object is tracked only within the current field of view or beyond.

Camera Placement: Defines the vertical height of the camera's location relative to the area being monitored.

Optimize Zoom Settings for Objects of this Type: Defines the type of object to be tracked.

Minimum Object Size: Defines the minimum size of objects tracked. Observe the location of where you place this element and the relationship to the perspective of the scene.

Average Object Size: Determines the average size of objects to be counted.

Maximum Object Size: Defines the maximum size of objects tracked. Observe the location of where you place this element and the relationship to the perspective of the scene.

Sensitivity: Overrides the global Profile sensitivity setting for the selected behavior, defining the relative amount of motion, between 1 (low) and 10 (high) that will trigger an event or alarm. Sensitivity is an advanced option for some behaviors.

Zone Sensitivity: Defines the relative amount of motion within the selected zone that will trigger an event or alarm. Zone sensitivity can be set at a lower or higher setting than the overall sensitivity setting for the rest of the scene or the Profile sensitivity setting for the selected behavior.

Object Speed: Adjusts for speed if the scene is configured to track moving objects at a slower or faster rate than actual speed.

NOTE: When advanced options are enabled for AutoTracker or Stopped Vehicle behaviors, any excluded zones that you have previously created within the scene are disabled. You can create additional excluded zones, but the zones will remain exclusive to the behavior within the selected profile.

Abandoned Object

The **Abandoned Object** behavior detects objects placed within a defined zone and triggers an alarm if objects remain in the zone longer than the user-defined time allows.

Ideal Scene Setup for Abandoned Object Analytics

Install the camera in a ceiling or against a wall with the lens pointing at a slight downward angle, above regular motion activities.

The ideal scene for the Abandoned Object behavior contains light traffic where people or objects within the field of view are continually moving, there are minimal obstructions, and the background is clean. If heavy traffic or a busy background is unavoidable, place monitoring zones in relatively stable areas.

Avoid crowded scenes where people or objects remain in one place for long periods of time.

Adaptive Motion

The Adaptive Motion behavior detects and tracks objects that enter a scene and then triggers an alarm when the objects enter a user-defined zone.

The Adaptive Motion behavior is designed to work indoors and outdoors to track a few moving objects in uncrowded fields of view. The behavior learns the background scene over time and adjusts to changing conditions like snow, fog, wind, and rain.

Ideal Scene Setup for Adaptive Motion

Install the camera in a ceiling or against a wall with the lens pointing at a slight downward angle, above regular motion activity.

The ideal scene for Adaptive Motion behavior is one with light traffic and a clean background. If heavy traffic or a busy background is unavoidable, place zones in a relatively stable area.

Avoid crowded scenes where people move in all directions or stand in place for long periods of time.

NOTE: Objects that are very small might not be classified as the correct object type. This could result in false alarms or alarms not being triggered. If objects appear too small in the scene, zoom in on the particular zone of interest or move the camera closer to the zone of interest to increase the relative size of the objects in the scene.

Camera Sabotage

The Camera Sabotage behavior detects contrast changes in the field of view, and triggers an alarm if the lens is obstructed by spray paint, a cloth, or if it is covered with a lens cap. Any unauthorized repositioning of the camera also triggers an alarm.

Ideal Scene Setup for Camera Sabotage

Install the camera in a high position, looking down on the scene. The field of view should be as large as possible. A small field of view could result in the view being blocked by an adjacent object.

Avoid scenes with a dark, uniform background, low lighting, and large moving objects.

Directional Motion

The Directional Motion behavior generates an alarm in a high traffic area when a person or object moves in a specified direction. Examples of typical installations for this behavior include airports, entrances and exits, and vehicle traffic through tunnels.

In an airport installation, cameras observe passengers boarding a plane in a terminal. If a person moves in the opposite direction of the normal flow of traffic, an alarm triggers.

In a tunnel installation, an operator wants to observe traffic flow. If a car enters a tunnel through an exit, an alarm alerts the operator to activate the traffic signals to stop all traffic in the tunnel.

In an entrance or exit installation, a camera is pointed at an exit door. If a person tries to enter through the exit door, an alarm triggers.

Ideal Scene Setup for Directional Motion

Install the camera in a ceiling or against a wall with the lens pointing at a slight downward angle, above regular motion activity. The width of the object you want to detect should be at least one-tenth of the total width of the scene. To achieve increased accuracy in a crowded scene, set the width of the object to one-sixth of the total width of the scene.

The ideal scene selection for the Directional Motion behavior contains light traffic with all people and objects moving in the same direction, minimal obstructions, and a clean background; however, the behavior can be used in settings that do not meet all of these requirements. If heavy traffic or a busy background is unavoidable, place zones in a relatively stable areas.

Avoid crowded scenes in which people move in all directions or stand in one place for long periods of time.

Loitering Detection

The Loitering Detection behavior identifies when people or vehicles remain in a defined zone longer than the user-defined time allows. This behavior is effective in real-time notification of suspicious behavior around ATMs, stairwells, and school grounds.

Ideal Scene Setup for Loitering Detection

Install the camera in a ceiling or against a wall with the lens pointing at a slight downward angle, above regular motion activity.

The ideal scene for Loitering Detection behavior is one with light traffic and a clean background. If heavy traffic or a busy background is unavoidable, place the user-defined zone in a relatively stable area.

Avoid crowded scenes where people move in all directions or stand in one place for long periods of time.

Object Counting

The Object Counting behavior counts the number of objects that enter a user-defined zone. This behavior can be used to count people at a store entrance/exit or inside a store where the traffic is light. It might also be used to monitor vehicle traffic on highways, local streets and roads, parking lots, and garages.

Ideal Scene for Object Counting

If you plan to detect people, install the camera pointing downward (vertically) above regular motion activity. If you plan to detect vehicles, install the camera pointing downward at a slight angle above regular motion activity.

The ideal scene for the Object Counting behavior contains light traffic, minimal obstructions, and a clean background. If heavy traffic or a busy background is unavoidable, place zones (polygon or line) in relatively stable areas.

A one-directional motion scene (for example, a vertical hallway) is preferable. Avoid crowded scenes in which people or objects move in all directions or remain in place for long periods of time.

Object Removal

The Object Removal analytic behavior triggers an alarm if an object is removed from a user-defined zone. It is ideal for detecting the removal of high-value objects, such as a painting from a wall or a statue from a pedestal.

Ideal Scene for Object Removal

Install the camera in a high position looking down on the scene. The monitored object should occupy a quarter of the camera scene, and the field of view should be as wide as possible.

The ideal scene selection for the Object Removal behavior is a clean background with stable lighting and minimal obstruction.

Stopped Vehicle

The Stopped Vehicle behavior detects vehicles stopped near a sensitive area, and sets an alarm if the vehicle is present for longer than a user-specified period of time. This behavior is ideal for parking enforcement, identifying suspicious parking, finding traffic lane break-downs, and spotting vehicles waiting at gates.

Ideal Scene for Stopped Vehicle

Install the camera in a ceiling or against a wall with the lens pointing at a slight downward angle, above regular motion activities.

The ideal scene for the Stopped Vehicle analytic behavior contains light traffic in which vehicles are continually moving, there are minimal scene obstructions, and the background is clean. If heavy traffic or a busy background is unavoidable, place monitoring zones relatively stable areas.

Avoid crowded scenes where people or objects remain in place for long periods of time.








Zones

Some analytic behaviors require you to configure zones. A **zone** is a defined boundary that your camera monitors for an analytic behavior. A zone can be defined by a polygon or line. Zones defined by polygons trigger analytics based on motion within the zone; zones defined by lines trigger analytic events when an object within the scene crosses the line.

When configuring a zone-based analytic behavior, you can draw zones by selecting one of the zone-drawing tools, and then clicking within the scene to draw the zone.

NOTE:

- The availability of zone drawing tools is dependent on the analytic behavior you are configuring.
- Zones will not scale proportionally with changes in zoom. Set the zoom level for the camera before defining zones.

	Box: Tracks objects in a defined zone and triggers an alarm if the objects move in the same direction as defined.
	Polygon: Tracks objects in a defined zone and triggers an alarm if the objects move in the same direction as defined.
	Line: Tracks objects that cross a line and triggers an alarm if the objects move in the same direction as defined.
	Exclude Zone Box Tool: Ignores objects inside a defined zone.
	Exclude Zone Polygon Tool: Ignores objects inside a defined zone.
	Object Size Filter: Sets the minimum and maximum object size for a zone.
	Display Size: Sets the size of a tracked object, relative to the surrounding scene, and maintains the size of the object within the scene.

Configuring an Analytic Profile

A profile consists of profile settings, the behaviors you want to operate on the profile, and the zones you want to monitor for selected behaviors. The instructions below describe how to configure a profile, but there are many settings and possibilities for each step below; the following sections provide a detailed understanding of the settings and controls available for each behavior.

1. Select Analytic Configuration from the Events menu.
2. Click New to create a new profile or select the profile you would like to edit.
3. Configure Profile Settings.
4. Calibrate the scene. Click Calibrate Scene, adjust the scene accordingly, and then click Return to Main View.
5. Select a behavior.
6. Configure advanced settings for the behavior.
7. Configure zones for the behavior.
8. Select Activate Behavior to ensure that the behavior and all zones are enabled when you run the profile.
9. Repeat the previous 4 steps to activate additional behaviors on the profile.
10. Click Save.

Calibrating a Scene

The Calibrate Scene option, under Profile Settings, allows you to adjust an analytic profile's scene setup to reflect the perspective and viewing angle of your camera. A properly calibrated scene makes the object sizes you set when configuring zones for a behavior more meaningful, increasing the accuracy of analytics.

It is important that you calibrate the scene before running a profile. If you find that you are encountering an excess of false alarms, or are not registering normal analytic alarms, you might need to recalibrate the scene for the profile.

1. Select Analytic Configuration from the Events menu.
2. Select the profile for which you want to calibrate the scene, or create a new profile.
3. Click Calibrate Scene
4. *(Optional)* Click Pause to pause the field of view if the scene contains moving objects. This allows you to more easily calibrate the scene and focus on near and far objects.
5. Adjust each of the blue boxes to account for objects in the scene. There are boxes for objects at the near left, near right, and an object in the distance; drag the boxes over appropriate objects, and adjust the size of each box to approximate the size of the object the box overlays.
6. Set the real-world height of an object used in the calibration.
7. Select "Set Width" and set the width of both a near object in the scene and a far object in the scene.
8. Click Return to Main Menu.
9. Finish adjusting the profile, and then click Save.

Running Profiles

An analytic profile must be running for your camera to monitor the profile for analytic behaviors.

The complexity of each profile, including active behaviors and zones per behavior, increases the processing load on your camera. If the camera cannot support the processing requirement of a profile, either due to the complexity of the profile itself, or because other profiles are also running, you will not be able to run the profile.

1. Select Analytic Configuration from the Events menu.
2. Select the profile you want to run or stop.
3. Click Run to activate the profile or Stop to deactivate the profile.

NOTE: Stopping or deleting a profile deactivates all of the behaviors associated with that profile, including motion detection enabled through the Pelco API.

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