

# Esprit Enhanced Series

## Operations Manual



# Contents

Important Notices .....	5
Regulatory Notices .....	5
Radio and Television Interference .....	5
Warranty Statement .....	5
Legal Notice .....	5
Audio Notice .....	5
Video Quality Caution .....	5
Open Source Software .....	6
Korean Class A EMC .....	6
 Accessing the Camera .....	7
Accessing Camera Settings .....	7
Understanding the Camera Configuration Sequence .....	7
 Accessing the Live Video Page .....	9
Live Video Controls .....	9
PTZ Controls .....	9
 Using the System Menu .....	11
Configuring General System Settings .....	11
Changing the Camera Name .....	11
Enabling and Disabling LEDs .....	11
Understanding the Pressure Sensor .....	11
Configuring Time Settings .....	11
Restoring All Camera Defaults .....	12
Generating a System Log .....	12
Backing Up and Restoring Settings .....	12
Backing Up Camera Settings .....	12
Restoring Camera Settings from a Backup .....	12
Restarting the Camera .....	13
Firmware Settings .....	13
Configuring OSDi Overlays .....	13
Using Snapshot Viewer .....	14
Managing Local Storage .....	14
 Using the Network & Security Menu .....	15
Changing General Network Settings .....	15
Understanding General Network Settings .....	15
Network Hostname .....	15
Port Settings .....	15
Link Settings .....	15
Configuring Users and Security .....	16
Accessing Users and Security .....	16
Configuring Users & Security .....	16
Configuring Security .....	16
Configuring TLS .....	17
Enabling SSH .....	18
Configuring Traffic Shaping .....	18
Configuring 802.1x Security .....	19

Configuring the SMTP Server .....	19
Configuring SNMP .....	19
Configuring SNMP V2c .....	19
Configuring SNMP V3 .....	19
Configuring Firewall Settings .....	19
Using the Imaging Menu .....	21
Changing General Image Settings .....	21
Configuring Image Enhancement Settings .....	21
Freeze Frame .....	21
Image Stabilization .....	21
Highlight Mode .....	21
Defog Mode .....	21
Noise Reduction .....	22
Digital Processing Settings .....	22
Restoring Imaging Settings .....	22
Configuring Exposure Settings .....	22
Configuring Focus Settings .....	23
Setting White Balance .....	23
Using the Window Blanking Feature .....	24
Configuring Window Blanking .....	24
Calibrating Window Blanking .....	24
PTZ Menu .....	26
Setting Up and Operating Pelco Camera Link .....	26
Setting Up Pelco Camera Link .....	26
Setting Up a Preset .....	33
Configuring a Preset Tour .....	34
Configuring Pan/Tilt/Zoom Patterns .....	34
Configuring Pan/Tilt/Zoom Scans .....	35
Configuring Pan/Tilt/Zoom Zones .....	36
Configuring the Pan/Tilt/Zoom Positioning .....	36
Configuring Digital Zoom .....	36
Configuring Pan/Tilt Speed Control .....	36
Setting the Pan Center Point .....	37
Configuring Pan and Tilt Limit Stops .....	37
A/V Streams Menu .....	38
Selecting Preset Video Configurations .....	38
Configuring Custom Video Streams .....	38
Video Configuration Settings .....	38
Configuring Audio .....	40
Managing Local Recording .....	40
Local Recording Storage Limits .....	40
Managing RTP Settings .....	41
Setting Static Multicast Addresses .....	41
Setting the Maximum Transfer Unit Size .....	41
Smart Compression .....	41
Configuring Settings and Short Term Graph .....	41
Configuring Long-Term Rate Control .....	42
Events .....	43

Configuring Sources .....	43
Configuring an Alarm Event Source .....	43
Configuring an Analytic Event Source .....	43
Configuring a Park Action Event Source .....	44
Configuring a System Event Source .....	44
Configuring a Timer Event Source .....	44
Deleting an Event Source .....	45
Configuring Handlers .....	45
Configuring an Event Handler: Send Email .....	45
Configuring an Event Handler: Write JPEG to SD Card .....	46
Configuring an Event Handler: Upload JPEG to FTP Server .....	46
Configuring an Event Handler: Run Pattern .....	47
Configuring an Event Handler: Go to Preset .....	47
Configuring an Event Handler: Open/Close Relay .....	47
Configuring an Event Handler: Run Scan .....	48
Configuring an Event Handler: Run Tour .....	48
Deleting an Event Handler .....	49
Analytic Configuration .....	49
Configuring Profile Settings .....	49
Selecting Behaviors .....	50
Abandoned Object .....	51
Adaptive Motion .....	51
Auto Tracker .....	51
Camera Sabotage .....	51
Directional Motion .....	52
Loitering Detection .....	52
Object Counting .....	52
Object Removal .....	53
Stopped Vehicle .....	53
Zones .....	53
Configuring an Analytic Profile .....	54
Calibrating a Scene .....	54
Running Profiles .....	55
Event Stream .....	55
Wash and Wipe Configuration .....	55

# 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](http://www.pelco.com/warranty).

## Legal Notice

SOME PELCO EQUIPMENT CONTAINS, AND THE SOFTWARE ENABLES, AUDIO/VISUAL AND RECORDING CAPABILITIES, THE IMPROPER USE OF WHICH 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 RECORDED SUBJECTS. YOU ARE SOLELY RESPONSIBLE FOR INSURING STRICT COMPLIANCE WITH SUCH LAWS AND FOR STRICT ADHERENCE TO ANY/ALL RIGHTS OF PRIVACY AND PERSONALTY. USE OF THIS EQUIPMENT AND/OR SOFTWARE FOR ILLEGAL SURVEILLANCE OR MONITORING SHALL BE DEEMED UNAUTHORIZED USE IN VIOLATION OF THE END USER SOFTWARE AGREEMENT AND RESULT IN THE IMMEDIATE TERMINATION OF YOUR LICENSE RIGHTS THEREUNDER.

## 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](mailto: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.

## **Korean Class A EMC**

이 기기는 업무용 (A 급) 전자파 적합기기로서 판매자 또는 사용자는 이 점을 주의하시길 바라며, 가정 외의 지역에서 사용하는 것을 목적으로 합니다.

# Accessing the Camera

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 the latest version of Internet Explorer®, Microsoft™ Edge™, Google Chrome™ browser, or Mozilla® Firefox®. For supported browser versions, refer to the Specification Sheet for your product.

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 or VxToolbox 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.

3. Click Login.
4. If needed, type your user name and password.

**NOTE:** For security purposes, it is recommended that you create a user account when you login to the camera for the first time.

- In its out-of-the-box configuration, the camera has no user name and password assigned. For security purposes, it is recommended that you set an administrative user name and password after initial configuration of the camera. Creation of an administrative user name changes the state of the camera to its "operational mode," where credentials must be provided in order to change its configuration.
- There is no provision for recovering a forgotten administrator user name or password. The camera can be restored to its out-of-the box, no-password configuration by powering down, depressing the reset button with an object such as a paper clip, and holding the button down for at least five seconds while powering the camera back up.

**NOTE:** The Reset button for Esprit Enhanced cameras is located inside the enclosure.

- If a user name and password exist, a Login link appears in the upper right area of your web browser.
5. Click Log In.

## Accessing Camera Settings

Access to camera settings is determined by user permissions. If you do not have access to camera settings, the Settings link will not appear in the upper-right corner of the interface.

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

## Understanding the Camera Configuration Sequence

After the camera is installed and power is applied, the camera undergoes a configuration sequence, taking approximately two minutes to complete. The camera will come online after the configuration sequence is complete.

**NOTE:** If the camera connected to a network without a DHCP server and DHCP is enabled, the configuration sequence can take up to five minutes to complete.

# Accessing the Live Video Page






The live video page provides access to video streams and, where applicable, to PTZ controls.

The camera defaults to the live video page, but can be accessed by clicking Live at the upper right corner of the window.

From the Live video page, you can clean the camera with the Wiper. Click and release to activate the Wiper.







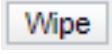
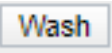
## Live Video Controls

Viewable controls are based on camera model and user permissions.


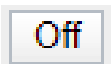
	<b>Open Stream in New Window:</b> Opens the video stream in an independent window.
	<b>Take a Snapshot:</b> Captures a still image from the video stream and saves it as a JPEG file.
	<b>Center Viewing Area:</b> Engages click-to-center functionality. Click the icon, and then click within the video stream to center the camera's field of view.
	<b>Pan and Tilt:</b> 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.
	<b>Resize Viewing Area:</b> 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.

At the bottom of the live view screen, adjust the Zoom slider to the desired zoom level and click the Auto Focus button to auto focus the camera.

## PTZ Controls

	<b>Zoom In:</b> Click and hold to zoom in.
	<b>Zoom Out:</b> Click and hold to zoom out.
	<b>Focus Near:</b> Click and hold to focus on an object near the camera.
	<b>Focus Far:</b> Click and hold to focus on an object far away from the camera.
	<b>Iris Open:</b> Click and hold to open the iris and brighten the image.
	<b>Iris Close:</b> Click and hold to close the iris and darken the image.
	<b>Wipe:</b> Click to turn the wiper on and off.
	<b>Wash:</b> Click to turn the washer on and off.



	<b>On:</b> Click to turn the illuminators on.
	<b>Off:</b> Click to turn the illuminators off.

# Using the System Menu

The System menu contains general system time settings, backup and restore, firmware, OSDi, Snapshot Viewer, and storage management.

## Configuring General System Settings

The General page in the System menu contains basic settings such as the device name and time zone. Update these settings according to the instructions in the following sections.

### 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 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.

### Understanding the Pressure Sensor

Pressure Sensor (psi): This displays the pressure reading. For pressurized camera models, a reading greater than zero indicates positive pressure.

### 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:** This default option 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:** Each time the camera reboots, it will default to a time of zero, which is January 1, 1970. For this reason, selecting None is not recommended.
3. 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 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.

## 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 Generate Backup File, 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 Choose File, 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.

### 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.

## Firmware Settings

The Firmware 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. There is also a section for uploading new firmware to the camera.

Access this page by selecting Firmware from the System tab.

To upload new firmware, Click Select File and then select the PPM file to upload. It usually takes a couple of minutes to load new firmware and then the camera will reboot.

## Configuring OSDi Overlays

The **OSDi** (Intelligent On Screen Display) feature allows the camera to imbed pertinent information as overlays into the streamed video. You can define up to four overlay rules. You can also determine the position of each overlay within the scene.

If using PTZ Preset or Zone overlays, the overlay will use the name of the zone or PTZ preset for the overlay; ensure you set relevant names for zones and presets.

If using the Current Zone Label overlay, and multiple zones are in the field of view, the camera will display the labels in order of size, smallest to largest; if all zones in the field of view are the same size, the camera will display zone labels in order of creation, oldest to newest. If the **Duration** field is set to 0 seconds, the overlay will only display the first zone label using the rules above until the zone is no longer in the field of view.

1. Go to the **OSDi** page from the **System** menu.
2. Check the box next to the overlay you want to enable.
3. Select the type of overlay you want to show.
4. Select the location of the overlay within the field of view. You can select the **Metadata** option to send the overlay within the camera's event or metadata stream (for use within a video management system).  
**NOTE:** You cannot have metadata and a visible overlay for the same overlay type, even if you configure the overlay types separately.
5. Set details for the overlay.
  - For **Name**, **Date**, and **Time** overlays, provide the text or format for the overlay.
  - For **PTZ** or **Zone Label** overlays, select the duration for which the overlay will appear when active.
  - For Image overlays, provide the image file.
6. Set the font size for the overlay.
7. Set the Opacity Color Settings.
8. Click **Save**.

## Using Snapshot Viewer

The Snapshot Viewer page displays a list of snapshots saved to the micro 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 micro SD card. There are 100 snapshots displayed per page.

To access the Snapshot Viewer, select Snapshot Viewer from the System tab.

- The micro SD cards are available in both SDHC and SDXC formats.
- The micro SD card must be formatted as FAT32 or reformatted to ext4. Because SDXC cards are preformatted as exFAT, you must reformat them to ext4. This can be done in the camera itself.

## Managing Local Storage

Local storage settings are available from the System tab Storage Management page.

- The Device Information area lists the device type, free space, total size, and status.
- The Settings and Actions area lists the Device Format and enables you to reformat the micro SD card. To do so, click Reformat, and then click OK in the confirmation dialog box.

- The Export Recordings area lists available recordings and enables you to export them.

# Using the Network & Security Menu

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

## Changing General Network Settings

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

1. Select Network from the Network & Security menu.
2. Update settings, as necessary, according to the information in Understanding General Network Settings, below.
3. Click the appropriate Save button in each section of the settings that you change.

## Understanding General Network Settings

### Network Hostname

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 Settings

**Link Speed:** The default setting for the camera throughput speed is 100 MB.

**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** (Optional): 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 some Pelco systems, do not support connections to cameras and encoders over IPv6.

## Configuring Users and Security

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

### Accessing Users and Security

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.

### Configuring Users & Security

1. Select Users & Security under the Network & Security 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.
8. If appropriate, delete a user: select the user in the Users area, and then click Delete User.

### Configuring Security

1. Select Users & Security under the Network & Security menu.

2. For Pelco API, select whether authentication is required:
    - **Open Authentication:** When selected, credentials are not required when accessing the device via the Pelco API.
    - **Closed Authentication:** When this recommended setting is selected, credentials are required when accessing the device via the Pelco API.
  3. For RTSP/JPEG, select whether authentication is required:
    - **Open Authentication:** When selected, credentials are not required when streaming video via RTSP or JPEG pull.
    - **Closed Authentication:** When this recommended setting is selected, credentials are not required when streaming video via RTSP or JPEG pull.
- NOTE:** Pelco API must be set to Closed Authentication before you can set RTSP/JPEG to Closed Authentication. If you reset Pelco API to Open Authentication, then RTSP/JPEG is automatically reset to Open Authentication.

## Configuring TLS

The TLS settings page includes TLS 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.

The TLS page provides a mode to require HTTPS (TLS 1.2) communication between VideoXpert and cameras. This means that any API communication between a camera and a video management system will occur over an encrypted channel and will not be intelligible over the network. API communications, like ONVIF commands, include the ability to configure and read camera settings such as resolution, framerate, and PTZ control. API calls over a non-encrypted channel (HTTP) will not be allowed from the camera in this mode, adding another level of cybersecurity. To enable the TLS required feature, a customer will have to generate or upload a certificate in the camera web UI.

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

1. Select TLS from the Network menu.
  2. If no certificate has been installed, install one now:
    - a. Click Install New Certificate.
    - b. Select the appropriate certificate installation method: Generate Self-signed Certificate, Generate Certificate Request, or Upload Certificate.  
Upload Certificate should only be used if you have already generated a certificate using Generate Certificate Request.
    - c. Click Next.
    - d. Enter information requested in the Certificate area.
    - e. Click Generate Certificate.
  3. Select your TLS mode:
    - **Disabled:** Disables HTTPS communications with the device.
    - **Optional:** Requires that you install a signed TLS certificate and enables HTTPS access to the camera; however, the camera will still be available over HTTP.
    - **Required:** Requires that you install a signed TLS 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:** The Required option cannot be enabled or disabled through the Web interface. To enable or disable Required TLS 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.
4. Click Save.



## 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. Select Enabled.
3. Provide a password for the root user. Passwords are case-sensitive.
4. Confirm your password.
5. Click Save.

## Configuring Traffic Shaping

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

Your camera can produce large I-frames, resulting in a traffic burst within each group of pictures as the camera transmits the frame; if your network infrastructure does not have the speed or 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 2 ms 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.

**NOTE:** Limiting the transmission rate might increase video latency. The setting also limits all of the video data coming from the camera. For this reason, set the limit to more than the video bit rate times the number of connections to the camera that are receiving the data.

The screenshot shows the 'Traffic Shaping' configuration page. At the top, there are tabs for 'System', 'Network', 'Imaging', 'A/V Streams', 'Users', and 'Events'. The 'Network' tab is selected. The 'Traffic Shaping' section has a title bar and a description: 'Customize your settings to reduce video frame loss which could be resulting from spikes in network traffic.' Below this, there are three radio button options: 'Disabled', 'Enabled', and 'Enabled with Bursts (Advanced)'. The 'Enabled with Bursts (Advanced)' option is selected. To the right of these options, a note states: 'Camera limits transmission rate. After periods of idleness, the camera may burst amounts of data at full speed.' Below the radio buttons is a 'Settings' section with a 'State' dropdown set to 'Enabled with Bursts (Advanced)'. It includes a 'Rate Limit (Mbps)' slider set to '80.0', an 'Average rate over 2 ms' label, a 'Bursts' section with a 'Burst Size (Kbytes)' slider set to '10', and 'Save' and 'Reset' buttons at the bottom. To the right of the settings is an 'Alerts' section that says 'There are no alerts resulting from the current configuration.'

1. Go to the *Traffic Shaping* page from the *Network* menu.
2. Enable *Traffic Shaping* with or without bursts, depending on your need.
  - **Disabled:** Camera will send data at full network hardware link speed (for example: 100 Mbps or 1 Gbps).
  - **Enabled:** Camera will limit the rate at which it sends data. In this setting, the "averaging period" (the period over which the rate limit is valid) is 1 ms. The rate limit for this setting is  $12.5 \text{ Mbps} < R < 100 \text{ Mbps}$ .
  - **Enabled with Bursts:** This advanced setting allows you to specify the maximum burst size that the camera can send at the hardware link speed. This balances video latency with the transmission rate.
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.

## 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 SNMP from the Network and Security menu.
2. Type the address of your SMTP server in the SMTP Server box.
3. Click Save.

## Configuring 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](http://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. Complete the fields under SNMP V2c.
4. Click Save.

### Configuring SNMP V3

1. Select SNMP from the Network menu.
2. Select SNMP V3.
3. Complete the fields under SNMP V3.
4. Click Save.

## Configuring Firewall Settings

1. Select Firewall Configuration from the Network & Security menu.

2. Select Off, Allow, or Deny from the Mode drop-down menu.

- **Off:** The default setting is Off. Disables Firewall Configuration.
- **Allow:** Allows all IP addresses entered to view the camera.
- **Deny:** Denies all IP address entered to view the camera.

3. Type up to 10 IP addresses in CIDR format in the boxes provided. Incorrect configuration of these.

**NOTE:** Incorrect configuration of these IP addresses can result in being locked out of the camera. All IP addresses entered will either be allowed or denied. You cannot allow some IP addresses and deny others.

4. Click Save.

# Using the Imaging Menu

The Imaging menu contains 3D noise reduction, digital processing, exposure, flicker correction, day/night, white balance, window blanking, and alignment settings for your camera.

## Changing General Image Settings

The General Image Settings page contains basic settings to configure the quality and orientation of video from your camera. The Quick-View stream is available on the page, so you can determine how each setting affects the quality of your video.

1. Select General from the Imaging drop-down menu.
2. Set Image Enhancement options (e.g. Freeze Frame, Electronic Image Stabilization, Highlight Mode, Defog Mode, and Noise Reduction).
3. Set your camera's digital processing settings (e.g. Normal, Vivid, or Custom). For some models, setting a custom value for your camera's sharpness, saturation, contrast, or brightness settings will engage the Custom Quick Setup mode.

## Configuring Image Enhancement Settings

The Image Enhancement area of the Imaging tab, General selection contains settings for Freeze Frame, Electronic Image Stabilization, Highlight Mode, Defog Mode, and Noise Reduction.

### Freeze Frame

The **Freeze Frame** feature freezes video output when a preset is called, resuming video when the camera completes the preset operation. This allows for a smooth transition between preset scenes, reduces bandwidth consumption, and guarantees that blanked areas are not inadvertently revealed when a preset is called.

### Image Stabilization

**Electronic Image Stabilization** attempts to compensate for vibrations that interfere with your camera and video output.

### Highlight Mode

The **Highlight Mode** feature allows you to choose from four different lighting modes for your camera including Off, Visibility Enhancement, Backlight Compensation, and WDR.

- Use **Off** for normal lighting situations.
- Use **Visibility Enhancement** to automatically correct brightness and contrast and show bright zones more clearly.
- Use **Backlight Compensation** to enhance objects in the center of the picture when a bright backlight causes subjects in the picture to appear dark or silhouetted.
- Use **WDR** (Wide Dynamic Range) to automatically balance the bright and dark zones in the image, increasing the dynamic range.

### Defog Mode

The **Defog Mode** feature allows you to make the subject appear clearer when the surrounding area of the subject is foggy and low contrast. Choose Off, Low, Medium, or High for this mode. Low is used for slightly hazy conditions. It does a minimum amount of correction. High is used for more foggy conditions. It does the maximum amount of correction.

### Noise Reduction

**Noise Reduction:** Adjusts for video noise in the scene.

- **Normal:** Adjusts for noise in low-light scenes.
- **High:** Adjusts for a greater amount of noise in low-light scenes.
- **Off:** The camera does not compensate for video noise.

## 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.

- **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.

## Restoring Imaging Settings

The Imaging menu contains buttons that allow you to restore your camera's imaging settings.

- Use **Restore Settings to Defaults** to reset your camera's settings to their factory defaults on the current webpage.
- Use **Restore All Imaging Settings** to reset all of your camera's imaging settings to their factory defaults.

## Configuring Exposure Settings

Exposure settings, accessed from the Imaging tab, Exposure option, help ensure that video contains an adequate level of detail and contrast between light and dark values.

1. Select Exposure from the Imaging menu.
2. Select your camera's Exposure Mode.
  - **Auto:** Allows you to set maximum Gain limit and Exposure Time limit settings, while retaining the full range of Day/Night controls.
  - **Manual:** Allows you to specify the Exposure Time and adjust the Gain. You should only engage this mode if fixed exposure time is a priority.
3. 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.
4. *(Optional)* If you selected the Day/Night Auto Mode, set the Transition Level, determining whether the transition is Lighter, Default, or Darker. Lighter settings cause the camera to change modes at higher lux values.
5. Set the **External IR Illuminator** mode to Auto, Manual (only available if you have selected Day/Night Manual Mode), or Off.
6. Set the **White Light** mode to On or Off. There is also a power percentage setting that controls the amount of illumination. Control of these White Light Illuminators is completely independent of the IR Illuminators. If a dark scene becomes bright enough to switch

to Day mode, the IR Illuminator may switch Off (if in Auto mode) until the White Light Illuminator is turned Off and the scene becomes dark again.

7. If necessary, use **Restore Settings to Defaults** to reset the camera settings to the factory defaults on the current page only, or use **Restore All Imaging Settings** to reset all of the camera settings to the factory defaults on all Imaging pages.

## Configuring Focus Settings

Focus Settings affect your camera's focusing behaviors. If you set all focus behavior settings to Off, you must manually focus your camera.

- **Mode:** Enables you to use Auto or Manual focusing. Auto Mode causes your camera to automatically focus during runtime operation.
- **Sure Focus:** When set to On, causes your camera to auto focus when pan, tilt, and zoom (PTZ) operations are complete or if the IR cut filter changes state. When your camera achieves an auto focus lock, auto focus is turned off and the focal position will remain until the next PTZ operation. If 30 seconds pass without an auto focus lock, your camera will retain its focal position until the next PTZ action.
- **Focus Trace:** Enables your camera to use a focus trace curve when zooming based on the distance to ground-level targets in the scene; distance to ground-level targets is determined by the Install Height setting. If Auto Focus is disabled, set to Off, your camera will not perform auto-focus operations, but will perform focus trace corrections when the tilt angle of your camera changes.

If necessary, use **Restore Settings to Defaults** to reset the camera settings to the factory defaults on the current page only, or use **Restore All Imaging Settings** to reset all of the camera settings to the factory defaults on all Imaging pages.

## Setting White Balance

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

To set white balance:

1. Select White Balance from the Imaging menu.
2. Select a white balance mode:
  - **Auto:** The recommended setting for most lighting conditions. It has a color temperature range from 7,500K to 2,500K. It can be used to properly white balance scenes illuminated by daylight to warm white sources.
  - **Extended Color Temp:** Maintains color balance in outdoor settings where sodium vapor lighting is widely used, such as parking lots or street lights.
  - **Auto Tracking White:** Has the largest color temperature range.
  - **Cool White:** A fixed white balance mode for cooler (more blue) sources such as true daylight, daylight fluorescent, white light LEDs, or metal halide sources.
  - **Warm White:** A fixed white balance mode for warmer (more yellow) sources such as incandescent, tungsten-halogen, warm white compact florescent, or LED lighting.
  - **Manual:** Allows manual adjustment of the red and blue range; this may be helpful in areas where lighting does not change, such as inside a casino or mall. Move the Red and Blue sliders to change color levels.

## Using the Window Blanking Feature

Window blanking allows a user to defined areas that cannot be viewed by the operator of the system. For PTZ cameras, a blanked area will move with pan and tilt functions and automatically adjust in size as the lens zooms telephoto and wide.

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.

## Configuring Window Blanking

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.
6. If necessary, use **Restore Settings to Defaults** to reset the camera settings to the factory defaults on the current page only.

## Calibrating Window Blanking

Calibrating the window blanking feature prevents blanked areas from shifting when you zoom the camera. You only need to calibrate the window blanking feature once, and you can calibrate before or after configuring blanking areas. If you notice blanked areas shifting after you have calibrated the window blanking feature, you should recalibrate.

1. Select Window Blanking from the Imaging menu.
2. Click Calibration.
3. Click within the scene to center the camera on an object you want to cover, and then click Ok.
4. Click and drag to draw a blanking region within the camera's field of view, and then click Ok. The camera will zoom in, and the blanking region you drew will shift.  
**NOTE:** The blanking region that you draw should be small enough that it does not fill the field of view when the camera is fully zoomed. If the blanked region fills the screen when the camera zooms in, you will have to recalibrate.
5. Redraw the blanking region now that the camera has zoomed in, and then click OK. Redrawing the region accounts for the shift that can occur when zooming the camera.
6. Click Done, or click the Start Over button to recalibrate.

# PTZ Menu

The PTZ menu contains settings for your camera's PTZ settings including Pelco Camera Link, Presets, Preset Tours, Patterns, Scans, PTZ Zones, and Positioning.

## Setting Up and Operating Pelco Camera Link

Three steps are required to install, enable, and verify that Pelco Camera Link Auto Tracking is working. First, establish a connection between the Optera and the Pelco Enhanced Series PTZ camera. Second, set up 2 Camera Tracking for the Optera. Third, calibrate the position of the Enhanced Series PTZ camera relative to the Optera.

After setup, Pelco Camera Link provides controls to verify that the cameras are aligned correctly and that auto tracking is operating correctly. Before setting up Pelco Camera Link, install and turn on both the Optera and Pelco Enhanced Series PTZ cameras using standard procedures. Verify that the cameras are operating and that both can be access from a web interface. Note the IP addresses from the cameras that are to be connected with Pelco Camera Link. Both Optera and the Pelco Enhanced Series PTZ camera must have firmware version 2.11 or later.

### Setting Up Pelco Camera Link

**Step #1 (Enhanced Series PTZ Connection):** First, establish a connection between the Optera and Enhanced Series PTZ camera.

1. Open a web page and enter the IP address for the Enhanced Series PTZ camera.



2. Login and click Settings, PTZ, and Pelco Camera Link. Three red stop lights show the status. All three lights turn green when the cameras are linked and ready to operate together.

**PELCO** Spectra Enhanced™ DAILY

[Live](#) | [Settings](#) | [Help](#) | [admin](#) | [Logout admin](#)

Settings : IP Camera - D6230L - H500377

System | Network & Security | Imaging | **PTZ** | A/V Streams | Events

Pelco Camera Link -- Optera™-driven Motion Tracking

**Setup** | **Operate**

## Pelco Camera Link

To get started, configure your Optera™ connection below.

Step #1: Optera™ Connection

-- Specify the address and credentials of the Optera™ that will drive auto tracking.

IP Address

Username

Password

Advanced

Connect

Disconnect

Step #2: Optera™ Analytics Configuration

-- Bring up Optera™ WebUI. Set up and enable 'Adaptive Motion' and '2-Camera Tracking' as an Optera™ Analytic profile, and then return to this page and refresh.

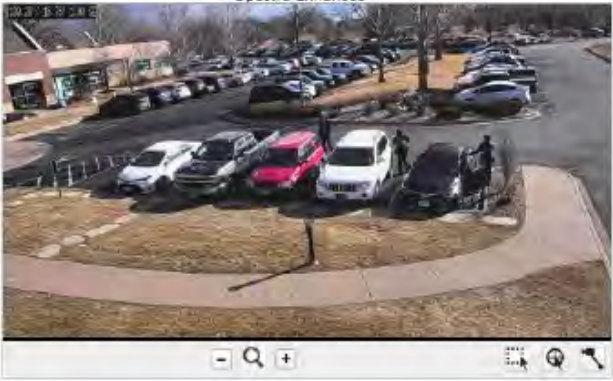
Go to Optera™ Analytics Page

Step #3: Spectra Enhanced™-Optera™ Calibration

-- Calibrate connected cameras so they know where they are relative to each other.

Calibrate

Spectra Enhanced™



**Step #1 Continued (Optera Connection):** Next, connect the Optera camera.

27

1. Enter the IP address of the Optera that will provide analytic information to the Enhanced Series PTZ camera, enter username and password, and click Connect. If the connection is successful, the light turns green and the panoramic view from Optera appears at the top of the screen. You are now viewing both Optera and the Enhanced Series PTZ reduced resolution video on this web page.

**PELCO Spectra Enhanced™ DAILY** [Live](#) [Settings](#) [Help](#) [admin](#) [Logout admin](#)


Settings : IP Camera - D6230L - H500377

System Network & Security Imaging **PTZ** A/V Streams Events


### Pelco Camera Link -- Optera™-driven Motion Tracking

[Setup](#) [Operate](#)

Optera™ Panorama



Spectra Enhanced™



**Step #1: Optera™ Connection**

-- Specify the address and credentials of the Optera™ that will drive auto tracking.

IP Address

Username

Password

[Advanced](#) [Connect](#) [Disconnect](#)

**Step #2: Optera™ Analytics Configuration**

-- Bring up Optera™ WebUI. Set up and enable 'Adaptive Motion' and '2-Camera Tracking' as an Optera™ Analytic profile, and then return to this page and refresh.

[Go to Optera™ Analytics Page](#)

**Step #3: Spectra Enhanced™-Optera™ Calibration**

-- Calibrate connected cameras so they know where they are relative to each other.

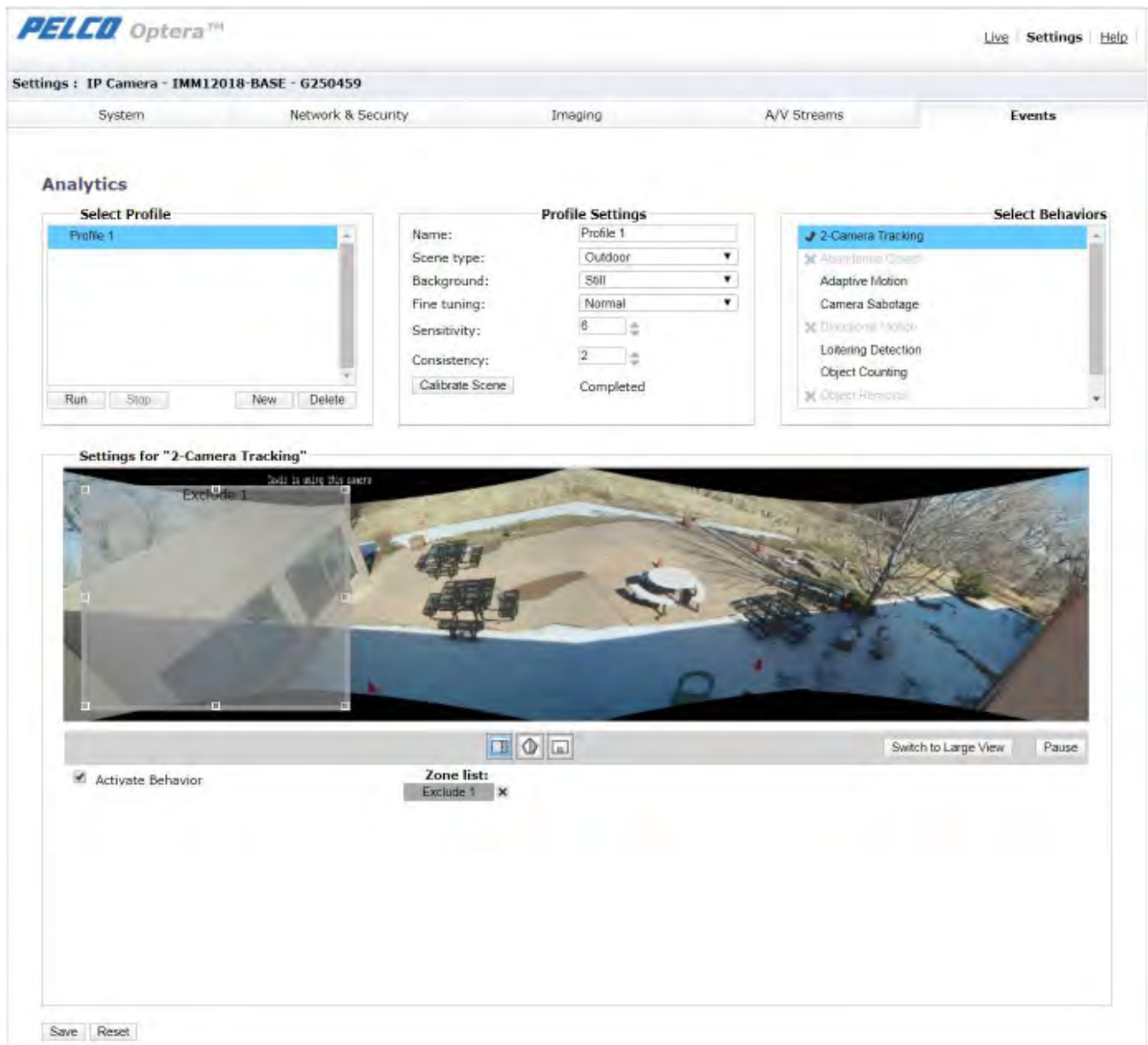
[Calibrate](#)

Pelco Camera Link with Auto Tracking uses the Optera 2 Camera Tracking analytic. To set up Pelco Camera Link 2 Camera Tracking, follow the steps below.

**Step #2 (Optera Analytics Configuration):** From the Enhanced Series PTZ webpage, click "Go to Optera Analytics" to open a new tab showing the analytics setup page from the Optera. Note the IP address for the Optera is shown as the URL. One tab is the Enhanced Series PTZ and one tab is Optera.

1. Select a New Profile, name it if desired.
2. Select 2 Camera Tracking.
3. Configure Profile Settings, Indoor/Outdoor, etc.
4. For Pelco Camera Link, Sensitivity = 6 and Consistency = 2 are the recommended settings to start with, but may need to be adjusted depending on the scene.
5. Calibrate the scene. A Calibrate page appears.
6. On the Calibrate page, place the blue box at a distant point in the view and adjust the height of the box to match the height of a typical object at that distance. If needed, enter the height in the entry box.
7. Select Set Width and position and adjust the length of the yellow bars of a typical object at a close distance, and at a far distance.
8. When complete, click Return to Main Menu. This returns to the Analytics Page.
9. Set Exclude Zone for the 2 Camera Tracking Analytic. The analytic detects motion over the entire Optera scene. However, if desired, a portion of the scene can be excluded from the analytic. For example, a portion of the scene below is viewing inside the building

through the windows. If only the motion over the patio is desired, excluding the building windows is possible using the Exclude zone tools.



10. Activate the behavior.
11. Click Save. This saves the setup for analytics into the Optera camera memory. As with settings for Pelco cameras, a backup copy of settings can be saved by clicking Backup from the system Tab.
12. Click Run.
13. Return to the Enhanced Series PTZ tab. The stoplight next to Analytics Configuration should be green. (Refreshing this page may be required for some browsers.)

**Step #3 (Calibration):** The final step for Pelco Camera Link setup is to calibrate the position of the Enhanced Series PTZ relative to Optera. Calibration is only required one time when first turning on Pelco Camera Link. A critical element for Pelco Camera Link tracking is that all tracked motion occurs in one plane. During calibration, the user must select matching points in the motion plane.

1. Click Calibrate. This brings up a step-by-step process.



2. Select mount-type and mutual visibility of the cameras. Mutual visibility means that the Spectra is visible in the Optera view, and that by adjusting the Enhanced Series PTZ camera's pan and tilt, the Optera is visible in the Enhanced Series PTZ's view. If the cameras are mounted together, neither camera is visible to the other. But if the cameras are mounted separately in many cases each camera is viewable by the other camera. After answering the two questions, click Next.
3. Calibration guides the user through a series of steps where four points from each camera are matched. These points must be in the plane of motion that Optera will track. In most cases, this will be points on the ground or floor of the scene. These four points allow the Enhanced Series PTZ and Optera to determine the location and orientation of each camera to enable Pelco Camera Link Auto Tracking. Calibration is most accurate if the user can select matching points in several regions as shown in the unshaded portions of the camera view below. Some installations will not allow this. In that case, attempt to choose points in the motion plane that are separated as much as possible. Also, some installations may show a small red region where you should not select matching points. This area is excluded to prevent incorrect geometry solutions. For each point, use the mouse to position the matching points in the center of the box, then Save the point and click Next. Careful matching of the points will result in the best calibration results.

**NOTE:** The plane of motion can be a tilted plane relative to the Earth (e.g. the plane could be on a hillside).

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Settings : IP Camera - D6230L - H500377
 

System
 Network & Security
 Imaging
 **PTZ**
A/V Streams
Events

### Pelco Camera Link -- Optera™-driven Motion Tracking

Setup
 Operate

Not yet calibrated for this combination of camera-mounting and visibility.

Step #2: Point both cameras at an image feature near the ground that they can both see, and then click "Save". In the following steps you will select 3 more shared image features. Ideally each feature would reside in or as close as possible to the highlighted window of the Optera™ Panorama view.

Camera Mounting Mounted Together
 Visibility Mutually Visible

Back
 Save
 Next
 Progress 1 2

This is the Optera™ panorama view. Click anywhere in this view to center the immersive view (below left) at that point.

Optera™ Immersive

Spectra Enhanced™

31

4. After selecting the four points, Submit these and the camera will calculate the geometry. A calibration score is displayed, along with recommendations on whether the points provide a good geometrical solution. Careful choice of points provides the highest score. Also, note that it is possible to ReDo the Calibration changing only one or two points. The calibration points are saved for reference and adjustment when redoing calibration. Redoing all four points is not required.
5. Click on Setup to go back to modify any setup steps performed, or to verify and use Pelco Camera Link.

**Operation Manual:** After calibration, all three stoplights on the Setup page should be green. Clicking Operate puts the Enhanced Series PTZ camera into a mode where you can verify calibration and analytics. There are several controls in the Operate page. Tracking Mode allows Manual Tracking, Off, or Automated. Setting to Manual lets the user select either Move PTZ Camera to Mouse Click or Zoom PTZ Camera to Mouse-Drawn Box. To verify good Calibration, select Move and click different points in the Optera view. The Enhanced Series PTZ view will move to that point and display the video. Selecting the Mouse-Drawn Box will position the Enhanced Series PTZ at that point and zoom into or out of the view.

**Operation Auto:** Choosing Auto Tracking Mode puts turns on the automatic 2 Camera Tracking where analytics from the Optera will drive the Enhanced Series PTZ camera. As the Optera detects motion, a box will show in the Optera video and the Enhanced Series PTZ will position to show a high magnification view of that motion. If the Optera detects multiple moving objects, multiple boxes will be displayed. The box that the Enhanced Series PTZ camera is following will show with a red frame. If the user clicks on a box, that box becomes the priority, turns red, and is the motion object that is tracked.

Three controls allow configuring the Motion Tracking:

- **Priority:** Largest, Fastest, and Farthest Object let the user select the analytic detected object the Pelco PTZ will follow.
- **Sticky Follow On and Off:** Set to On, the PTZ camera will continue to follow the original object that was detected even if other objects are detected, even if other objects are larger, faster, etc. The Sticky Follow will stay with the original object until it is stationary for some period of time.
- **Movement Sensitivity:** This control allows the user to select sensitivity of the motion. A high setting will track small motions, a lower setting will disregard small movements such as sawing trees and blowing leaves, and only track large movements such as cars driving and people walking. However, setting too low may disregard people walking and only track faster moving cars.



## Setting Up a Preset

A **preset** is a camera position that you can configure and call as a single command, allowing users to quickly move the camera to common positions.

1. Select Presets from the PTZ menu.
2. Click New Preset or select the preset you want to edit.
3. Provide a name for the preset.

4. Select the Focus Lock mode:
  - **On:** The camera's focus settings are saved with the preset, and are called with the preset. This ensures that the camera uses the expected focal point any time the preset is selected.
  - **Off:** The preset does not retain focus settings. This mode requires the camera to use current focus setting when the preset is selected.

If an operator has changed the focus of the camera before the preset is selected, it is possible that the camera will be out of focus when the camera displays the preset position later. Turn on Focus Lock to avoid this problem.

5. If appropriate, click to select this as the Washer Preset.

A washer is in a fixed location of your choice. Before using the washer, pan and tilt the camera to point at the washer, and then use this location to create the Washer Preset.

When activating the Washer, the PTZ unit will go to the washer preset position, wipe, and then return to its original position

6. Position the camera using the pan and tilt controls.
7. Adjust the zoom and focus controls as necessary.
8. Click Save.
9. To delete a preset, click to select the preset in the Presets area, and then click Delete Preset.

## Configuring a Preset Tour

You must configure presets before adding them to a preset tour. A **preset tour** is a series of presets through which your camera will cycle. You can configure the length of time for which the camera will remain at each preset position in the tour.

1. Select Preset Tours from the PTZ menu.
2. Click New Tour or select the preset tour you want to edit.
3. Provide a name for the tour.
4. For each preset to add to the tour:
  - a. Click and drag the preset to the Tour workspace section of the page.  
For the second and any additional presets, drag the preset very close to an existing preset until a yellow vertical bar appears, and then drop the preset on the bar.
  - b. Set the dwell time for the preset. **Dwell time** is the length of time (in minutes or seconds) the camera will remain at a preset position before engaging the next preset in the tour.
  - c. Set the transition speed for the preset.
5. Click >> in the Transition preview area to review the tour.
6. Click Save.
7. To delete a tour, click to highlight the tour in the Tours area, and then click Delete Tour.

## Configuring Pan/Tilt/Zoom Patterns

A pattern uses the path of motion recorded by the operator during configuration of the pattern.

This is different from a Preset Tour in that a preset tour begins at one spot and ends at another, using the most direct path between them.

1. Select Patterns from the PTZ menu.



2. To create a new PTZ pattern:
  - a. Click New.
  - b. In the Create New Pattern dialog box, type in a name for the pattern.
  - c. Click Create Pattern and Start Recording.
  - d. If appropriate, add a Scan, a Preset, or a Preset Tour as part of the pattern: At the lower left corner of the page, select a scan, preset, or preset tour from the drop-down menu; click Start to run it; click the adjacent Stop button to end it.
  - e. When appropriate, in the PTZ Patterns task bar, click Stop.
3. To run an existing PTZ pattern:
  - a. Select a pattern from the drop-down box to the right of the New button.
  - b. Click Run to start the pattern.
  - c. Click Stop to stop the pattern.
  - d. If necessary, click Re-record to record over the current configuration, and then click OK in the confirmation dialog box.
4. If appropriate, rename an existing pattern:
  - a. Select the pattern from the drop-down box to the right of the New button.
  - b. Click Rename.
  - c. Type the new name into the Name field in the Rename Pattern dialog box.
  - d. Click Save.
5. If appropriate, delete an existing pattern:
  - a. Select the pattern from the drop-down menu to the right of the New button.
  - b. Click Rename.
  - c. Click OK in the confirmation dialog box.

## Configuring Pan/Tilt/Zoom Scans

A Scan is a pan movement between two limits at a defined speed and a defined dwell time (pause) at each frame.

- When configured with limits, when a limit is reached the Scan will bounce back in the other direction, to the other limit, to start the pan movement again. It will continue until interrupted by a manual movement or a stop.
  - When configured without limits or the limits are set to the same point, the scan will pan 360 degrees until interrupted by a manual movement or a stop.
  - A Scan can be started at any tilt angle, and will maintain that tilt angle throughout the pan Scan.
1. Select Scans from the PTZ menu.
  2. To create a new PTZ Scan:
    - a. Click New.
    - b. In the New Scan area of the window, type in a name for the scan.
    - c. *(Optional)* Type in a value for the Left Pan Limit, and then click Save as Left Pan Limit.
    - d. *(Optional)* Type in a value for the Right Pan Limit, and then click Save as Right Pan Limit.
    - e. Type in a Speed.
    - f. Type in a Dwell Time.
    - g. You can include a pattern, preset, or preset tour in the Scan. At the lower left corner of the page, select a pattern, preset, or preset tour from the drop-down menu. Click Start to start the scan. Click the adjacent Stop button to end the scan.
    - h. Click Save.
  3. To edit an existing scan, select the scan from the PTZ Scans area, make the changes in the Edit Scan area, and then click Save.

4. To run an existing scan:
  - a. Select the scan from the PTZ Scans area.
  - b. Click Run.
  - c. When appropriate, click Stop.
5. If appropriate, delete an existing scan:
  - a. Select the scan from the PTZ Scans area.
  - b. Click Delete.
  - c. Click OK in the confirmation dialog box.

## Configuring Pan/Tilt/Zoom Zones

From the PTZ Zones page, you can create zones. When the camera is in view of a zone, the zone name will appear as an On Screen Display (OSD). Configure the Current Zone Label on the OSDi page to enable this feature.

1. Select Zones from the PTZ menu.
2. To create a new PTZ Zone:
  - a. Click New Zone.
  - b. In the New Scan area of the window, type in a Zone Name.
  - c. Use the pan, tilt, and zoom controls to select the Zone Position.
  - d. To start with the default settings, click Reset.
  - e. Click Save.
3. To edit an existing zone, select the zone from the PTZ Zones area, make the changes in the Edit Zone area, and then click Save.
4. If appropriate, delete an existing zone:
  - a. Select the zone from the PTZ Zones area.
  - b. Click Delete Zone.

## Configuring the Pan/Tilt/Zoom Positioning

From the Imaging tab, Positioning page, you can set the Digital Zoom Mode, control Pan and Tilt Speed, set the Pan Center Point, and Limit Stops.

### Configuring Digital Zoom

The Digital Zoom setting increases the zoom capability of your camera by up to 12X. The total zoom capability of your camera is determined by multiplying the optical and digital capabilities of your camera.

1. Select Positioning from the PTZ menu.
2. In the Digital Zoom area, select the Mode: On or Off.
3. Click Save.

### Configuring Pan/Tilt Speed Control

Pan and tilt speed control determines the acceleration of your camera's pan and tilt controls.

1. Select Positioning from the PTZ menu.

2. Select the Pan/Tilt Speed Control type:
  - **A: Linear:** Pan and tilt speeds accelerate at a fixed rate.
  - **B: Exponential:** Pan and tilt speeds accelerate at a rate corresponding to the length of time for which a user engages pan and tilt controls; the longer a user engages pan and tilt controls, the faster the camera will pan and tilt.
  - **Proportional Velocity:** Automatically reduces pan and tilt speeds proportional to the camera's zoom level.
  - **Auto Flip:** Allows the camera to rotate 180 degrees when the tilt is pointing straight down (e.g. -90 degrees tilt angle).
  - **PTZ Resume:** Allows the dome to recover the last PTZ action requested before the camera loses power. The camera will resume the previous action upon start-up.
3. Click Save.

## Setting the Pan Center Point

The pan center point determines the zero point for pan operations. Setting a new center point automatically adjusts Pan Limit Stop settings to account for the new center point.

On the Positioning page, you can click Go To Pan Center Point to determine the current center point or click Restore Default Center Point to restore the camera's default center position.

1. Select Positioning from the PTZ menu.
2. Use the left and right arrows next to the video preview to pan the camera to the desired location.
3. Click Set New Pan Center Point.
4. Click Save.

## Configuring Pan and Tilt Limit Stops

Pan and tilt limit stops allow you to limit the range of motion for your camera. Pan and tilt limit values are provided in degrees.

1. Select Positioning from the PTZ menu.
2. Select On for Pan Limit Stops, Tilt Limit Stops, or both.
3. Configure the left and right pan limits and the top and bottom tilt limits. You can provide a value, in degrees, for each limit, or click Get Current Pan/Tilt to retrieve the current value from the video preview window.
4. Click Save.

# A/V Streams Menu

The A/V Streams menu contains settings for your camera's video and audio streams as well as local recording, RTP settings, and Smart Compression.

## Selecting Preset Video Configurations

The Video Presets page contains fully-configured video configurations for both your primary, secondary, and tertiary video streams, offering a balance between video performance and bandwidth. These presets can also be used as a starting point for a custom video configuration.

1. Select Video Presets from A/V Streams menu.
2. Select your desired video preset stream configuration.
3. Click Save.

## Configuring Custom Video Streams

The Video Configuration page contains settings for customizing your camera's primary and secondary (and optional tertiary) video streams. Although each stream can be configured independently, the settings for one stream can limit the options available to the other stream, depending on the processing demands of your stream settings.

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.

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 primary stream before the secondary stream. The primary 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. 60 fps, 50 fps, 30 fps, or 25 fps) and the aspect ratio (e.g. 16:9 or 4:3). These settings affect both the primary and secondary stream configurations.
3. *(Optional)* Provide a user-friendly name for your custom streams in the Name box (2 to 64 characters).
4. Select the Compression Standard, Resolution, Image Rate, and Bit Rate. For H264 encoding, select I-frame Interval, profile, QoS (DSCP) Codepoint, Endura Signing, and rate control for the Primary stream.
5. Set the Compression Standard, Resolution, Image Rate, Bit Rate, and I-frame Interval settings for the primary stream.
6. Repeat the previous steps for the Secondary stream.
7. Click Save.

## Video Configuration Settings

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

- **H.265:** Designed to boost video streaming. A compression standard designed to substantially improve coding efficiency.
- **MJPEG:** Has the least impact on the camera's processor but requires the most bandwidth. This is similar to JPEG (not available on this camera), but uses RTP.
- **MJPEGMJPEG:** The most processor-intensive compression standard but requires the least amount of bandwidth. Has the least impact on the camera's processor but requires the most bandwidth. This is similar to JPEG, but uses RTP.
- **H.264:** The most processor-intensive compression standard but requires the least amount of bandwidth. Standard compression format for increased efficiency.

**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 images per second (ips) available for the video stream configuration. Available image rates depend upon the model of the camera that you are using.

**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 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:**

**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 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.
- **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 in response to motion, while not exceeding the user-defined maximum bit rate over a period of several GoPs.
- **CVBR:** The constrained variable bit rate (CVBR) provides high-quality video and long recording time of variable bit rate in response to motion, while not exceeding the user-defined maximum bit rate over a period of several GoPs.

## 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. Enable Audio.
2. Select your audio device.
  -
3. Select your sample rate. The sample rate is the quality of the audio stream (measured in hertz per second).
4. Select the encoding method.
5. 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.

6. Click Save.

## Managing Local Recording

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 micro SD card, a micro SD card that was previously used or reformatted and has reached the end of its life, or the camera's time settings being improperly configured.

### Local Recording Storage Limits

The number of hours of video you can store on the micro SD card depends on several factors besides the capacity of the micro SD card. The bit rate is an important factor. For example, with a 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 micro SD card. For example, below a bit rate of 1.5 Mbps, you can store a maximum of 48 hours of video at 30 fps on a 32 GB card. 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.

# Managing RTP Settings

The RTP Settings page provides access to advanced multicast and MTU settings.

## Setting Static Multicast Addresses

You can set static multicast addresses and ports for all of your camera's multicast streams (primary, secondary, service, etc).

Default, automatically-assigned multicast addresses are confined to the 239.x.x.x block in a scheme matching your IP address and network settings; you can determine the automatically-assigned multicast address(es) for your camera from the RTP page.

1. Go to the *RTP Settings* page from the *A/V Streams* menu.
2. Enter static multicast addresses and ports for your streams as necessary.
3. Set the *Time to Live (TTL)* for each stream; this is the number of routers the stream can pass through before it expires.
4. Determine whether or not to *Always Multicast this stream*. This setting eliminates the need for a client to connect to the camera to initiate a stream; when enabled, the camera begins sending the multicast stream when it starts up, without requiring initiation from a client.
5. Click *Save*.

## Setting the Maximum Transfer Unit Size

You can adjust the maximum transfer unit size to adjust to your network's constraints. Changing the MTU setting will require your camera to restart. This could take several minutes.

1. Go to the *RTP Settings* page from the *A/V Streams* menu.
2. Set the *Max Transfer Unit* size.
3. Click *Save*, or *Save and Reboot Camera*, depending on your camera.

## Smart Compression

**Smart Compression** can greatly reduce the bit rates produced by your camera at the potential cost of a slight to moderate degradation in video quality, depending on the compression level you set. This change in video quality is dependent on the complexity of the scene and the compression level you select. The *High* Smart Compression setting can reduce the bit rate up to 90% of the expected bit rate.

From the *Smart Compression* page, you can also set a dynamic group of pictures (GoP) length, allowing the camera to update picture groups depending on scene composition and motion. A dynamic GoP can further reduce bit rates produced by the camera, by allowing the camera to increase the GoP length when there is little action in the scene.

**NOTE:** Dynamic or long GoP lengths may cause compatibility issues with some video management systems (VMS). Ensure your VMS supports dynamic GoP settings before enabling this setting.

## Configuring Settings and Short Term Graph

1. Go to the *Smart Compression* page from the *A/V Streams* page.
2. On the Pelco Smart Compression page, click Settings and Short Term Graph.
3. Indicate your Smart Compression Level.

The Smart Compression level allows you additional control to balance video quality versus bit rate. The smart compression settings determine how aggressively the camera will drop the bit rate on easily compressed scenes and how aggressively it will adjust image processing settings to make the scene more compressible. If the scene is difficult to compress (high motion, high noise), the camera will use the full bit rate allowed by the stream bit rate settings. The Off and Low settings will have a similar, minor effect on the image; the Medium and High settings will have correspondingly more effect on the image and greater savings on storage.

4. *(Optional)* Enable Dynamic GOP Length. If you want to place an upper limit on the Dynamic GOP length, set the Optional Maximum GOP Length for each stream.  
**NOTE:** Dynamic or long GoP lengths may cause compatibility issues with some video management systems (VMS). Ensure your VMS supports dynamic GoP settings before enabling this setting.
5. Click Save.
6. To view the Bitrate of either Video Stream, select Primary or Secondary above the Bitrate graph at the bottom of the page.

## Configuring Long-Term Rate Control

Set Long-Term Rate Control if you must ensure storage does not exceed a specific size.

1. After ensuring the date and time have been set on the camera, run the camera for multiple days which should represent multiple times the length of the observation period you will be using.
2. Go to the Smart Compression page from the A/V Streams page.
3. On the Pelco Smart Compression page, click Long-Term Rate Control.
4. Select the Video Stream to which you will apply the settings.
5. Select the Bitrate Units: either total kbps or Gbytes/day.
6. In the Long-Term Rate Controls area:
  - a. Enable the Controls.  
**NOTE:** You can disable the Controls at any time.
  - b. Use the slider bar to select the Average Bitrate Limit, type in a value, or click Copy to Slider in the Recommendations area.
  - c. Use the slider bar to select the Observation Period in Days, or type in a value.
7. Click Save.
8. To view the Long-Term Graph for either stream:
  - a. Select the Primary or Secondary Video Stream at the top of the page.
  - b. To the right of the Long-Term Graph title, click Update.  
The graph helps you understand how much storage the camera will use.
  - c. If appropriate, click Delete Long-Term Data for [Secondary or Primary, whichever is selected], and then click OK in the confirmation dialog box.



# Events

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™, VideoXpert™, 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.

There is also an analytic you can configure called 2 Camera Tracking. This analytic is tied to Pelco Camera Link, a technology feature that requires two different types of Pelco Cameras (e.g. Optera and a Pelco Enhanced Series PTZ camera) to set up.

## Configuring 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

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. *(Optional)* If available, select the handler(s) that you want to associate with this source. Handlers are configured from the Events tab Handler page.
11. 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. Analytics are configured on the Events tab Analytic Configuration page.
6. *(Optional)* If available, select the handler(s) that you want to associate with this source. Handlers are configured from the Events tab Handler page.
7. Click Submit.

## Configuring a Park Action Event Source

A park action event source triggers an event if the camera is inactive for a specified period 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 Park Action from the Type menu.
5. Configure the dwell time (the amount of inactivity before the event handler starts).
6. *(Optional)* If available, select the handler(s) that you want to associate with this source. Handlers are configured from the Events tab Handler page.
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)* Click to select Boot, if you want the event to trigger when the camera starts up or reboots.
6. *(Optional)* If available, select the handler(s) that you want to associate with this source. Handlers are configured from the Events tab Handler page.
7. 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, including the units of time available in the pull-down menu.

6. *(Optional)* If available, select the handler(s) that you want to associate with this source. Handlers are configured from the Events tab Handler page.
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.

## Configuring 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

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

**NOTE:** 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.

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 a micro 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.

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

1. Install a micro SD card in the slot located on the back of the camera.  
**NOTE:** The micro SD card must be formatted as FAT32 or reformatted to ext4.
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 micro 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, including the units available from the pull-down menu. Do not select a size limit that exceeds the available memory on the micro 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. Sources are configured from the Events tab Sources page.
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. The selection is simply the format of the date and time stamp.
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. Sources are configured from the Events tab Sources page.
11. Click Submit.

### Configuring an Event Handler: Run Pattern

This event handler runs a selected pattern.

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 handler in the Name box.
4. Select the Run Pattern handler type.
5. Select a pattern from the drop-down menu.

6. *(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.
7. *(Optional)* Select one or more sources that you want to trigger this event handler. Sources are configured from the Events tab Sources page.
8. Click Submit.

## Configuring an Event Handler: Go to Preset

You must define a preset before you can create a Go to Preset event handler. Presets are configured from the Imaging tab Preset page.

The Go to Preset handler activates a camera preset 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 Go to Preset handler Type.
5. Select a preset from the Preset drop-down menu.
6. *(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.
7. *(Optional)* If available, select the source(s) that you want to trigger this event handler. Sources are configured from the Events tab Sources page.
8. 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. Select the Relay Mode: Pulse or Trigger.
8. If you selected Pulse, use the On Time controls to set the amount of time the relay will remain open, up to 200 seconds.
9. If you selected Pulse, use the Off Time controls to set the amount of time the relay will remain closed, up to 200 seconds.
10. Set the Pulse Count for the relay. The pulse count is the number of relay pulses (number of on and off cycles).
11. *(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.

12. *(Optional)* If available, select the source(s) that you want to trigger this event handler. Sources are configured from the Events tab Sources page.
13. Click Submit.

## Configuring an Event Handler: Run Scan

This event handler runs a preset scan when an event source is triggered. You must define a Scan before you can create a Run Scan event handler. Scans are configured from the Imaging tab Scan page.

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 handler in the Name box.
4. Select the Run Scan handler type. Scans are configured from the Imaging tab Scans page.
5. Select the Scan from the pull-down menu.
6. *(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.
7. *(Optional)* Select one or more sources that you want to trigger this event handler. Sources are configured from the Events tab Sources page.
8. Click Submit.

## Configuring an Event Handler: Run Tour

You must define a Preset Tour before you can create a Run Tour event handler. Preset tours are configured from the Imaging tab Preset Tours page.

1. Select Handlers from the Events menu.
2. Click New Handler or select the handler you want to reconfigure.
3. Select Handlers from the drop-down menu.
4. In the New Event Handler section of the window, click the Name box and type a user-friendly name (2 to 23 alphanumeric characters).
5. Select Run Tour from the Type drop-down menu.
6. Select a tour from the Tour drop-down menu.
7. *(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.
8. *(Optional)* If available, select the source(s) that you want to trigger this event handler. Sources are configured from the Events tab Sources page.
9. 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.

### Configuring 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.

### Selecting 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.

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.

- **Alarm at (Object Counting):** Determines the number of objects entered into a zone that will trigger an alarm.
- **Alarm severity:** Defines the severity of alarms triggered. Alarm severity helps you and other users prioritize alarms.
- **Average Object Size:** Determines the average size of objects to be counted.
- **Camera Placement:** Defines the vertical height of the camera's location relative to the area being monitored.
- **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.
- **Direction:** Determines the direction of motion a zone should track. Events will only be triggered when your camera detects motion in the specified direction.

- **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.
- **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.
- **Follow Options:** Determines whether an object is tracked only within the current field of view or beyond.
- **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.
- **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.
- **Object speed:** Adjusts for speed if the scene is configured to track moving objects at a slower or faster rate than actual speed.
- **Optimize Zoom Settings for Objects of this Type:** Defines the type of object to be tracked.
- **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.

**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.

## **Auto Tracker**

The AutoTracker behavior detects and tracks movement in the camera's field of view. When the AutoTracker behavior is configured, the system automatically pans and tilts to follow the moving object until the object stops or exits the monitored area.

### **Ideal Scene Setup for Auto Tracker**

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 the AutoTracker behavior contains light traffic and a clean background. If heavy traffic or a busy background is unavoidable, place zones relatively stable areas.

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 a failure to trigger valid alarms. 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 breakdowns, 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 in 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:** This zone configuration is different from the configuration performed in the Imaging tab PTZ Zone page.

**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.

	<b>Box:</b> Tracks objects in a defined zone and triggers an alarm if the objects move in the same direction as defined.
	<b>Polygon:</b> Tracks objects in a defined zone and triggers an alarm if the objects move in the same direction as defined.
	<b>Line:</b> Tracks objects that cross a line and triggers an alarm if the objects move in the same direction as defined.
	<b>Exclude Zone Box Tool:</b> Ignores objects inside a defined zone.
	<b>Exclude Zone Polygon Tool:</b> Ignores objects inside a defined zone.
	<b>Object Size Filter:</b> Sets the minimum and maximum object size for a zone.
	<b>Display Size:</b> 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 is at least one box, and there might be 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 View.
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.

## 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.

## Wash and Wipe Configuration

1. Select Wash & Wipe from the Events menu.
2. Provide a wash time in seconds.
3. Provide a wipe delay time in seconds.
4. Select a washer relay, either 1 or 2.
5. Click Save.



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