Nice LINEAR

Fixed Lens
Bullet Camera

Motorized Varifocal Lens
Bullet Camera

Fixed Lens -&- Motorized
Varifocal Lens Dome Camera

IV400

Smart Surveillance Cameras | 5MP SERIES

User Manual

About This Document

This document intends to explain different aspects of the IV400 Cameras. It aims at simplifying the tasks to be done with the application based on IV400. It will also help you learn some key concepts. In this document, you will learn about different events and settings.

An overview of the Artificial Intelligence (AI) events and settings is as follow,

Event

- AI Events are different occurrences or incidents triggered by the camera.
- Each AI event has individual settings which allow you to tune them for optimal accuracy in your environment.
- Motion Detection
- Camera Tamper Detection
- Intrusion Detection
- Line Cross Detection
- Loiter Detection
- Object Left/Removed Detection
- Object Classification

Settings

- Camera settings allow you to tune your image quality.
- System settings allow you to manage users or also perform a reset for your camera.
- *Event Output* allows you to define what the camera should do when a particular event occurs.

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1. Abbreviations & Key Concepts

1.1 Abbreviations

Table 1: Description of Abbreviation	
IP Cam	Internet Protocol Camera
NTP	Network Time Protocol
DST	Daylight Saving Time
DHCP	Dynamic Host Configuration Protocol
DNS	Domain name server
CBR	Constant Bitrate
VBR	Variable Bitrate
FPS	Frames per second
MJPEG	Motion JPEG
SMTP	Simple Mail Transfer Protocol
RTSP	Real Time Streaming Protocol
FoV	Field of View
IVA	IntelliVision Analytics
FDFR	Face Detection Face Recognition
RoI	Region of Interest

1.2 Key Concepts

Table 2: Description of Key Concepts	
NTP	Network Time Protocol used to synchronize computer clock times in a network.
Force sync	Forcefully synchronizes time and date of the camera.
NTP Sync Interval	How often the camera synchronizes time to the Network Time Server.
Factory Reset	Used to reset all the settings to default values.
Reboot	Shuts down and restarts the camera.
Restore Default	Used to reset all the settings to default value, except for network settings.
HTTPS	Security protocol designed to facilitate privacy & data security for communications over the internet.
H.264 H.265	Popular compression for HD video, achieving high quality video in relatively low bit rates.
MJPEG	Motion JPEG (M-JPEG or MJPEG) is a video compression format in which each video frame or interlaced field of a digital video sequence is compressed separately as a JPEG image.
DHCP	*Dynamic Host Configuration Protocol* (DHCP) is a network protocol that enables a server to automatically assign an IP address to a computer from a defined range of numbers configured for a given network.
Static IP	A static IP address is an address that is manually assigned to your network devices. The IP address remains constant until manually changed.

PoE, Power over Ethernet provides Local Area Network (LAN) connection and Power to the IP Camera over the Ethernet cable.

1.3 Prerequisites

The prerequisites are as follows:

- Make sure your camera is always connected to a PoE LAN connection.
- Web browser (Firefox/Chrome/Safari/Microsoft Edge).

2. Introduction to Linear IV400 Management Application

An Internet Protocol camera (IP) camera is a digital video camera that receives data and sends image data via the LAN or WAN using Internet Protocol. They're used for surveillance and can be directly accessed over a network connection. This makes them easy to install and connect to your system, and you can view live camera feeds at any time with any web browser, RTSP client, or on a smartphone mobile app. IP cameras can handle recording video, images and alarm management. The camera can record directly to remote storage media such as a Network Video Recorder (NVR), local SD card or cloud platform.

2.1 Need of the Application

A security camera system is required for effective surveillance of perimeter and internal monitoring, as well as creating a record for events.

You can stay connected to your daily operations by monitoring with your surveillance system. This allows you to manage store lines, employee activities, and streamline workflow based on live or recorded video footage of your business or organization during working hours.

You can monitor, with clear video, large areas such as parking lots of any suspicious activity or accidents with a powerful video surveillance system.

Video surveillance can help enormously with crowd control as well as prevent crime. It equips security staff with real-time images from an event. Advance Security Systems can zoom in on suspicious behavior before it becomes a problem. Law enforcement can also view a video of public places like parks and common public places via a Security Operations Center (SOC), from their smartphones or a vehicle laptop.

Video surveillance can help in monitoring traffic, such as counting the cars passing through or improving the flow of traffic for better travel times. HD cameras can even record fast-moving cars in challenging lighting conditions.

Video surveillance can help in transport Safety. Cameras can allow the vehicle or train operator to confirm that people are clear of closing doors and that everyone is safe.

2.2 Features

The Linear® IV400 cameras includes advanced AI features including Motion Detection, Intrusion Detection, Camera Tamper Detection, Object Classification, Loiter Detection, Line Crossing Detection, Object Left/Removed Detection and Face Recognition (optional license required). Feature descriptions are included with the event in the 7.4 Events section of the manual.

2.3 Technical Specifications

The technical specifications are listed in the following table. Understanding the technical specifications will help you technically know your camera better.

Model	IV400- 5DFW	IV400-5DVW	IV400-5BFW	IV400-5BVW
Product Description	5MP Fixed Lens Dome Camera	5MP Varifocal Lens Dome Camera	5MP Fixed Lens Bullet Camera	5MP Varifocal Lens Bullet Camera
SOC Information	64-bit ARM® Quad Core Cortex™-A53	64-bit ARM Quad Core Cortex™-A53	64-bit ARM Quad Core Cortex™-A53	64-bit ARM Quad Core Cortex™-A53
Flash	256MB	256MB	256MB	256MB
RAM	512MB	512MB	512MB	512MB
Scanning System	Progressive	Progressive	Progressive	Progressive
Image Sensor	OV OS05A	OV OS05A	OV OS05A	OV OS05A
Max Resolution	2592x1944	2592x1944	2592x1944	2592x1944
Lens	2.8 mm Fixed	2.8 -12 mm MFZ	4 mm Fixed	2.8 -12 mm MFZ
Angle of view for(h/v/d)	104/77/136	90-31/65-23/118-38	77/57/101	90-31/65-23/118-38
Day/Night	Auto (ICR) / Color / B/W	Auto (ICR) / Color / B/W	Auto (ICR) / Color / B/W	Auto (ICR) / Color / B/W
Wide Dynamic Range	120dB	120dB	120dB	120dB
Noise Reduction	3D DNR	3D DNR	3D DNR	3D DNR
Lens	2.8 mm Fixed	2.8 -12 mm MFZ	2.8 mm Fixed	2.8 -12 mm MFZ
Field of view for(h/v/d)	103°/79°/134°	88°-30°/65°-23°/115°-38°	103°/79°/134°	88°-30°/65°-23°/115°-38°
Ethernet	RJ-45 (I0/I00Base-T)	RJ-45 (I0/I00Base-T)	RJ-45 (I0/I00Base-T)	RJ-45 (I0/I00Base-T)
Internal Storage	MicroSD/SDHC/SDXC	MicroSD/SDHC/SDXC	MicroSD/SDHC/SDXC	MicroSD/SDHC/SDXC
Audio IO	External audio I/O cable Line in/Line out	Built-in Mic External audio I/O cable Line in/Line out	External audio I/O cable Line in/Line out	External audio I/O cable Line in/Line out
Power Input	PoE IEEE 802.3af Class 2 DC 12V	PoE IEEE 802.3af Class 0 DC 12V	PoE IEEE 802.3af Class 2 DC 12V	PoE IEEE 802.3af Class 0 DC 12V
Power Consumption	Max. 6.49 W (IR on) Max. 3.6 W (IR off)	Max. 12.95 W (IR on) Max. 9 W (IR off)	Max. 6.49 W (IR on) Max. 3.6 W (IR off)	Max. 12.95 W (IR on) Max. 9 W (IR off)
Dimensions	Ø117 x 89.5 mm	Ø133.15mm X10 9.82mm	177 x 72.3 mm	215.46 x 85 mm
Weight	558g	1.12kg	550g	760g
Operating Temperature	Min: -30°C Max: +50°C (Min -22° F Max 122° F)	Min: -30°C Max: +50°C (Min -22° F Max 122° F)	Min: -30°C Max: +50°C (Min -22° F Max 122° F)	Min: -30°C Max: +50°C (Min -22° F Max 122° F)
Relative Humidity	Less than 95% RH	Less than 95% RH	Less than 95% RH	Less than 95% RH
Ingress Protection	IP66 IK10 Housing	IP66 IK10 Housing	IP66 IK10 Housing	IP66 IK10 Housing
Regulatory	CE/FCC/UL	CE/FCC/UL	CE/FCC/UL	CE/FCC/UL

2.4 Camera Types

There are four types of camera available: *Fixed Dome*, *Motorized Varifocal Dome*, *Fixed Bullet* and *Motorized Varifocal Bullet*.

Fixed Dome Camera Images for Illustration

Figure 1: Fixed Lens Dome Camera

The following figure shows front view and rear view of the camera.

Figure 2: Front View of Fixed Lens Dome Camera

Figure 3: Rear View of Fixed Lens Dome Camera

Motorized Varifocal Lens Dome Camera Images for Illustration

Figure 4: Motorized Varifocal Lens Dome Camera

The following figure shows front view and rear view of the camera.

Figure 5: Front View of Motorized Varifocal Lens Dome Camera

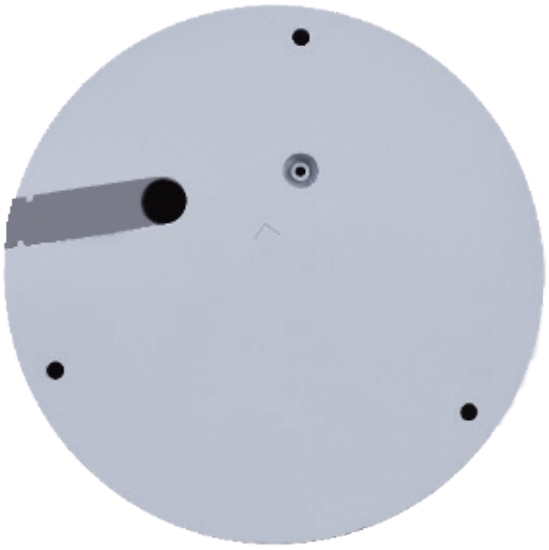


Figure 6: Rear View of Motorized Varifocal Lens Dome Camera

Fixed Lens Bullet Camera Images for Illustration

Figure 7: Fixed Bullet Camera

The following figure shows front view and rear view of the camera.

Figure 8: Front View of Fixed Lens Bullet Camera

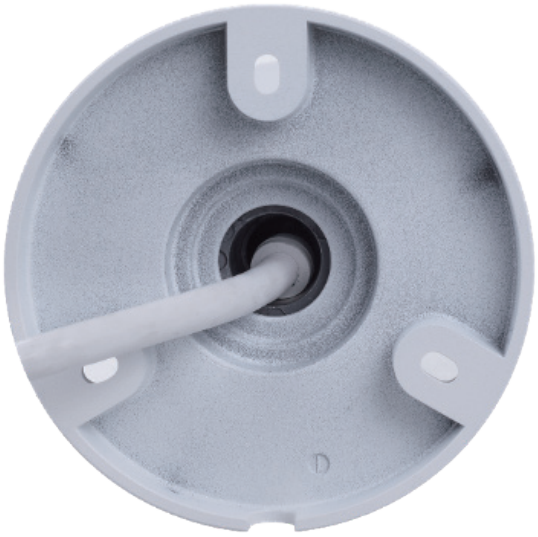


Figure 9: Rear View of Fixed Lens Bullet Camera

Motorized Varifocal Lens Bullet Camera Images for Illustration

Figure 10: Motorized Varifocal Lens Bullet Camera

The following figure shows front view and rear view of the camera.

Figure 11: Front View of Motorized Varifocal Lens Bullet Camera

Figure 12: Rear View of Motorized Varifocal Lens Bullet Camera

2.5 Software Specifications

Computer must be installed with any of the following browser.

- Web browser (Firefox/Chrome/Safari/IE/Microsoft Edge).

3. Getting Started

3.1 Accessing the IV400 camera in any Web Browser using HTTPS or HTTP Protocol:

1. Start your computer system, and launch any installed browser.
2. Enter the IV400 camera IP in the address bar to access its web UI. (for example: https://192.168.0.230), then press **Enter**.
3. A warning message may appear on web browser UI.
4. If so, click **Advanced**.

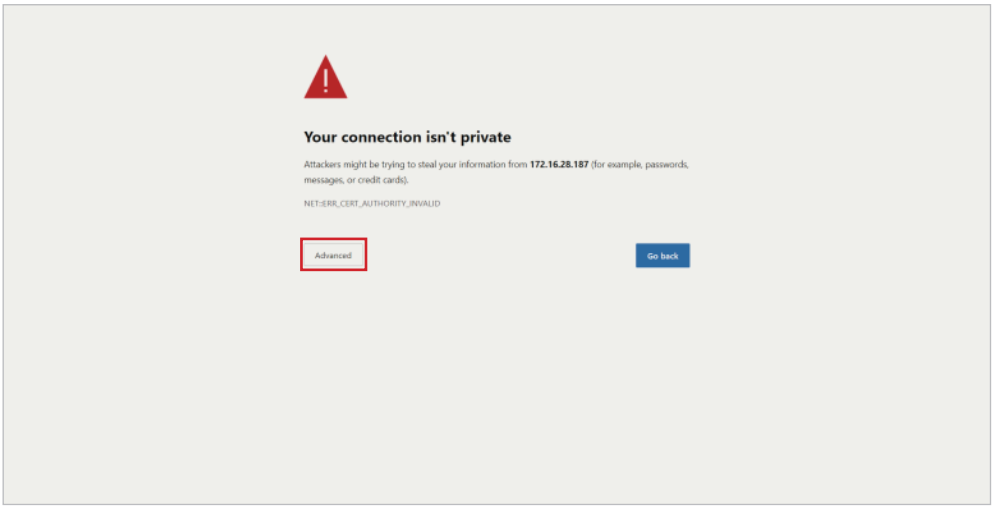


Figure 13: Connection Private

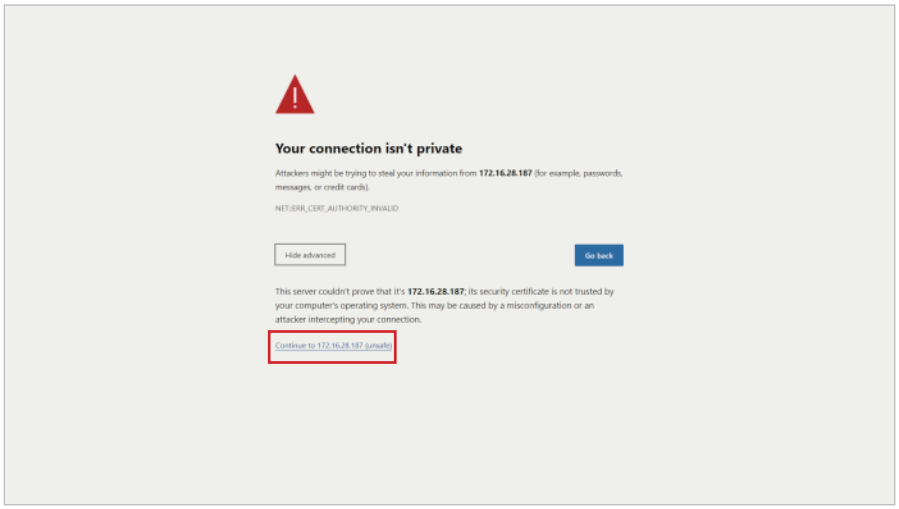


Figure 14: Advanced button options

5. Click the **Continue to 192.168.0.230 unsafe** link to access the IV400 Camera (IP). The Login page is displayed.

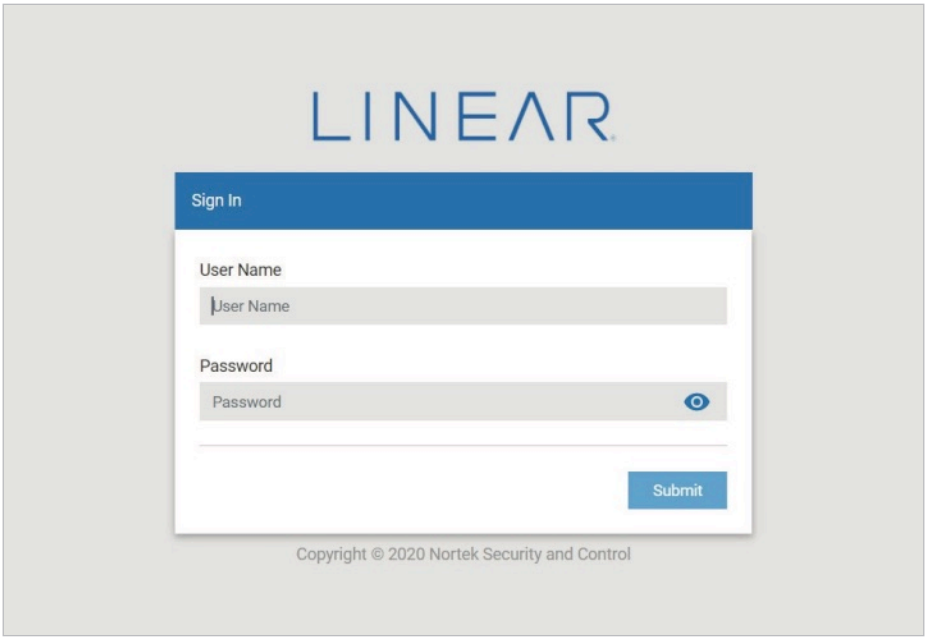


Figure 15: Login Window

Accessing the IV400 camera using HTTP protocol:

1. Launch any browser.
2. Enter the IV400 camera IP in the address bar to access its web UI. (for example: http://192.168.0.230), then press **Enter**.
3. The Login page is displayed.

Notes:

- Make sure that IV400 camera is connected to the required power supply through "LAN/WAN" network with POE Switch or NVR.
- Make sure the IV400 camera firmware is up to date and the camera is powered on.
- **The default static IP for the IV400 Camera is 192.168.0.230.**
- In the Mozilla Firefox browser, live view cannot be accessed using Self-signed certificate if attempting to access IV400 Camera using HTTPS protocol.

3.2 Logging into the Application

To log into the system, follow these steps:

1. Launch any web browser, enter the IV400 camera (IP) then press **Enter**.
2. Enter valid **User Name** & **Password** on the Login page (**Default User Name** = *admin* / **Default Password** = *linear*).
3. Click the **Submit** button.

4. After authorizing provided credentials, the Change Password login screen will be displayed.

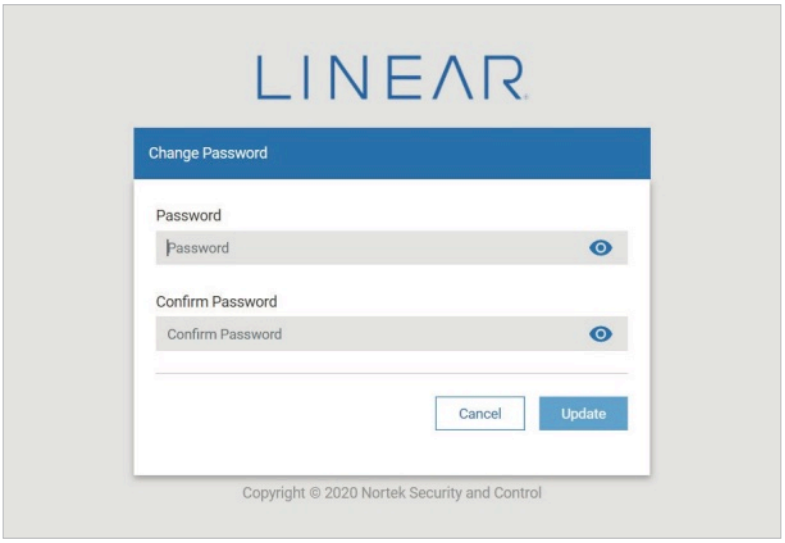


Figure 16: Change Password

3.3. Changing the Password

To change the default password provided:

1. Enter new password in **Password** and **Confirm Password** fields.
2. Click **Update**.

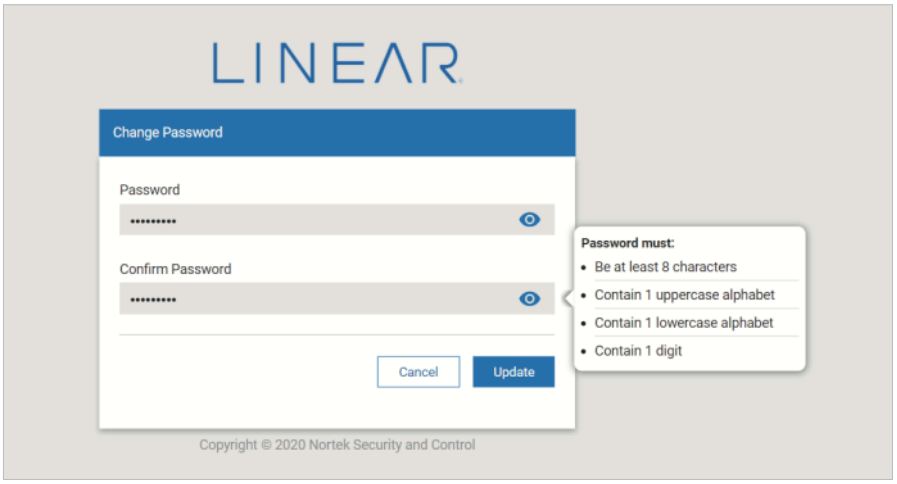


Figure 17: Update Password

Notes:

- Be certain the Password entries match. If needed, click the icon to confirm.
- If the new password is rejected, a prompt will be displayed. Confirm that all password requirements have been met, and then try again.

NOTE: If for some reason the password cannot be recalled, a Factory Reset will be required.

3. After the password has been updated and user login is successful, the **Live View** tab will be displayed.

4. Live View (Home/Landing Page)

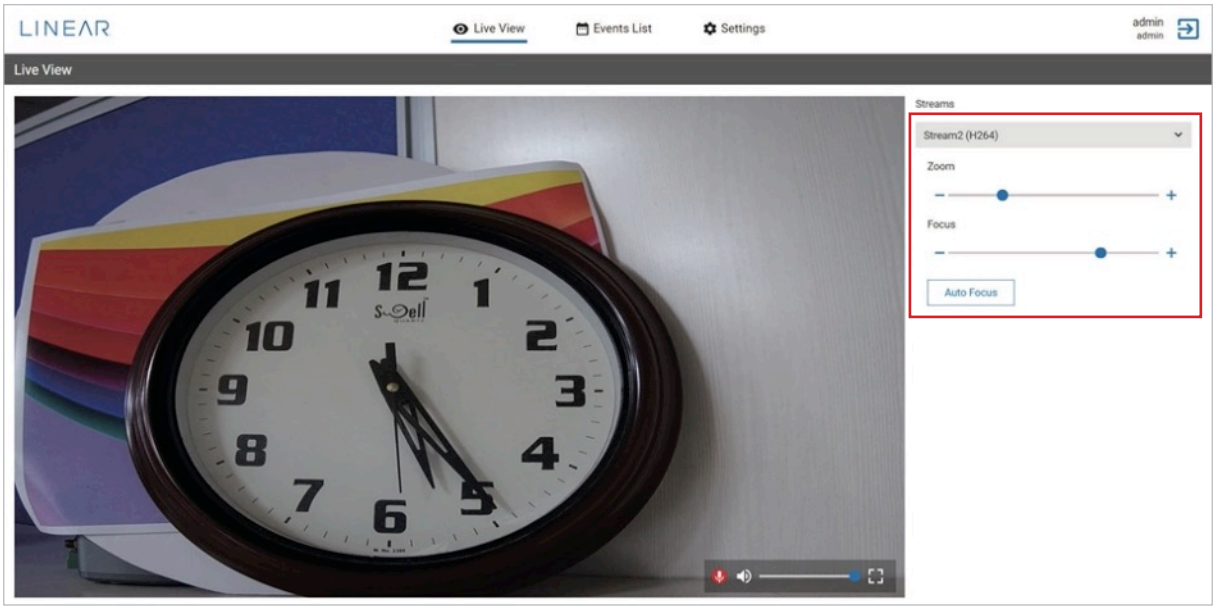


Figure 18: Live View (Homepage)

1. **Live View Streaming**: Monitor the camera's Live Streaming video.
2. **Full Screen**: Click ⛶ (Live View lower right) to access Live View full-screen. To exit Full Screen Live View, move your mouse to the top of the screen and click the **X** icon, press the **Esc** key or click ⛶ (extreme bottom-right side) of screen.
3. **Speaker**: Adjust speaker volume (Minimum to Maximum level) using a slider. Click the speaker icon to *Mute* or *Unmute* audio.

Figure 19: Adjust Speaker Volume / Mute

4. **Microphone**: Click the **Mic** icon to activate the mic and communicate (speak or announce). This option is available only when accessing the IV400 camera web-UI using HTTPS method rather than HTTP.

5. **Streams**: Select a desired stream (“Stream 2” or “Stream 1”). Once selected, adjust options for resolutions with encoding type supported by the IV400 camera. If any encoding type [for example: H265 with higher resolution(5MP)] is not supported on Web browser UI, a warning prompt will appear on the Live View screen.
6. **Zoom**: Increasing (+) or Decreasing (-) to Zoom the camera. Once the Zoom is set, a few seconds must pass before the new Zoom view will appear on live streaming.
7. **Focus**: Adjust camera focus by Increasing (+) or Decreasing (-). Once the Focus is set, a few seconds must pass before the new Zoom view will appear on live streaming.
8. **Auto Focus**: Click **Autofocus** to allow the camera to focus to an optimal level to better view unclear objects in the scene.

NOTE: Zoom, Focus & Autofocus functionality is supported only for the IV400-5BVW and IV400-5DVW Camera types.

5. Event Lists Section

1. This section will provide frequently generated events captured by the IV400 camera. A maximum of 10 events can be listed.

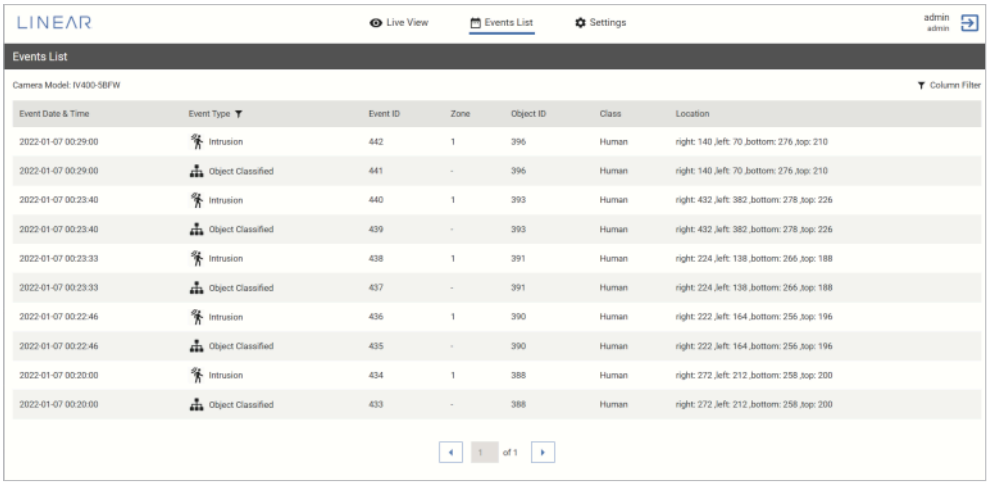


Figure 20: Events List

2. To filter displayed *Events*, hover the mouse over the **Column Filter** icon, and select or deselect checkboxes. Click **Apply**. Event data detailed information will display selected information.

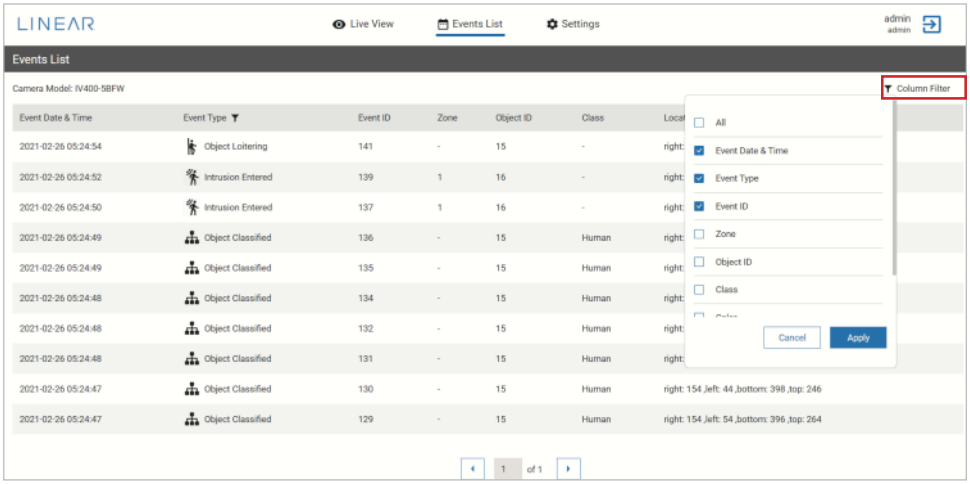
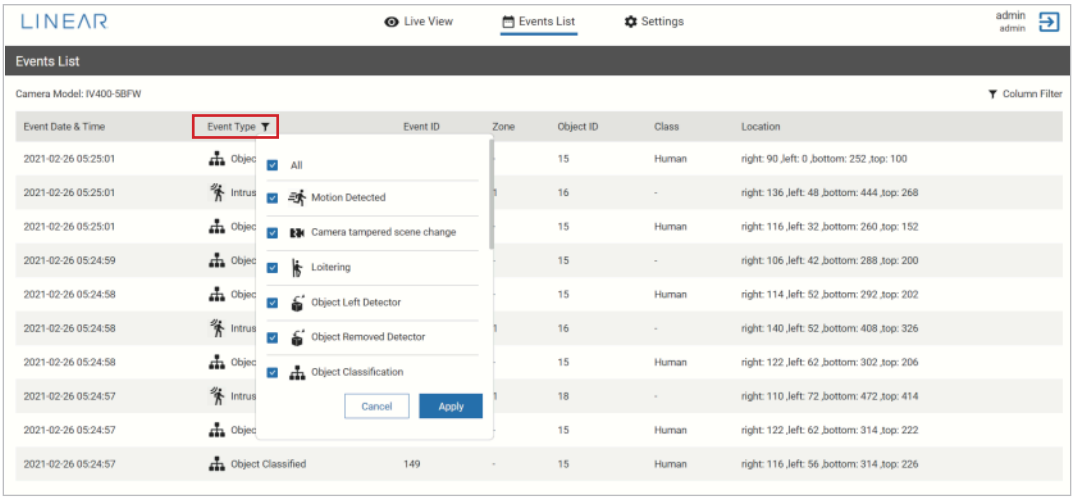


Figure 21: Filter Events List

3. To sort event data, hover your mouse over the **Event Type** filter. Select or deselect desired checkboxes, then select **Apply**. Only selected events type will be displayed.



6. Settings

Configure various system settings to customize the live streaming experience.

6.1 System > Information

1. Displays general information such as; *Camera Name*, *Camera Model*, *Firmware Version*, *Kernel version*, *Mac Address*, *IVA Licenses* and *License for FDFR*.

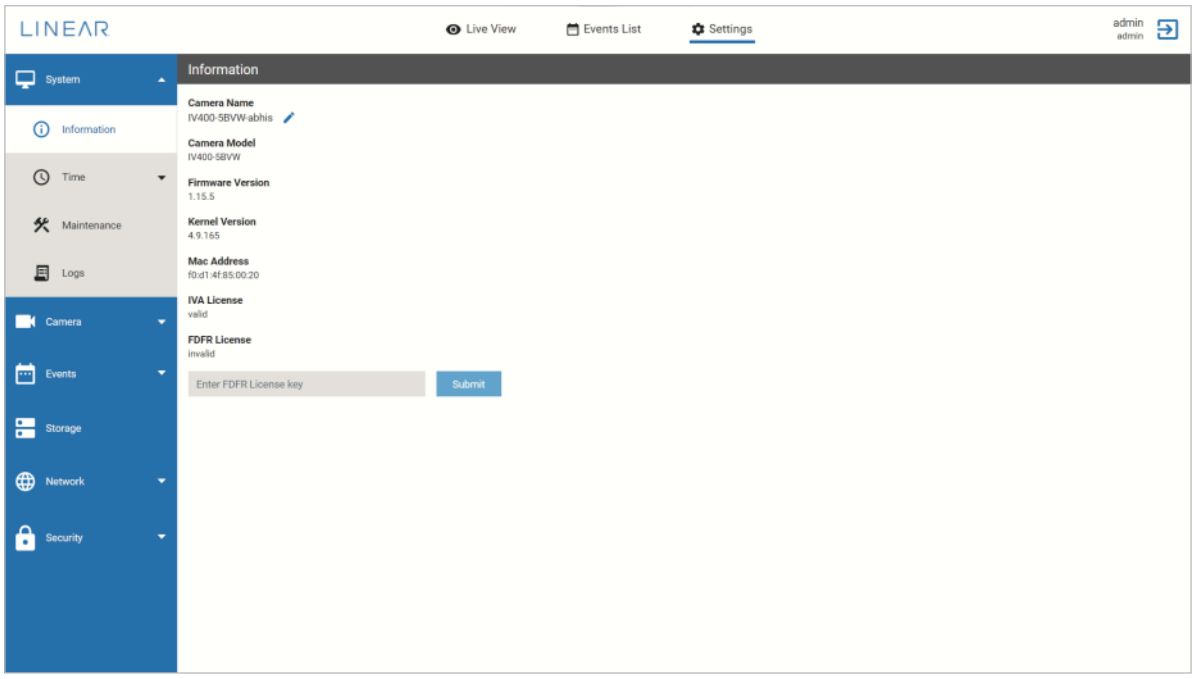


Figure 22: Settings/System - Information

1. **Edit Camera Name**: Click the **Edit** icon adjacent to **Camera Name**. The *Edit Camera Name* pop-up appears on-screen. Enter the new name, and then click **Save**.

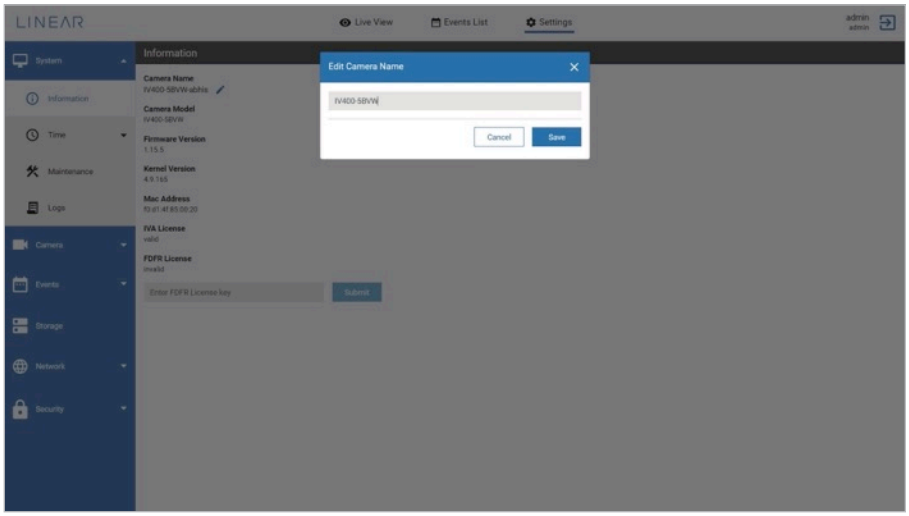


Figure 23: Edit Camera Name

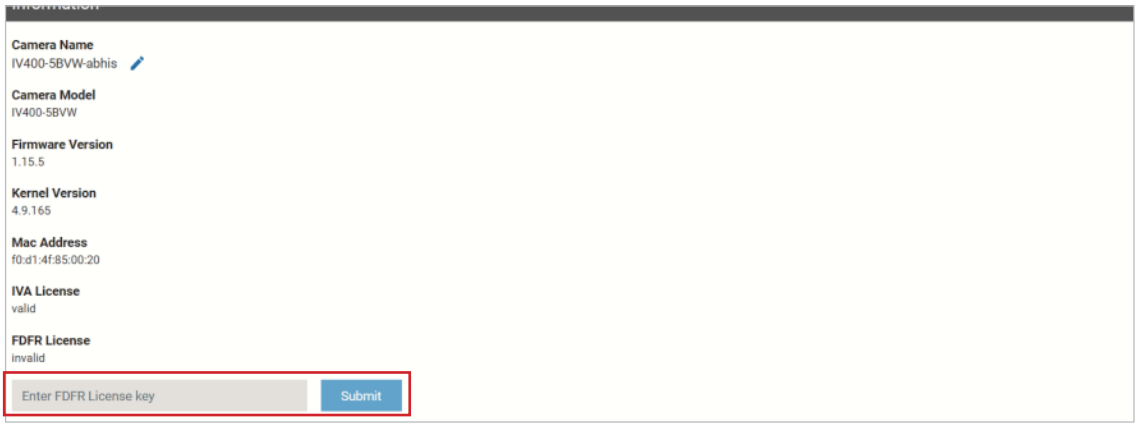


Figure 24: FDFR License

2. **FDFR License Validation**: Enter a FDFR License key, then select **Submit** to validate the license. Once validated, the camera's FDFR feature can be used.

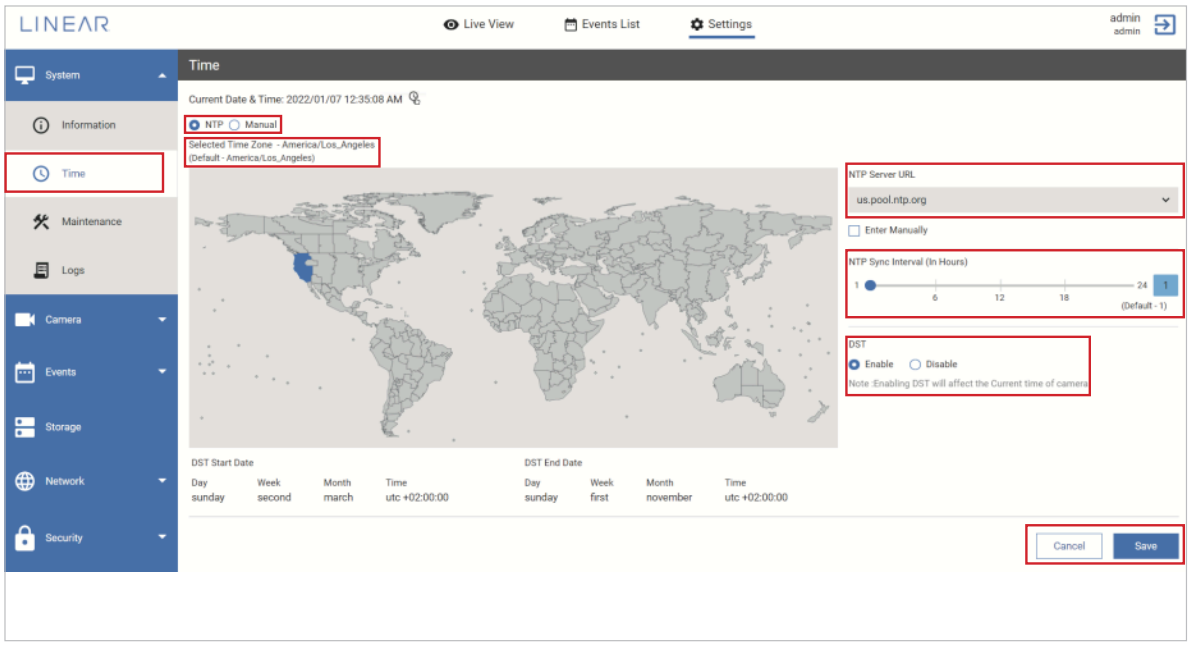
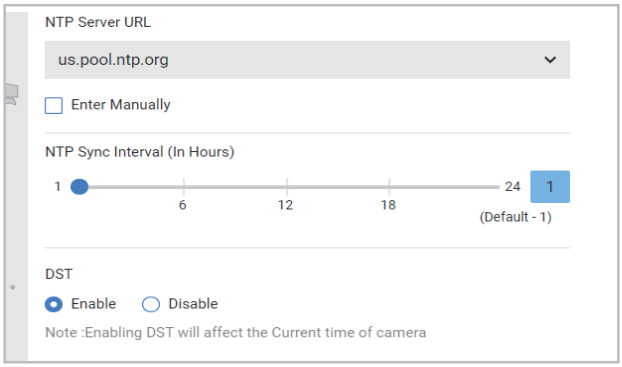


Figure 25: Set Date and Time via NTP

6.2 System > Time

Set the Date & Time for the IV400 camera. There are three methods available.



1. **NTP** - *Network Time Protocol* (NTP) synchronizes computer clocks by periodically querying an NTP Server. Date and Time settings for NTP are displayed.
   - **Select Time Zone**: On the map, click the desired zone.
   - **Selected Zone**: The selected location on the map is displayed.
   - **DST (Day Light Saving)**: After selecting a time zone, DST will be set to **Enable** by default (if applicable to the location). Click **Disable** to turn off DST.
   - **NTP Server URL**: For each region, an IP address or domain name for the timeserver can be assigned. With no IP address or domain entered, the Network Camera connects to the default time servers. For this option to take affect, the camera must have the access to the Internet.
   - **NTP Server Interval (In Minutes)**: Click on the slider option and move left or right to adjust the NTP Sync Interval time.
   - **Force Sync**: Click the checkbox to forcefully sync camera time with NTP server time whenever required.

Click **Save** to keep the new settings.

2. **Manual**: Manually Set the Date and Time by clicking on *Date* ( ) & *Time* ( ) and using the popup menus.
3. **Sync with Computer**: Click the checkbox to synchronize the camera's date and time with the computer's operating system.

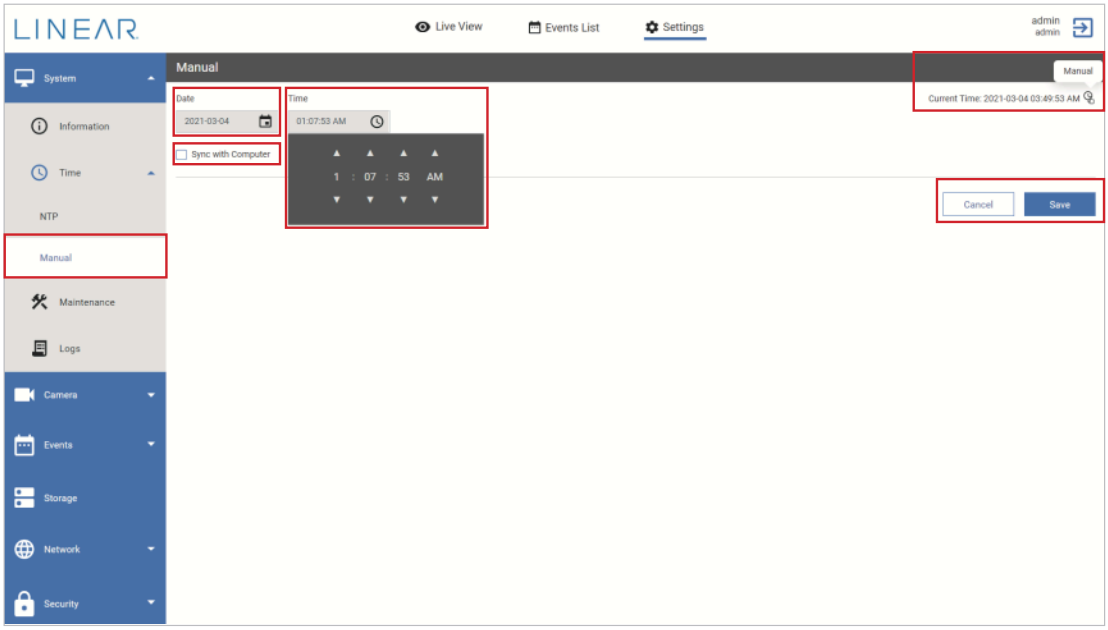


Figure 26: Set Date and Time Manually

Select **Save** to keep the updated date and time settings.

6.3 System > Maintenance

Use *Upgrade the camera firmware*, *Restore Default*, *Factory Reset* and *Reboot* options to perform camera maintenance on the IV400 camera.

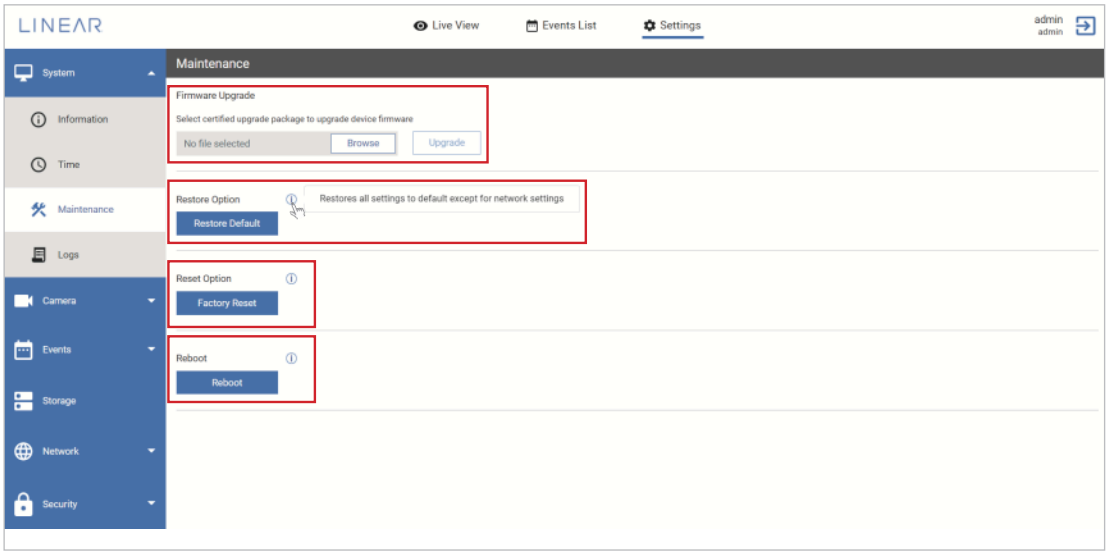
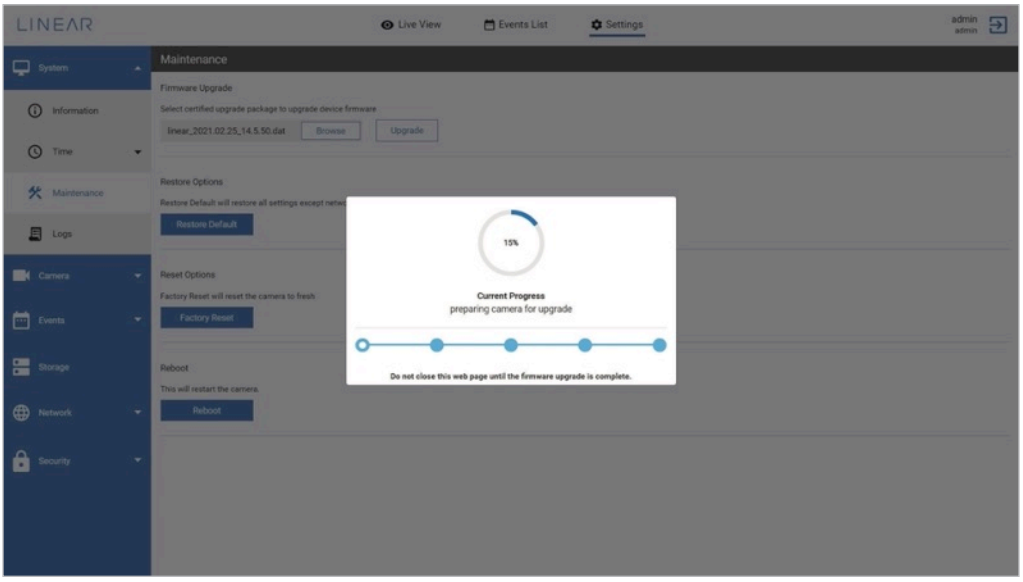


Figure 27: System > Maintenance



1. **IV400 Camera Upgrade**: This feature allows you to upgrade the firmware of your Network Camera.

To upgrade the firmware:

a. Download the latest firmware file from the link provided in the release document. The file is in <IV400-NORK-xxxxxxx>.dat file format.

b. Click **Browse**, and then locate the firmware ".dat" file in your computer.

c. Click **Upgrade**. The Network Camera will begin the process below and will reboot automatically when the upgrade completes.

- Upload firmware files to camera.
- Downloading firmware files on camera.
- Unpacking & Validating firmware files.
- Upgrading camera with new firmware.
- Rebooting the camera.

If the upgrade is successful: An **Upgrade Successful** message will appear on-screen. Click **OK** to validate the upgrade.

If upgrade process fails: a warning message will be appear on-screen. The previous firmware version will remain until a successful upgrade.

IMPORTANT: ***Do not power off the Network Camera or refresh the web UI of IV400 Camera while the upgrade process is in progress.***

2. **Restore Default**: This option restores the camera to default settings, taking 1-2 minutes to complete. The camera resets to default parameters for various Configuration settings other than the Network-IP setting. Other data such as Event, Logs, Users will also remain.

3. **Factory Reset**: Perform a factory reset on the camera, taking about 2-4 minutes to complete. The *Factory Reset* feature will wipe all configurations, data and logs from the camera.

   Once completed, the camera will operate with as it did straight from the factory. If troubleshooting attempts cannot return the camera to normal operation, a factory reset is an option to erase unforeseen problems preventing use of the IV400 Camera.

   Press **Factory Reset**, then click **Yes** to confirm. Once reset, use the default IP address of 192.168.0.230, user name "admin" and password "linear" to login. Follow the prompts to change the password from default.

4. **Reboot**: This feature allows you to reboot the Network Camera, taking about 1-2 minutes to complete. Click **Reboot**, then click **Yes** to confirm. If the network connection fails after rebooting, manually enter the IP address in the address field.

6.4 System > Logs

This feature allows you to view IV400 Camera logs (for example: *Time Stamp*, *Action*, *Applicant* and *Account Details*). View a list of all users who have accessed the system, as well as the actions they performed.

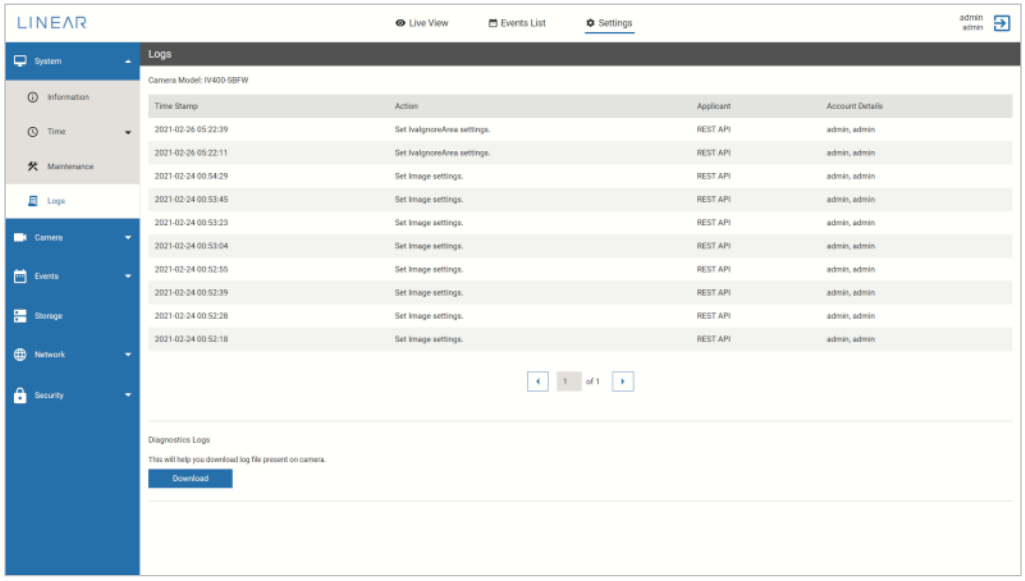


Figure 28: System Logs

Diagnostics Logs: These logs help discover the root cause of any failure on the camera.

To store log in local system: Click **Download**, confirm the download then click **Save** to store the log on the computer. *Please share this encrypted log file with Linear technical support for further troubleshooting.*

7. Camera

7.1 Camera > Video

Set various configuration related to Video settings.

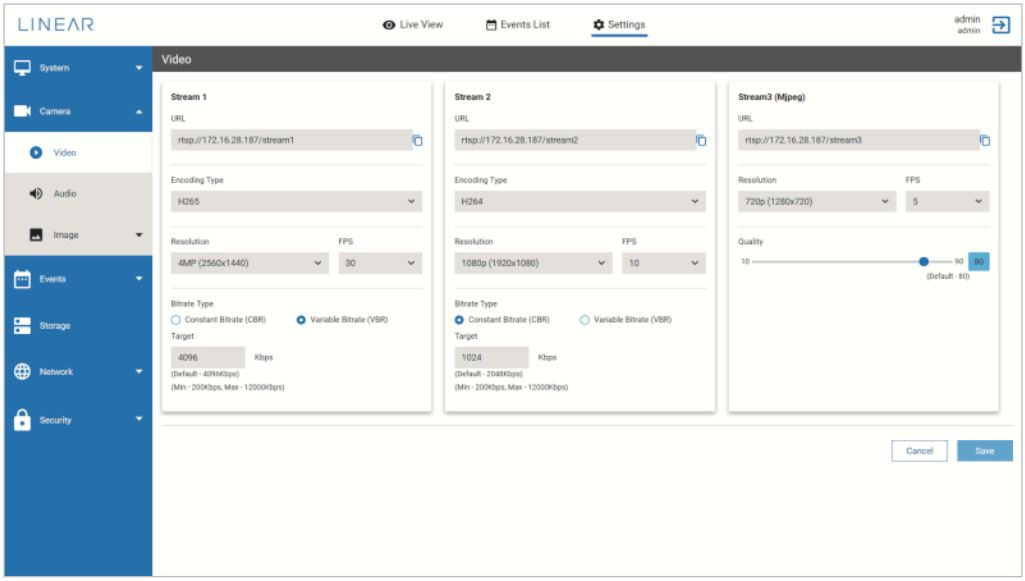


Figure 29: Video Settings

Adjust settings such as *Encoding Type*, *Resolution*, *Bitrate Type*, *FPS* and *Quality*. View three qualities of video streams, dictated by internet speed. Click **Save** when finished.

- **Stream 1**: Perform live streaming with highest resolution (up to 5MP).
- **Stream 2**: This is default stream used for live streaming. Video Analytics are available only when using Stream 2. It supports live streaming at medium resolution up to 1080P.
- **Stream 3 (Mjpeg)**: This stream supports live streaming at lowest resolution. This resolution option is not available for Live View. If required, live streaming is available using any third-party media player (such as VLC player).

1. **URL**: It contains the URL which can be used to play live streaming on third party media player like VLC.
   - RTSP (Real-Time Streaming Protocol) controls the delivery of streaming media.
   - By default, the port number is set to 554. If you want to use an VLC player to do live streaming, you must set the video mode to H.264 or H.265 and use the RTSP URL to request transmission of the streaming data with the correct login credentials.
   - URL: rtsp://<ip address>/<access name for stream 1 to 3> (for example: rtsp://192.168.0.230/stream1)
   - Copy the URL by clicking on icon available at end on URL field. Check live view streaming in a third party media player such as VLC.
2. **Encoding Type**: Select an encoding type (H264 or H265).
3. **Resolution**: This is the amount of detail the camera can capture, measured in pixels. Higher resolutions offer better quality.
4. **FPS (Frames Per Second)**: FPS is a measurement for the number of recorded images a camera will record each second. Low end digital video cameras typically have a frame rate of 30fps.

5. **Bit Rate**: Bit rate is defined by kilobits per second (Kbps). The higher the bit rate, the better the video quality.
   - **Constant Bit Rate**: Select this option to perform live streaming at constant bit rate, regardless of network bandwidth available.
   - **Variable Bit Rate**: Select this option to perform live streaming at variable bit rate that varies based to the network bandwidth available.

7.2 Camera > Audio

Select an audio *Encoding Type* and supported *Sample Rate*, and adjust *Mic* and *Speaker* settings for better audio quality during live streaming.

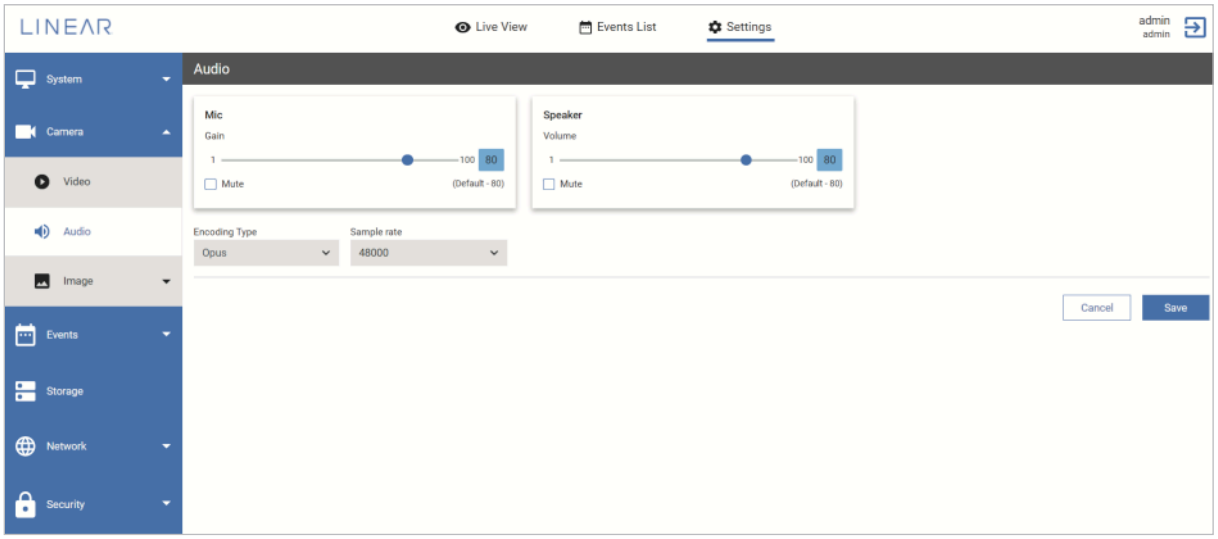


Figure 30: Audio Settings

1. **Mic-Gain**: Adjust microphone volume level by moving slider from 1%-100%.
2. **Mic-Mute**: Disable the Network Camera's microphone.
3. **Speaker-Volume**: Adjust speaker volume level by moving slider from 1%-100%.
4. **Speaker-Mute**: Disable the Network Camera's speaker.
5. **Encoding Type with Sample rate**: Select an encoding type from drop-down menu with its associated sampling bit rate:
   - G7.11A & G.711U support 8kHz & 16K=HZ sample rates.
   - G.726 is a speech codec standard setting, covering voice transmission at rates of 16, 24, 32, and 40k bits.
   - Opus encoding supports 48 kHz sample rate.

When finished, click **Save** to enable the settings.

NOTE: Audio encoding type ‘G.711A’ is not supported for .mp4 files.

7.3 Camera > Image

General

Enable overlay for *Date and Time* and *Video Analytics*. *Night Vision* options are available, as well as an option to *Flip* the Live View display. When finished making revisions, click **Save**.

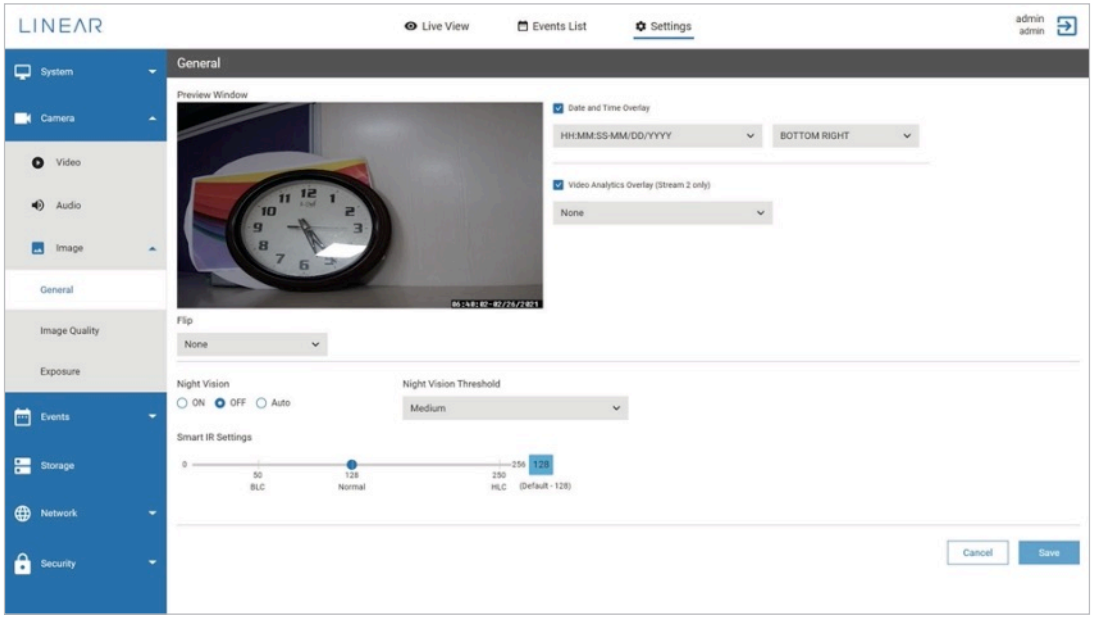


Figure 30: Image Settings

Preview Window: Previews the Live View display.

Date & Time Overlay: When enabled, use the two pull-down options to select a *Date and Time Overlay* format, as well as where the overlay will be located on the Live View screen.

Video Analytics Overlay (Stream 2 Only): Select required option available in dropdown.

- **None**: video analytics overlay will not be displayed for any motion observed.
- **Video Analytics Tracking**: a bounding-box will be displayed with its event-type.
- **Face Recognition Tracking**: a bounding-box surrounding a recognized face displays the known person's name. "Unknown State" will be displayed for unknown detected faces.

Flip Action: flip Live View. Options include *None*, *Rotate*, *Vertical* and *Horizontal*.

Night Vision: Enable or disable Night Vision. Options include *On*, *Off* or *Auto*.

Night Vision Threshold (Only for Auto mode): Select *High*, *Medium* or *Low*, based on lighting condition.

Smart IR Settings: Slide the pointer to balance lighting for Live View.

Infrared LED cameras have the capability to capture video in low light or no light areas. Infrared cameras (IR) are sometimes referred to as Night Vision Security Cameras. Infrared cameras have IR LEDs positioned around the outer edges of the camera lens, which provides the camera its Night Vision.

Infrared Cameras can capture acceptable video in total darkness. Even a small amount of ambient light helps the overall night vision capability of IR cameras.

Image Quality

Use the sliders to adjust image quality settings, or use the pull-down menu to select a *White Balance* setting. When finished making revisions, click **Save**.

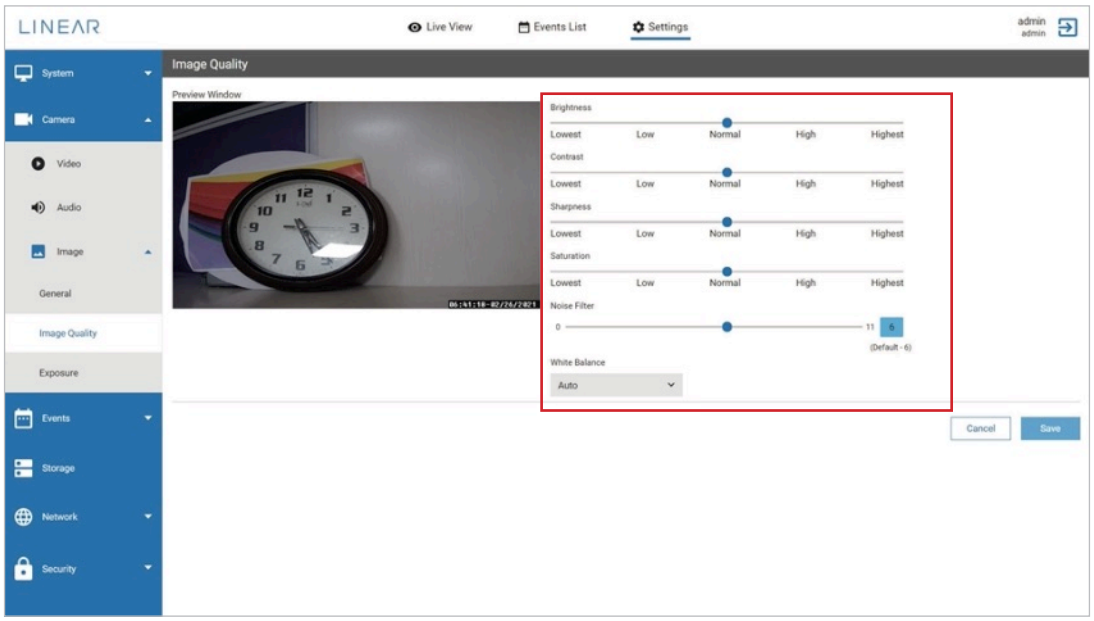


Figure 31: Image Quality

1. **Preview Window**: Previews Live View.
2. **Brightness:** Adjust the overall lightness or darkness of the image. When set to the lower side, contrast is provided to highlight areas and the medium tone is made darker. When set on the higher side, the scene can be brighter while overblown highlights are prevented.
3. **Contrast**: Adjust the range between lightness and darkness in the processed image. It controls the gradation between the darkest and lightest portions of the image.
4. **Sharpness**: Adjust the strength of a subject's contours. A lower number softens an image, and a higher number setting sharpens an image. Keep in mind that increasing video sharpness increases video noise.
5. **Noise Filter**: This noise filter is used to reduce visible noise.
6. **Saturation**: Adjust the color intensity in the image. When saturation is set toward the lower side, the image looks lighter and less vivid. When set toward the higher side, the image appears darker and more vivid.
7. **White Balance** (*On*, *Off* or *Auto*): This setting defines how the camera processes video images to render true colors in a scene. When this setting is **On**, the camera maintains automatic color balance for most lighting conditions, including scenes that are outdoors, scenes with changing lighting conditions or in scenes with more than one type of light source. Human eyes and brain compensate for different types of light. Digital cameras need help to emulate this process to compensate for different types of lighting and render a white object white.

Exposure

A photograph's exposure determines how light or dark an image appears when captured by camera. The IV400 has various available exposure camera settings. When finished making revisions, click **Save**.

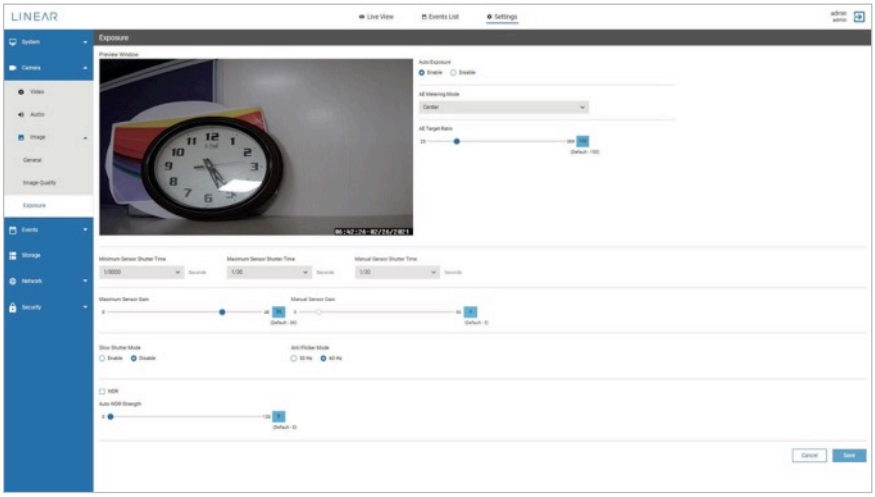
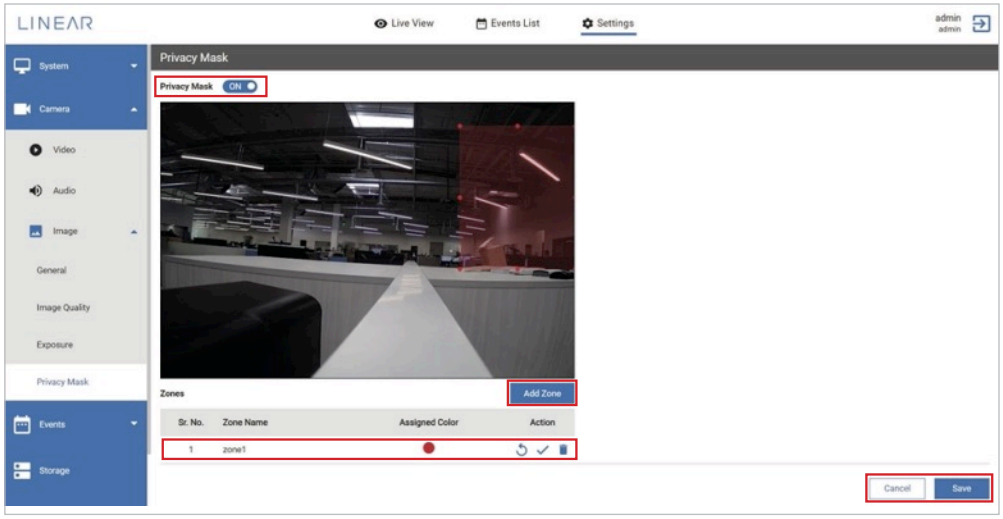


Figure 32: Image Exposure

1. **Preview Window**: It is actual preview of Live View-Image.
2. **Auto Exposure**: Enabled this setting to auto-adjust exposure level. Disable this option to set exposure manually.
3. **AE Metering Mode**: Metering allows your camera to determine a correct shutter speed and aperture, depending on the amount of light detected by the camera. The metering mode refers to the manner in which a camera determines exposure. Cameras generally allow a selection of spot, center-weighted average or customized metering modes. Set the exposure according to selected settings:
   - **Spot**: Only evaluates the light around your focus point and ignores everything else. It evaluates a single zone/cell and calculates exposure based on that single area.
   - **Center**: Evaluates the light in the middle of the frame and its surroundings. It ignores the corners.
   - **Average**: Best used when shooting low contrast scenes such as patterns on walls or floors.
   - **Custom**: allows you to customize settings, depending on the scene.
4. **AE Target Ratio**: Slide the pointer to set the AE Target ratio of Auto Exposure.
5. **Minimum Sensor Shutter Time**: When a slower shutter speed is selected, a longer time passes from the moment the shutter opens and closes. More time is available for subject movement to be recorded as a blur.
6. **Maximum Sensor Shutter Time**: Faster shutter speeds can cause a moving subject to appear unnaturally frozen.
7. **Manual Sensor Shutter Time**: Set the Sensor shutter time manually.
8. **Maximum Sensor Gain**: A digital camera setting that controls the amplification of the signal from the camera sensor. Use the slider to set the Maximum Sensor Gain.
9. **Manual Sensor Gain**: Set the sensor gain manually. Use the slider to set the Maximum Sensor Gain.

10. **Shutter Speed**: A camera's shutter speed determines when the camera sensor will be open or closed to incoming light. The shutter speed specifically refers to how long this light is permitted to enter the camera. A faster shutter speed means a shorter exposure time. Excessively fast shutter speeds can cause a moving subject to appear unnaturally frozen.
11. **Slow Shutter Mode**: When a slower shutter speed is selected, a longer time passes from the moment the shutter opens and closes. More time is available for movement in the subject to be recorded as a blur. Enable or disable Slow Shutter Mode as required.
12. **Anti-Flicker Mode**: Anti-Flicker is should be used if you are in a room with fluorescent lights or you plan on shooting a television screen. Often when using a camera in these environments, there is a noticeable flicker. This setting helps reduce flicker.
    - Sets the Anti-Flicker mode on
    - Setting it to 50Hz or 60 Hz depends on grid frequency
    - North and South America: 60Hz
    - Europe and Asia: 50Hz
13. **WDR (Wide Dynamic Range) Strength**: Sometimes part of image is extremely dark, and the other part is extremely light. This makes it difficult to capture the information, especially during surveillance of area like a store entrance. WDR balances that lighting to produce a clear image. Use the slider to balance lighting for the image with wide Dynamic Range of lighting.

Privacy Mask



Add Privacy Zones to indicate areas of the camera's view that will not trigger camera recording.

Privacy Mask Switch: Click the switch **ON** to enable the *Privacy Mask* option. Click to **OFF** to disable the option.

Add Zone: Click **Add Zone** to add a zone to the camera feed. Use the handles on the zone to shape the zone to cover the areas of the screen that will not trigger camera recording.

Click **Add Zone** again, and repeat the process to add more zones.

ClickClick the *Undo* icon (↺) to revert back to the zone's previous state. Click the *Edit* icon again to return to the edit process.

Click (✓) to lock the zone's position.

Click (🗑) to delete a zone.

Click **Save** to save Privacy Mask settings.

7.4 Events

General

Adjust settings for various general event options.

Events are generated whenever there is change in scene where the camera is focusing. For example, someone tampering with a camera, an object is detected in the scene, motion is detected or if someone is dwelling or loitering in the scene. There are various settings available for event generation.

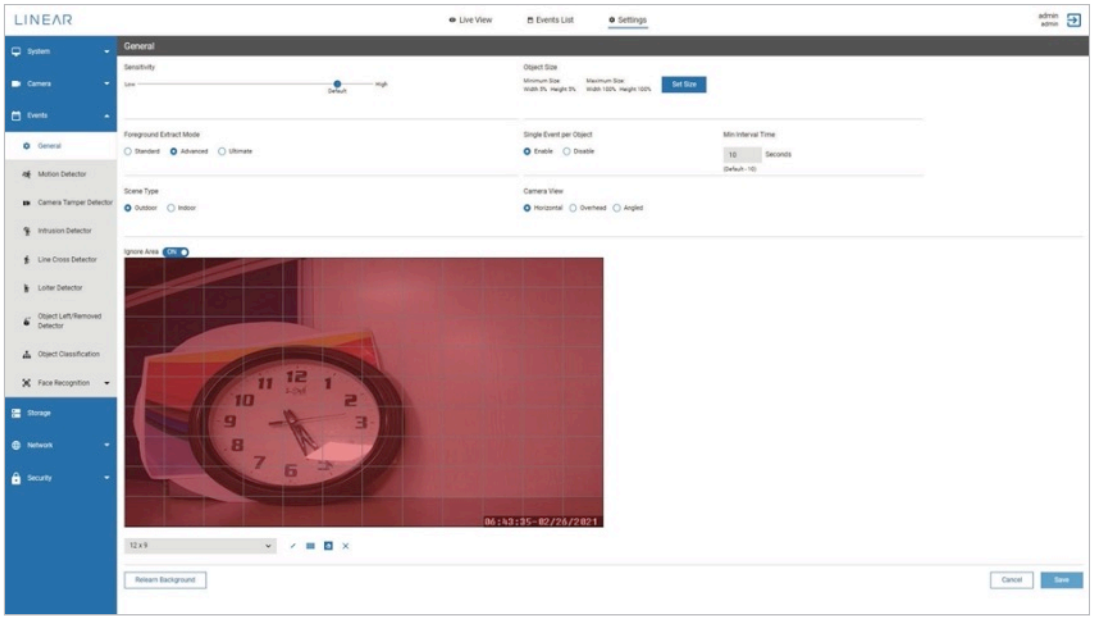


Figure 33: Events-General Settings

1. **Sensitivity**: Use the slider to select the sensitivity between *Low* and *High*.
2. **Object Size-Set Size**: Set the *Minimum Size* or *Maximum Size* for an object for event generation in scene.
3. **Foreground Extract Mode**: Select the mode as *Standard*, *Advanced* or *Ultimate*.
   - **Standard**: Background is clear.
   - **Advanced**: Background is blurred or not clear.
   - **Ultimate**: Background is blurred or not clear. It's more effective than the *Advanced* option.
4. **Single Event per Object**: When enabled, one event is generated per object until the object disappears from the scene. When disabled, the application continuously fires an event for same object until it exits from scene (at a regular interval, specified under Min. Interval Time).

   Minimum interval is set as 10 seconds by default.

   You can set the minimum interval when you disable *Single Event* per *Object*.
5. **Scene Type**: Specify the scene as *Outdoor* or *Indoor*. Accordingly, IVA will work because many parameters will change if the camera is kept indoor or outdoor (for example: Pattern of light in scene (Day-Night), Climate condition, etc.).

6. **Camera View**: Set the camera view as *Horizontal*, *Overhead* or *Angled*. The camera estimates the angle in which event generation will be more accurate.
7. **Ignore Area**: This option is defined for the area of the scene that does not come under region of interest. It also helps improve performance and reduces false alarms. Ignore Area examples include:
   - Part of scene which is not required to process for an event generation.
   - Part of scene in which there is no movement of an object or person.
8. To configure *Ignore Area* settings for camera:

   A. Click the toggle switch to **ON** to activate *Ignore Area*. The visible area is displayed in grid format.

   B. Perform any one of the following procedures:
   - **Select Grid Size**: Select one of the grid sizes available in the dropdown (v).
   - **Select Area**: Using this option (), select the required number of cells from the grid for Ignore Area.
   - **Select Area (All)**: Using this option (), select entire grid for Ignore Area.
   - **Erase Area**: Using this option (), clear the required number of cells from the grid for Ignore Area.
   - **Erase Area (All)**: Using this option (×), clear entire grid for Ignore Area.

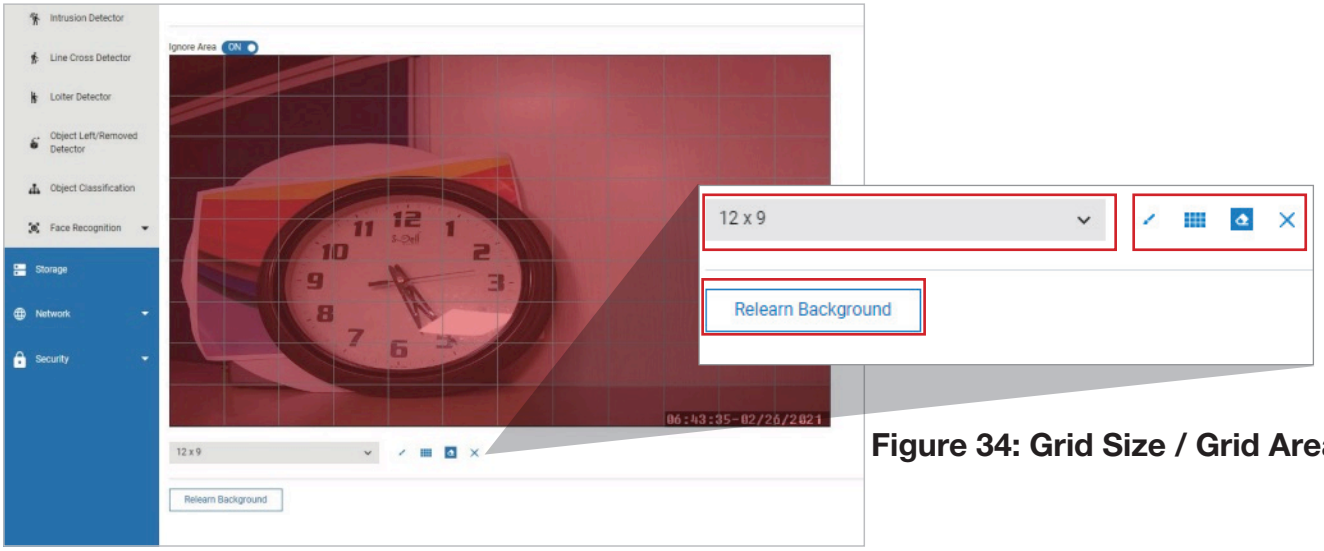


Figure 34: Grid Size / Grid Area

8. **Relearn Background**: Click this option to have the application relearn the background from current camera scene.

When finished adjusting settings, click **Save**.

Motion Detector

Motion detection is a monitoring algorithm that detects motions that triggers the surveillance camera to begin capturing an event. An advanced motion detection surveillance system can analyze the type of motion to determine if it warrants an alarm.

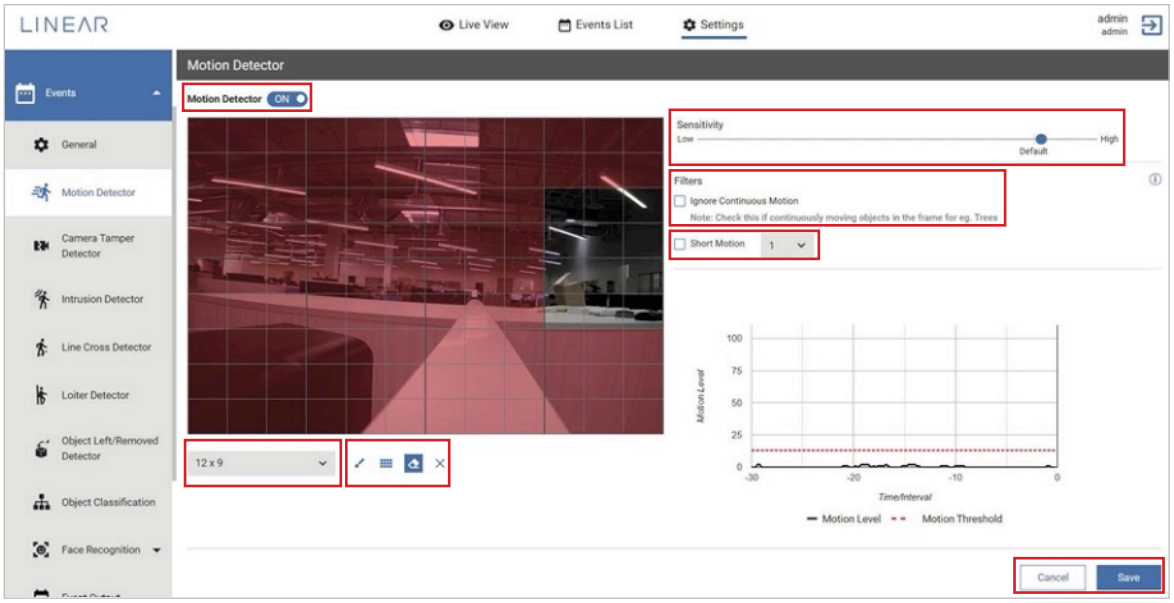


Figure 35: Motion Detector

To enable camera *Motion Detector*:

1. Click the toggle switch to turn on the *Motion Detector* toggle.
2. Use the slider to select *Sensitivity* from the scale of *Low* to *High*.

The visible area is displayed in grid format and perform any one of the following procedures.

- **Select Grid Size**: Select one of the grid sizes available in the dropdown (v).
- **Select Area**: Using this option (), select required number of cells from the grid for motion event detection.
- **Select Area (All):** Using this option (), select entire grid for motion event detection.
- **Erase Area**: Using this option (), clear required number of cells from the grid for motion event detection.
- **Erase Area (All)**: Using this option (×), clear entire grid for motion event detection.

When completed with the settings on this page, click on **Save**. All the events captured will be reflected within the *Events List* tab.

1. Check *Ignore Continuous Motion* box if continuously moving objects are in field of view such as trees moving.
2. Enable *Short Motion* to filter out activity that occurs for less than the specified duration. Select the duration from the drop down list 1 - 5 seconds.

Camera Tamper Detector

Camera Tamper Detector is a setting within the IP camera that will send a notification when the camera has been tampered with. The alert signals your video management system to monitor recorded events.

Light Change: Light ON and Light OFF events are generated according to the light condition in the scene.

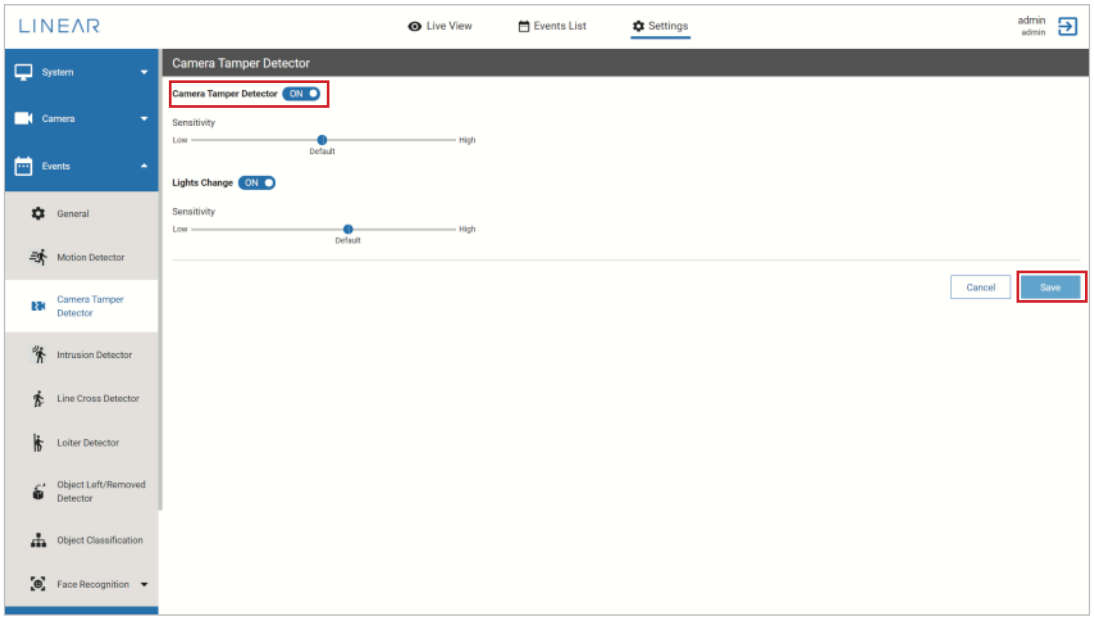


Figure 36: Camera Tamper Detector

To enable camera tamper detection:

1. To enable camera *Tamper Detection* and *Light Change*, click each option's toggle switch to the **ON** setting.
2. Move the slider left or right to adjust sensitivity toward *Low* or *High*.

When finished adjusting settings, click **Save**.

All the events captured will be reflected in the *Events List* tab.

Intrusion Detector

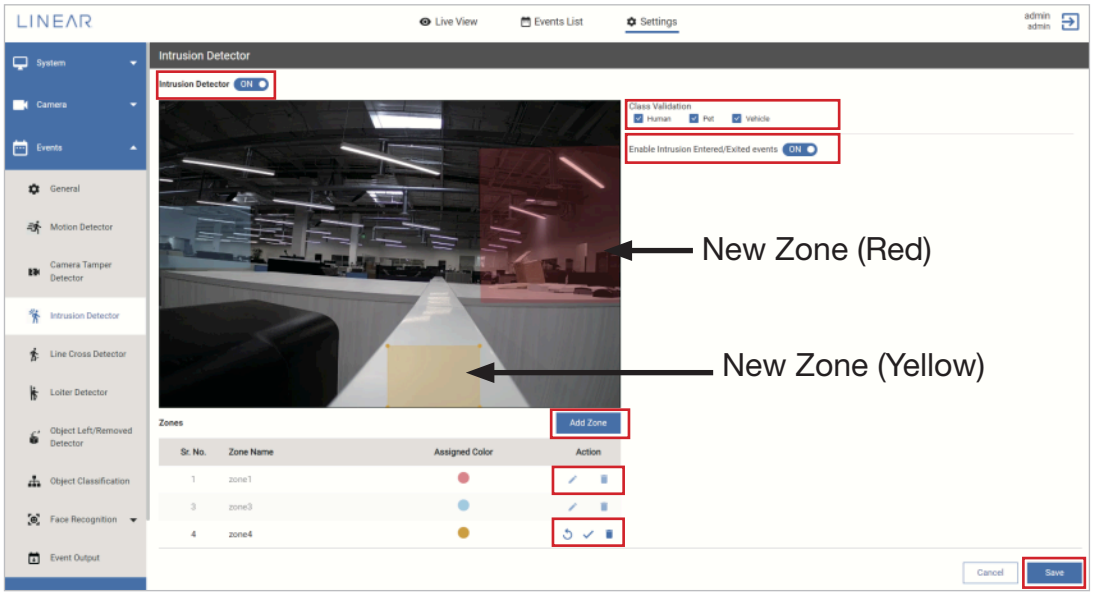


Figure 37: Intrusion Detector

To enable Intrusion detector:

1. Toggle *Intrusion Entered/Exited events* **ON** or **OFF**.
2. **Class Validation:** Click check box to filter the intrusion validation based on classification as a *Human*, *Pet* or *Vehicle*.
3. Perform any one of the following procedures:
   - **Add Zone**: Click **Add Zone**. Each newly created zone (Rectangle) will be listed under Zones list in a unique color. To move the new zone, simply drag-drop to a new position in scene.
   - **Edit Zone**: Clicking the *Edit* icon ( ) adjacent to the zone to be edited. Select and drag the corners of a zone to set exact intrusion areas. Click the *Undo* icon ( ) to revert back to the zone's previous state. Click the *Edit* icon again to return to the edit process. To save changes, click the *Save* icon ( ).
   - **Delete Zone**: Click the *Delete* icon ( ) to remove a zone.

When finished adjusting settings, click **Save**.

All the events captured will be reflected in the *Events List* tab.

Line Cross Detector

Line Crossing detects a moving object that crosses over a defined line. The entry/exit direction can be defined. The line can be drawn in any direction. Event notifications can be sent when a line is crossed in a specific direction, or a count can be maintained to determine entry/exit counts.

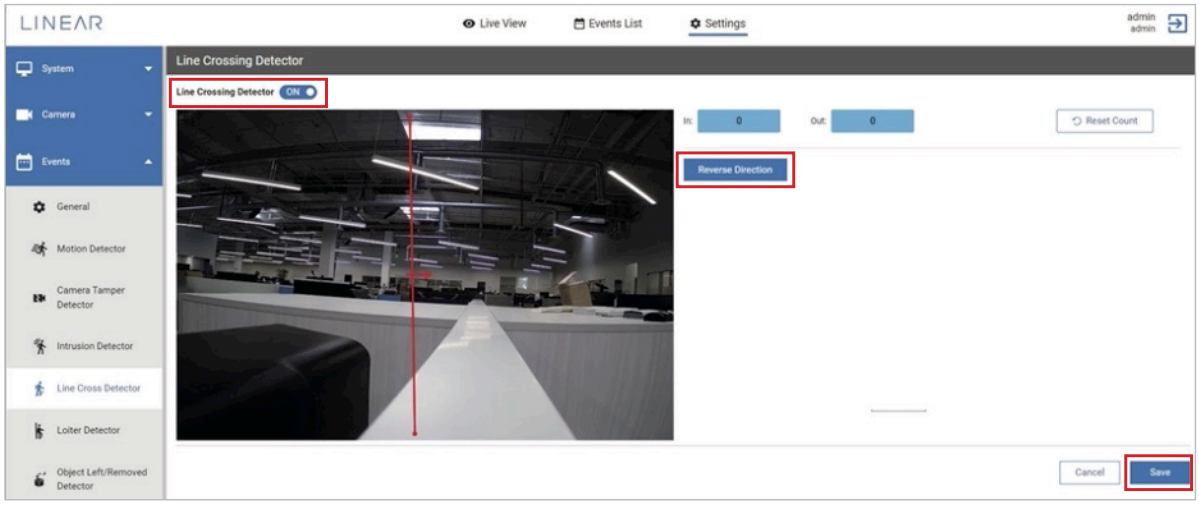


Figure 39: Line Crossing Detector

To enable Line Cross Detector:

1. Click the *Line Cross Detector* toggle switch to the **ON** setting.
2. Perform any one of the following procedures:
   - **Draw Line**: Add a horizontal or vertical line in the scene (Live View) by drawing a line on the display. An event will be generated when an object crosses the line in the designated direction.
   - **Reverse Direction**: Click this option to reverse the direction arrow displayed on the newly drawn line.

When finished creating the line crossing, click **Save**.

All the events captured will be reflected under *Events List* tab.

Loiter Detector

The Loitering event detects objects standing or lingering in a selected area. This event detection is based on *Loitering Detector Time*. It can be deployed indoors/outdoors, day or night, at any venue.

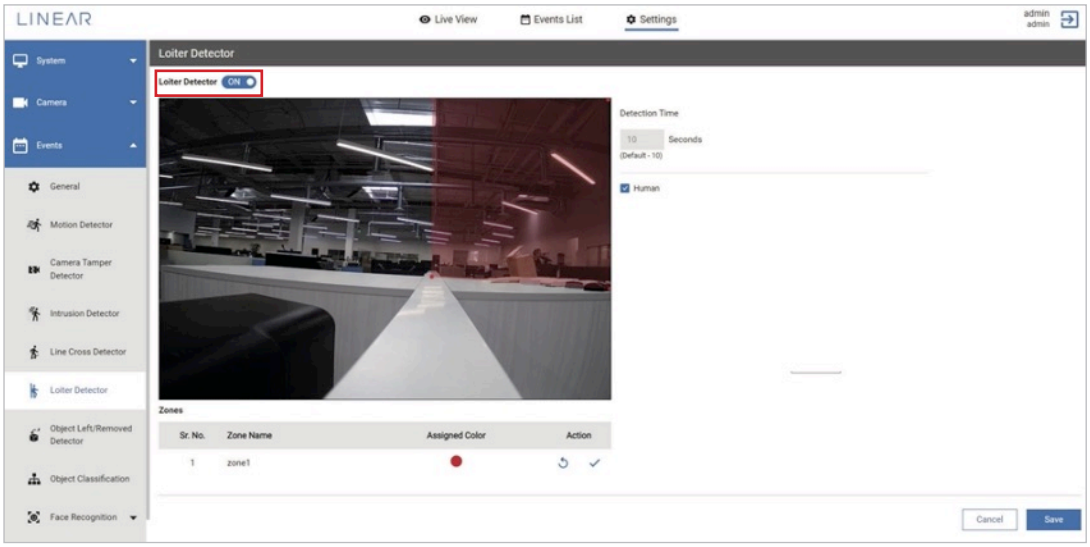


Figure 40: Loiter Detector

To configure Loitering Detector settings for camera:

1. Click the *Loiter Detector* toggle switch to the **ON** setting.
2. Perform any one of the following procedures:
   - **Add Zone:** Click Add Zone. Each newly created zone (Rectangle) will be listed under Zones list in a unique color. To move the new zone, simply drag-drop to a new position in scene.
   - **Edit Zone:** Clicking the Edit icon ( ) adjacent to the zone to be edited. Select and drag the corners of a zone to set exact intrusion areas. Click the Undo icon ( ) to revert back to the zone's previous state. Click the Edit icon again to return to the edit process. To save changes, click the Save icon ( ).
   - **Delete Zone:** Click the Delete icon ( ) to remove a zone.
   - **Detection Time**: Set loitering detection time in seconds.

When finished setting up the detector, click **Save**.

All the events captured will be reflected under *Events List* tab.

Object Left/Removed Detector

Object Left/Removed Detector identifies if an object is left or removed from the scene. *Object Left* detects if an object that has been left unattended for too long a period of time. It looks for objects that are not part of the normal scene. *Object Removed* can detect and alert when a specific object has been removed from the scene.

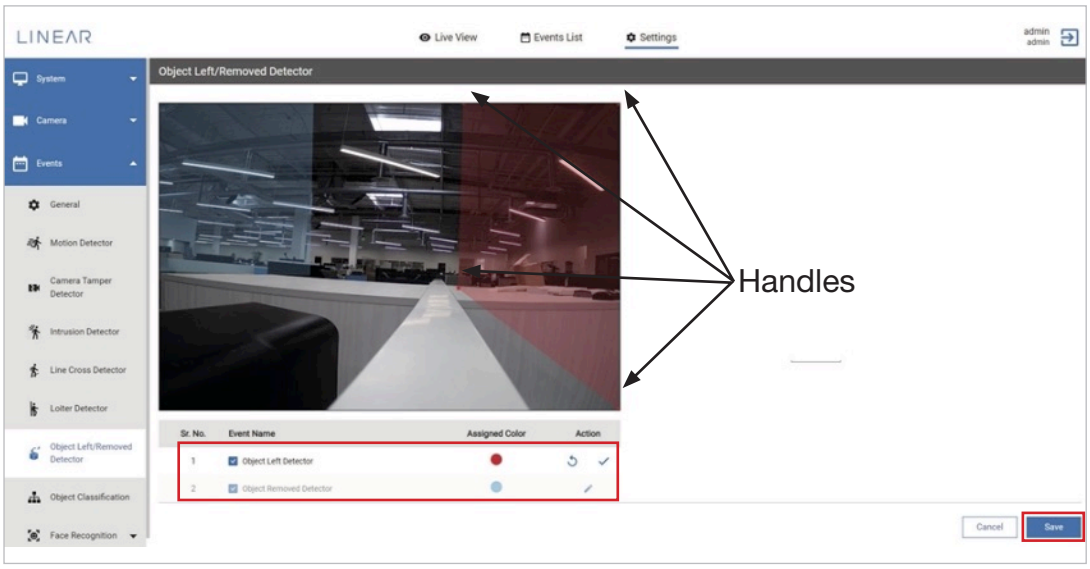


Figure 41: Object Left/Removed Detector

To configure *Object Left/Removed* settings for camera, click the checkbox for *Object Left Detector* or *Object Removed Detector* to enable the detector.

Use the four handles on the red or blue detection areas to shape that as needed.

When finished making changes, click **Save**.

All the events captured will be reflected under *Events List* tab.

Object Classification

Object Classification uses Deep Learning AI technology to monitor for *Humans*, *Vehicles* or *Pets*. The camera will notify only when an object of interest is detected, According to motion of any object (Human, Vehicle or Pet), an event is generated.

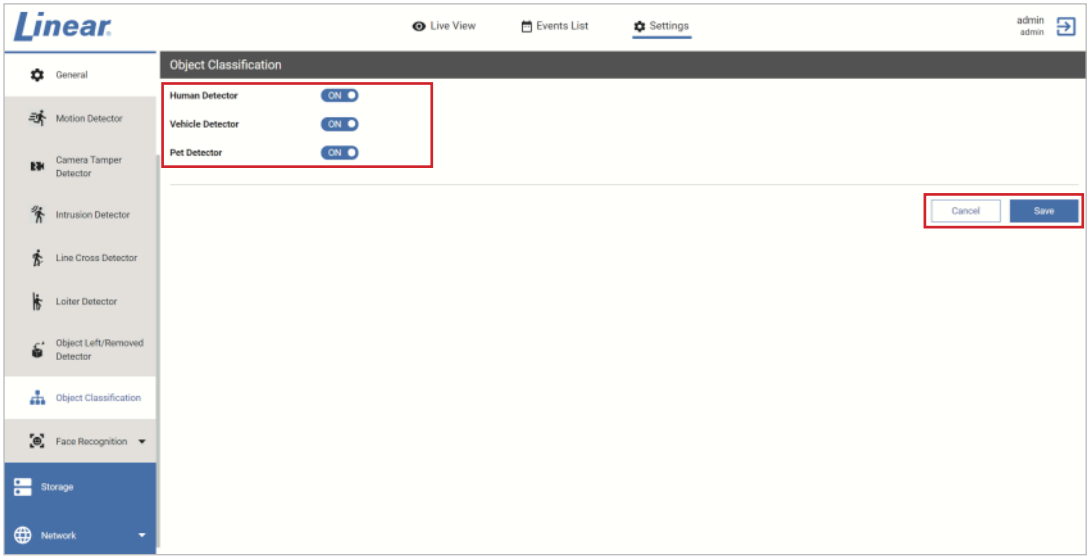


Figure 42: Object Classification

To enable *Object Classification*:

To configure *Object Classification* settings for camera, click the *Human Detector*, *Vehicle Detector* or *Pet Detector* to toggle switch to the **ON** setting.

When finished making changes, click **Save**.

All the events captured will be reflected under *Events List* tab.

7.5 Storage

This feature allows storage of the “live streaming data or event data” in .mp4 format on an external SD Card and explains how to manage the local storage on the Network Camera.

If the SD Card setting is enabled, avoid using FTP for video storage to avoid load (heavy data) processing. Either an SD Card or FTP server can be used to store event data.

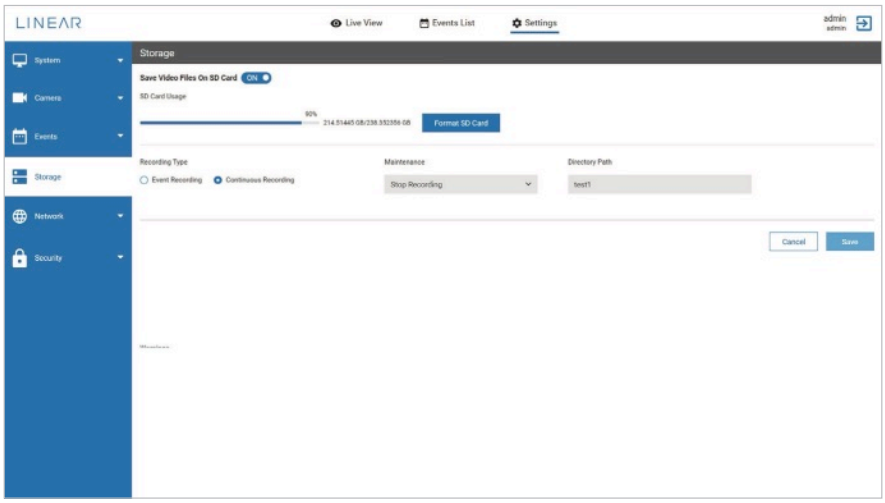


Figure 49: Storage

1. **Save Video Files on SD Card**: Click the toggle switch to **ON** to enable this parameter **only if the SD card is already inserted in an SD-card slot of any IV400 camera.** SD card storage usage is displayed in %.
2. **Format**: Delete (clear all) existing data stored on SD Card. Click **Format**, then follow on-screen instructions.

NOTE: If an SD Card exists in a camera, and the SD Card cannot be enabled, perform a ‘Format (Vfat format)’ action, so the SD Card will be compatible with IV400 Camera Hardware.

3. **Recording Type**: There are two modes available:
   a. **Event Recording** – In this mode, only the events generated in front of IV400 Camera are recorded. Event data is stored in .mp4 format to the selected directory path. For each event detected, a folder is created with the combination of “<Date>< Timestamp>” having 6 sec .mp4 clips under directory path provided for SD card.
   b. **Continuous Recording** – Select this mode if you want to enable continuous recording on an SD Card. A folder (Name) is created with the combination of “<Date>< Timestamp>” to directory path provided.
4. **Maintenance**: Select *Stop Recording* or *Cyclic Recording*. These options are only activated when the SD card storage capacity exceeds more that 90%.
   a. **Stop Recording** – Select this option if you want to enable stop recording.
   b. **Delete Older Files** – Select this option if you want to delete older files. When the maximum capacity is reached, the oldest file will be overwritten by the newest.
5. **Directory Path**: Choose the directory path to save the recordings on SD Card.

NOTES:

- The system supports vfat format to make an SD Card compatible with IV400 cameras.
- Only Insert/Remove the SD Card with the system power OFF to ensure proper SD Card functionality, and prevent SD Card corruption.

7.6 Network

This section explains how to configure a *wired* network connection for the Network Camera.

Select this option when the Network Camera is deployed on a local area network (LAN) and is intended to be accessed by local computers.

It's necessary to configure the server settings so that the Network Camera will know the action to take (such as where the server sends media files) when any event is generated.

There are four server types available for configuration: *SMTP/Email*, *FTP*, *HTTP Post (Server)* and *SD Card* storage.

Static Setting

Allows you to manually configure the IP setting with all the information necessary for successful network communications.

Default static IP for an IV400 camera is **192.168.0.230**.

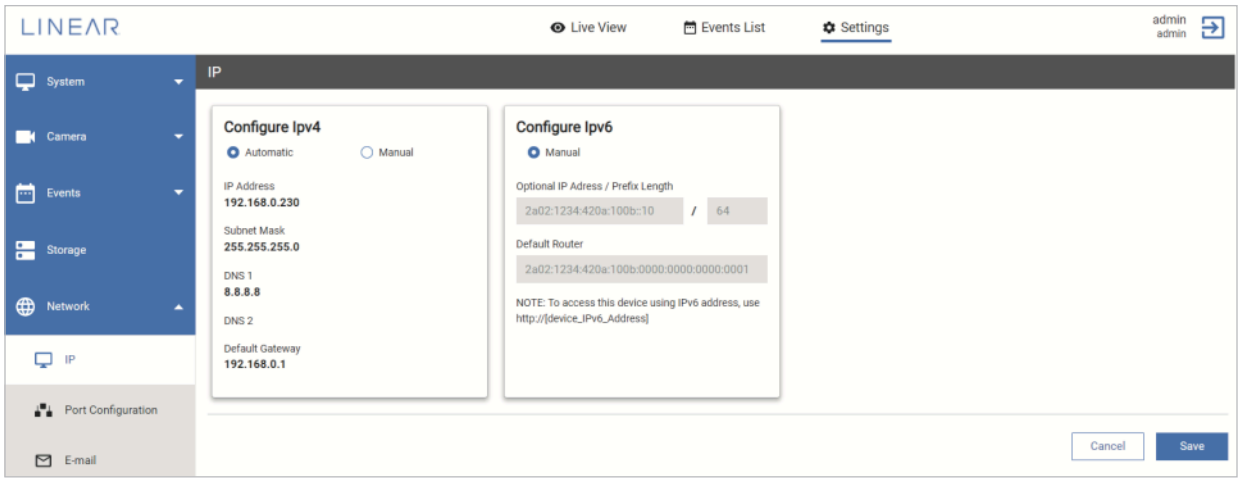


Figure 50: Network-Static

IP Address: Select *DHCP* or *Static IP* as required. The IP address will be displayed in IP Address field.

Subnet Mask: This is used to determine if the destination is in the same subnet. The default value is “255.255.255.0”.

Primary DNS1: The primary domain name server that translates hostnames into IP addresses.

Secondary DNS2: Secondary domain name server that backups the Primary DNS.

Default Gateway(router): This is the gateway used to forward frames to destinations in a different subnet.

An invalid router setting will disable the transmission to destinations across different subnets.

To configure Network IP settings:

1. Select required method (DHCP or Static) for IP configuration.
2. Edit all required IP related details, and click **Save**.

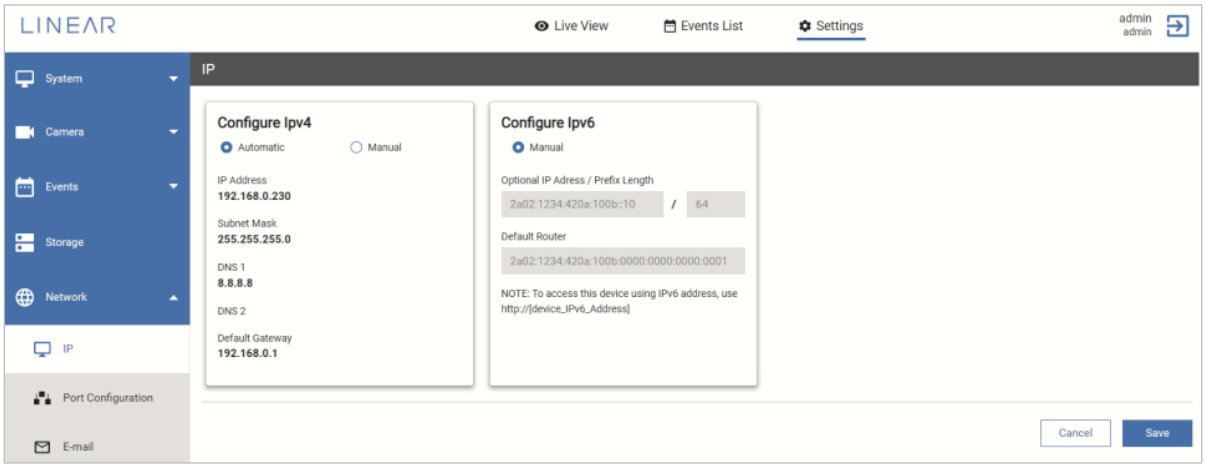


Figure 51: Network-DHCP

DHCP (Dynamic Host Configuration Protocol) Settings

DHCP is a dynamic network management protocol used to assign an Internet Protocol (IP) address to any device or node on a network, so they can communicate using IP.

Select this option to obtain an available dynamic IP address assigned for the IV400 Camera.

DHCP can be used to initially setup a surveillance system, but it is recommended that surveillance and access control systems have permanent static IP Addresses.

Port Configuration

This feature allows mapping new ports to HTTP, HTTPS for accessing the IV400 web interface, as well as mapping new port for RSTP (to perform live streaming using third party media player like VLC) instead of default ports.

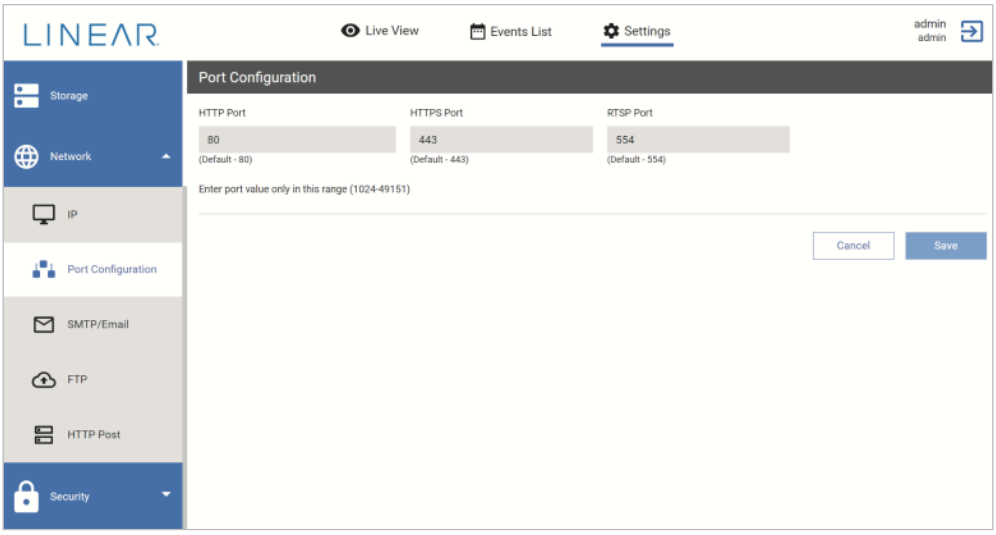


Figure 52: Network-Port Configuration

To configure Network Port Configuration settings:

2. Enter valid port in HTTP, HTTPS and RSTP.

3. Click **Save**.

Try to access IV400 Camera web UI with the newly introduced port using HTTP and HTTPS. Also, for live streaming on third party application like VLC, the RTSP port will be used.

SMTP/Email

Send event notification alerts via Email whenever an event is generated by the IV400 Camera.

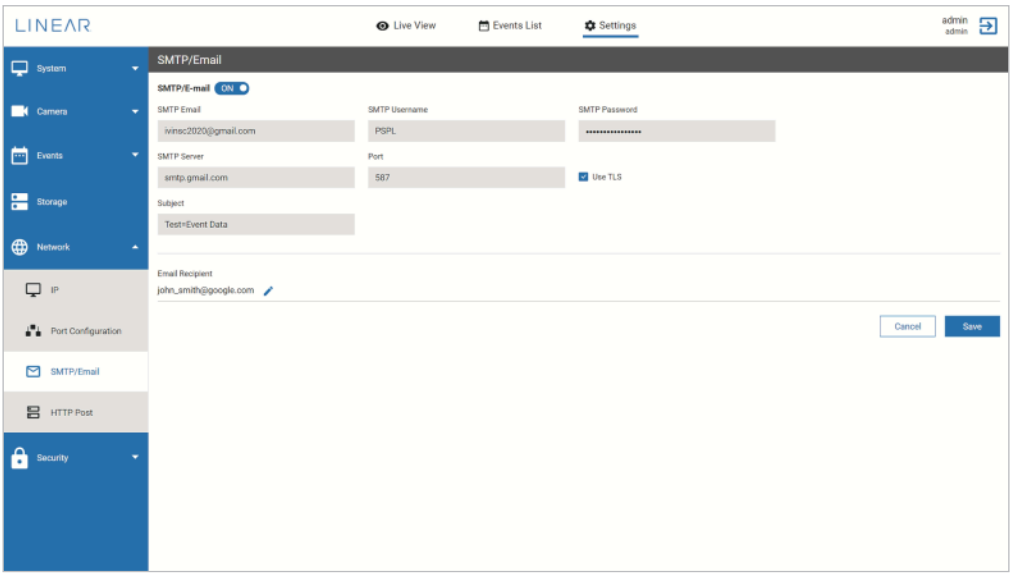


Figure 53: Network-SMTP/Email

To configured the SMTP/Email for IV400 Camera:

1. Enter all required data in each field as mentioned above (see below).
2. Click **Save**.

All event alert or data will be sent via email to respective recipient email address

SMTP Email: Enter the valid sender email address.

SMTP Username: Enter the user name of the email account.

SMTP Password: Enter the password of the email account.

SMTP Server: Enter the domain name or IP address of the email server.

Port: Enter valid port number associated with SMTP server.

Use TLS: If your SMTP server requires a secure connection, then click the **Use TLS** check box.

Subject: Enter the subject line for sending email to recipient.

Email Recipient: Enter the valid email address of recipient.

FTP

This feature allows you to send video (events data) to an FTP Server whenever any event is generated by the IV400 camera. Also new folder (Folder Name: Mac ID of IV400 Camera) gets created on FTP server which will have recorded event data as per '<Date><Timestamp> with 6 seconds .mp4 clips each.

End user needs to add require FTP login details as below example.

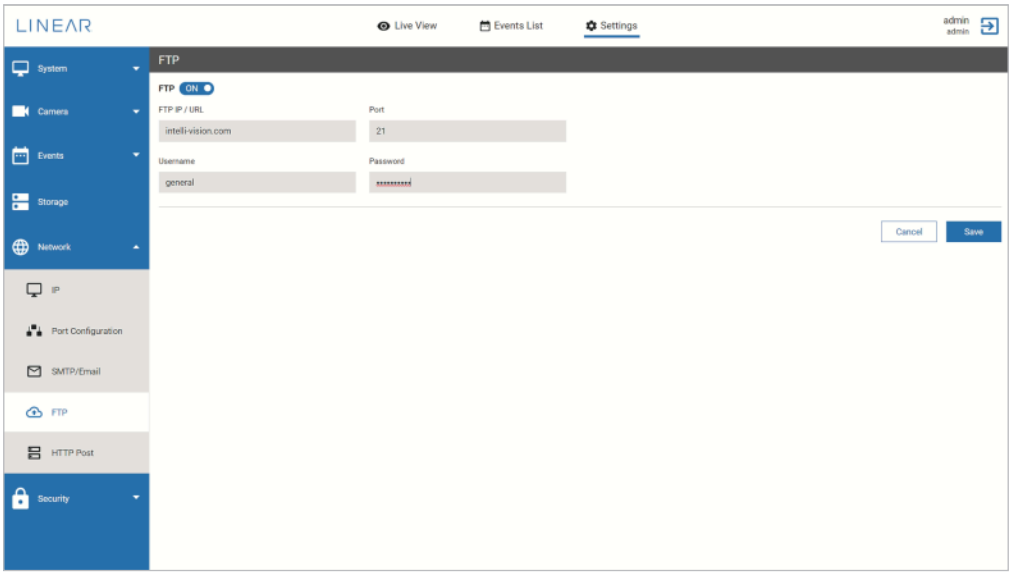


Figure 54: Network-FTP

To configure the FTP for IV400 Camera, follow below steps:

1. Enter all required data.
2. Click **Save**.

All event alert or data will be uploaded on the FTP Server.

NOTE: Use the FTP server to store event data only when the SD Card feature is disabled.

FTP IP / URL: Enter the FTP server URL.

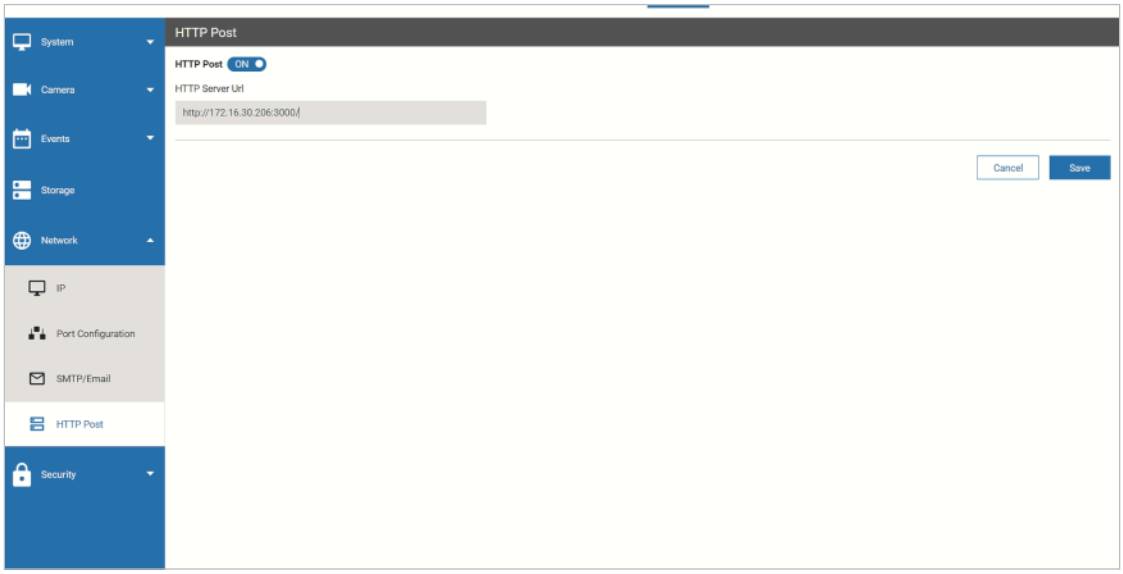
Port: Enter manually required valid port number associated with FTP server.

Username: Enter the FTP account user name.

Password: Enter the FTP account password.

HTTP Post

Send event notification alerts data to an HTTP Server whenever an event is generated.



Network-HTTP Post

To configure the HTTP Post for IV400 Camera:

1. Enter the server URL.
2. Click **Save**.

All event alert or data will be uploaded to the HTTP Server in json format.

HTTP Server URL: Enter the URL of the HTTP server to receive event data.

7.7 Security

Users

The Admin User can add a new user, change user passwords or delete users.

There are three types of users: *Administrator*, *Operators* and *User*.

Admin Role: No restriction to create, modify or remove any camera settings.

Operator Role: Has limited capabilities to change camera and event settings. The operator cannot change System Maintenance, logs or create new users.

User Role: View only access. Can access *Live View*, *Events List* and *Settings* page without any restrictions but cannot modify any configuration. Cannot make setting changes to System Maintenance and System logs.

By default, *Admin* is a "Super-Admin" that cannot be deleted.

Add User: Admin can add new user (see below):

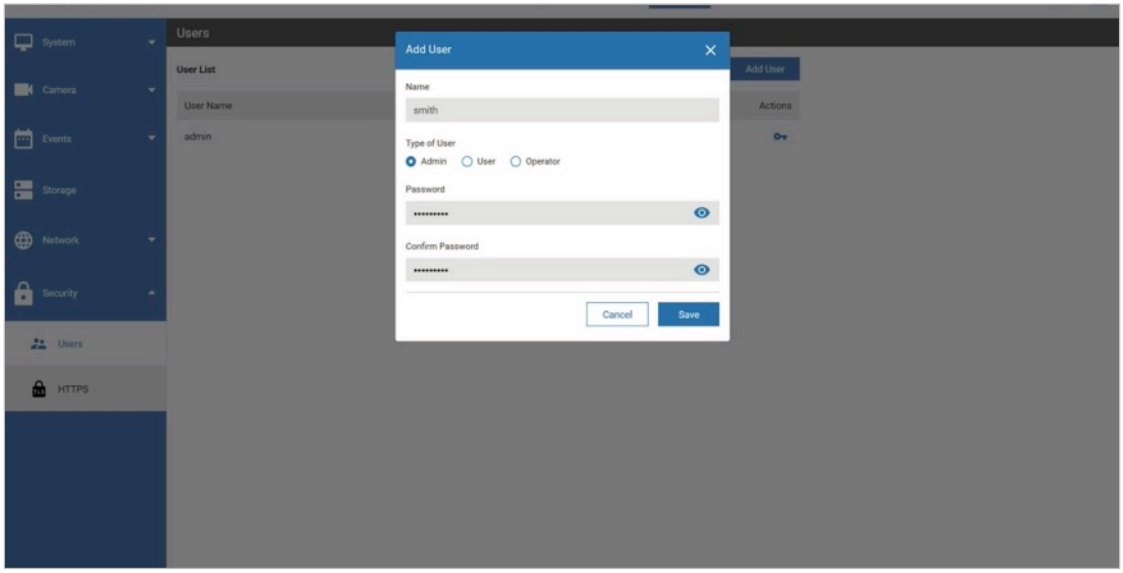


Figure 56: Add User

1. Click **Add User**.
2. Enter the **Username**.
3. Select **User Type** (*Admin*, *Operator* or *User*)
4. Enter **Password**.
5. Click **Save**.

The newly added user will be listed on the user list (see **Figure 57**, next page).

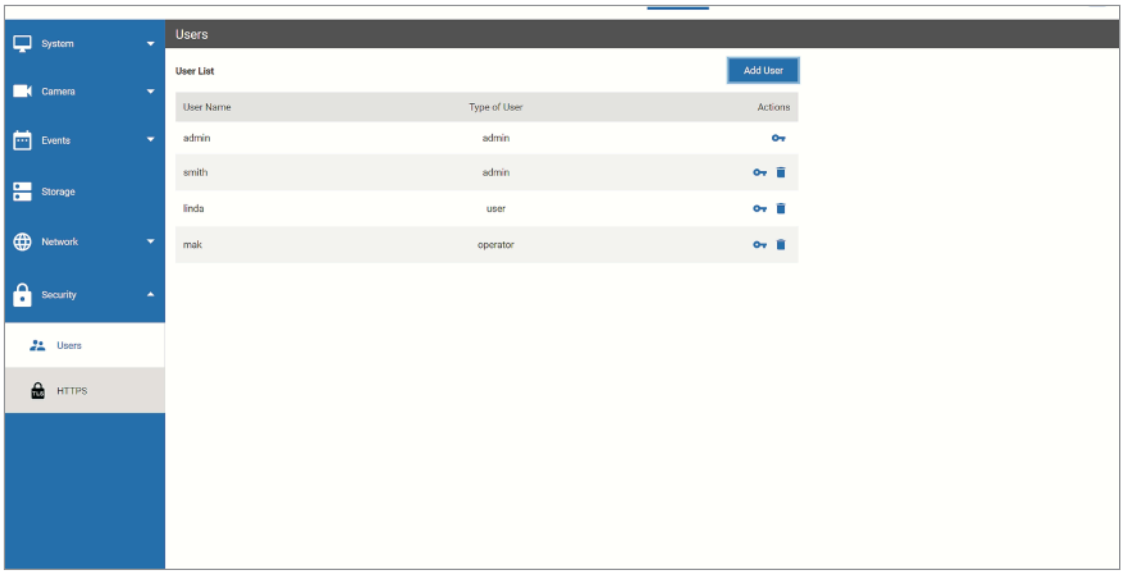


Figure 57: Listed Users

Change Password

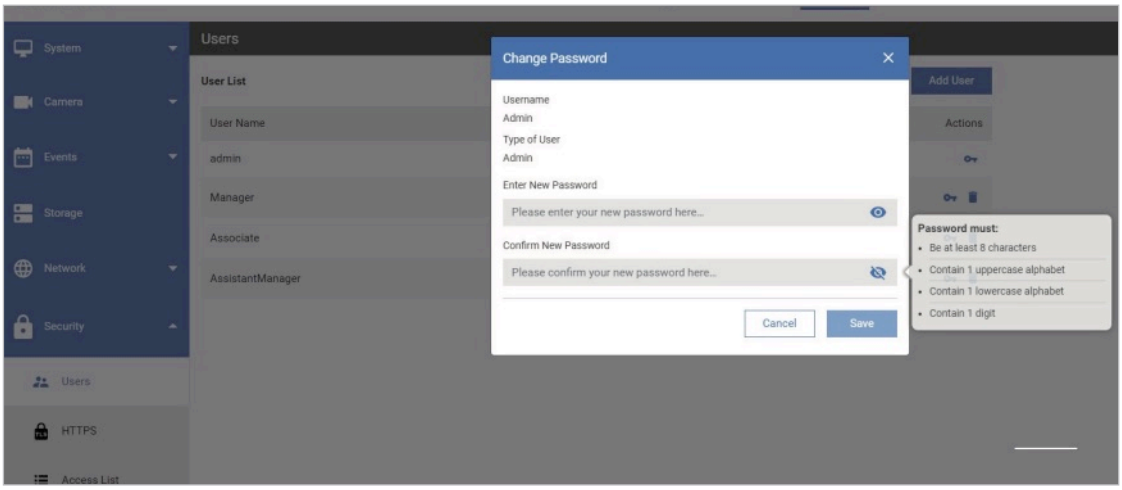


Figure 57: Change User Password

1. Click the **Change Password** icon (🔑) visible under *Actions*.
2. Enter a *New Password*.

NOTE: Password must contain minimum 8 characters, with at least 1 letter and 1 numeric character.

3. Confirm *New Password*.
4. Click **Save** to complete the password change process.

Delete User: Admin can delete an existing user by following these steps:

1. Click the **Delete** icon (🗑) associated with the user to delete.
2. Confirm the warning message "*Are you sure you want to delete 'Username'?*" by clicking **Yes**. The user will be removed from the list.

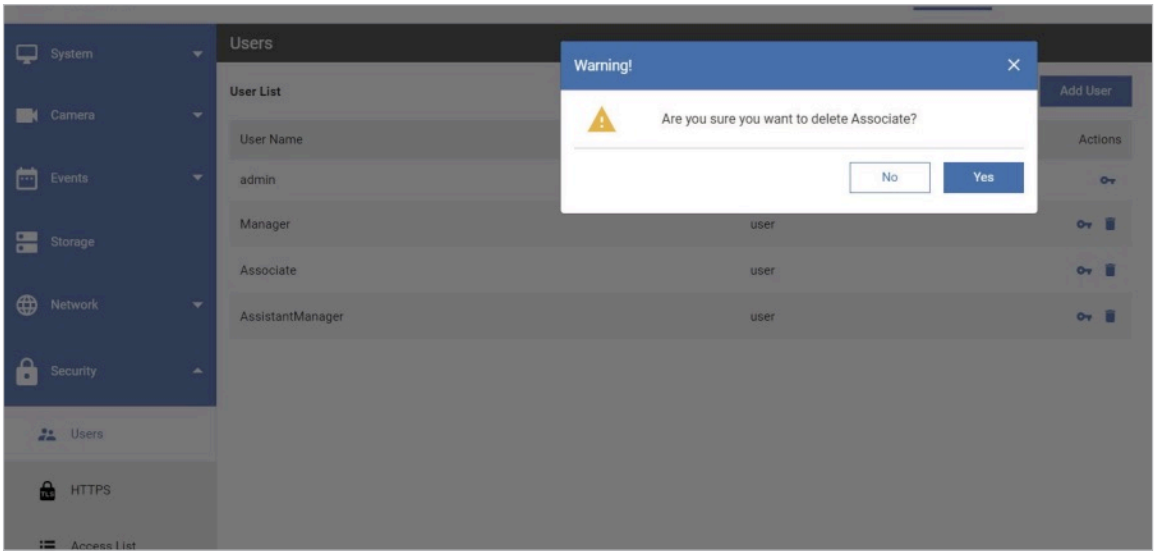


Figure 58: New Password / Delete User Icons

HTTPS

Generate an SSL certificate (if required). It will be valid for next 10 years (Validity 3650) from "date of issue".

By default, *HTTP* and *HTTPS* protocol is supported by the IV400 camera.

If required, HTTP can be disabled by clicking the ON/OFF toggle switch.

NOTE: The IV400 Camera has a Self-signed HTTPS certificate by default.

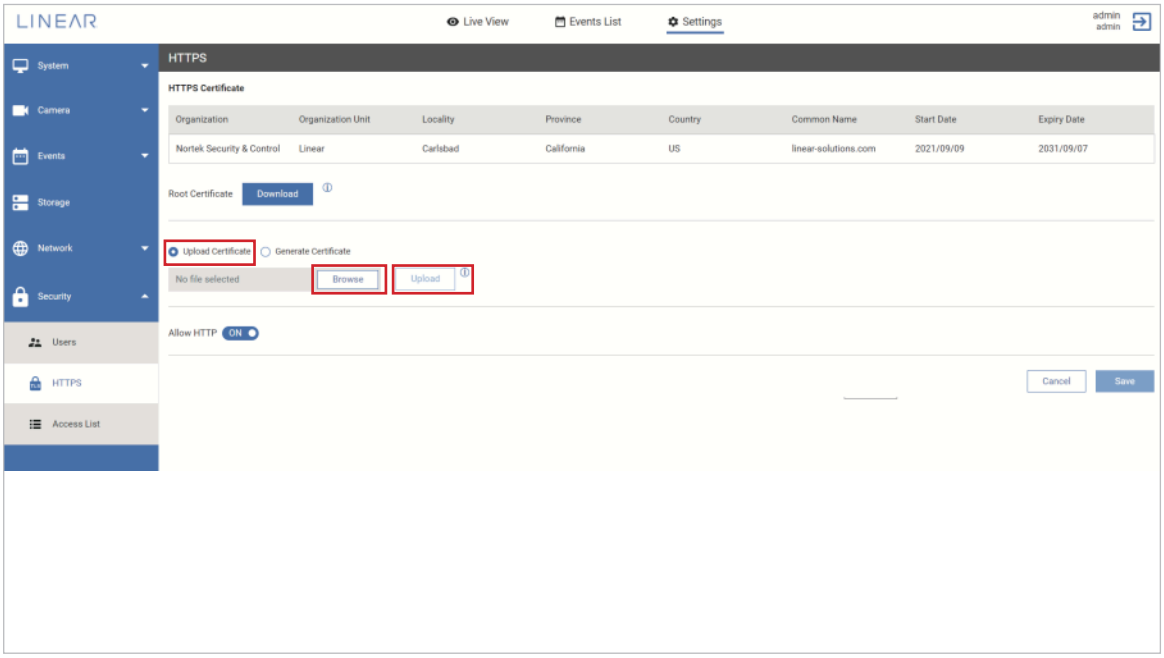


Figure 59: HTTPS

To upload a valid SSL Certificate:

1. Select the **Upload Certificate** option is available on Web UI.
2. Click **Browse**, then locate the certificate file.
3. Click **Upload**.

If the certificate is valid, it will be applied, and the end user needs to re-access the IV400 Camera.

If the certificate is not valid, an error message will appear and the existing certificate will continue to be used.

NOTE: Upload the *SSL Certificate* and *Private key* in a compressed .zip file.

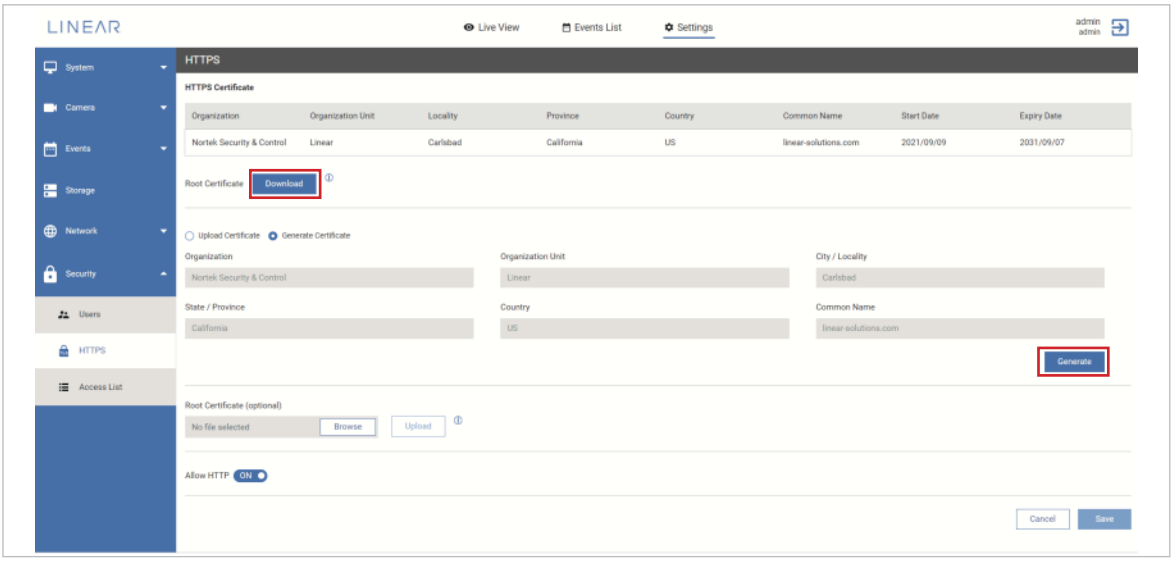
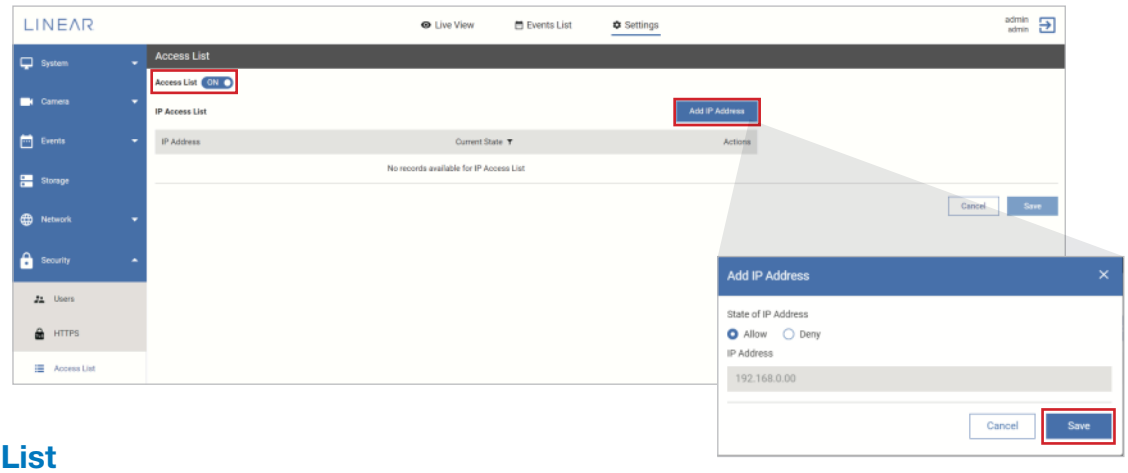


Figure 60: Generate New SSL Certificate

To generate valid SSL Certificate:

1. Click the **Generate Certificate** option.
2. Enter the required details for *Organization*, *Organization Unit*, *City/Locality*, *State/Province* and *Country*.
3. Click the **Generate** button. A newly generated certificate will be issued and replace the existing HTTPS certificate.
4. Access the IV400 Camera to apply the new certificate.

NOTE: The country name should be in standard Alpha-2 code.



Access List

1. Enable Access List by selecting **ON**.
2. Click **Add IP Address** to allow or deny an IP Address, click **Save**.
3. Click **Save** to update the *Access List*.

8. Logging Out

Click the *Logout* icon ( ) (located at the top right of the screen). The login page will be displayed.

9 FAQs

Question	How to access web UI of camera?
Answer	Open any web browser, and enter the camera IP address to access the IV400 camera web UI (default: 192.168.0.230).
Question	What are the supported internet browsers?
Answer	Mozilla Firefox, Google Chrome, Microsoft Edge and Safari.
Question	What is my camera's default IP?
Answer	192.168.0.230
Question	How do I set object sizes and sensitivity precisely?
Answer	To precisely set the object sizes, go to the Event > General > Set Object option to set maximum and minimum size of object.
Question	Where can I find events detected?
Answer	You can find events detected in *Events List* tab (next to Live View).
Question	What is intrusion detection?
Answer	Intrusion detection monitors activity within a defined area within the cameras field of view, and issue alerts when activity is discovered. You can set the area to apply the intrusion detection alarm by adding a zone.
Question	What is Camera tamper?
Answer	The *Camera Tamper* detector is a setting within your IP camera that will send a notification when the camera is tampered with. The camera sends a notification if someone is making contact with the camera or blocking its view. The alert prompts you to log into your video management system and review the event.
Question	How to check my license validity?
Answer	License validity can be checked in *System* > *Information* under the *Settings* tab. License Valid/Invalid status is displayed.

10 Troubleshooting

Question	Camera web UI is not accessible?
Answer	Check whether the camera is active and connected to LAN.
Question	How to revert camera to default settings?
Answer	You can revert the camera settings to default by restoring default settings. *Restore Default* resets all settings except network settings. If you want to reset all settings, click *Factory Reset*.
Question	Why small objects are not detected by camera?
Answer	Reduce the minimum width/height of the object or Try increasing the sensitivity.
Question	Why large objects are not detected by camera?
Answer	Please check if maximum width/height are set properly.
Question	Why many false objects are detected?
Answer	Try reducing the sensitivity and/or try increasing the Maximum object size. Enable/Define Ignore area to some part of scene if it doesn't need to be monitored.
Question	Why any events are not generated?
Answer	Check ignore area settings, ignore area should not mask entire area of the active area window.

11 Customer Support

USA & Canada Toll Free: 800-421-1587 or call 760-438-7000 | www.linear-solutions.com