PTZFusion Lite User Guide

Copyright Information

© 2025 J-Systems Inc

Open-Source Code

This product includes code licensed under the GNU General Public License, the GNU Lesser General Public License, and/or certain other open-source licenses. A complete machine-readable copy of the source code corresponding to such code is available upon request. This offer is valid to anyone in receipt of this information and shall expire three years following the date of the final distribution of this product version by J-Systems Inc. To obtain such source code, send a check or money order in the amount of US $10.00 to:

J-Systems Inc.
1s6878 School St.
Lombard, IL 60148
USA

Disclaimer

J-Systems Inc makes no warranties, either express or implied, regarding the PTZ Fusion Lite-13 PoE powered, IP Based Pan/Tilt Control System, its merchantability, or its fitness for any particular purpose. Further, in no event shall J-Systems Inc be liable for indirect, incidental, special, exemplary, punitive, or consequential damages of any nature including, but not limited to, loss of profits, revenue, production, use, or business interruption arising out of or in connection with the use or performance of any J-Systems Inc product, whether based on contract or tort, including negligence, or any other legal theory, even if J-Systems Inc has been advised of the possibility of such damages. J-Systems Inc total aggregate liability for damages of any nature, regardless of form of action, shall in no event exceed the amount paid by you to J-Systems Inc for the product upon which liability is based.

Table of Contents

PTZFusion Lite User Guide

Revision History

The following table lists the revisions of this document.

Revision	Date	Change Description
Revision 1.0	October 14, 2024	Initial Release

About this Guide

This User Guide describes the features and functions supported in the PTZFusion Lite Platform and provides instructions along with examples on how to configure the system for use with the majority of fixed ONVIF IP Cameras. This guide is intended for trained installers as well as system administrators responsible for configuring and maintaining networks. Administrators should have experience with Layer 2 networking technologies including the setup and configuration of VLANS.

If you are unfamiliar with VLANS or how to configure them, a pre-configured industrial grade PoE+ VLAN capable switch is available for purchase.

Tech Support

+1 630-627-3458

support@j-systems.com

CAUTION

THE INSTALLATION AND SETUP OF THE PTZFUSION LITE MAY INVOLVE POTENTIALLY DANGEROUS OPERATIONS SUCH AS CLIMBING, USING MAN LIFTS, WORKING WITH HIGH VOLTAGE POWER, HANDLING HEAVY ITEMS ABOVE GROUND LEVEL, AND WORKING WITH A DEVICE THAT CAN BE POTENTIALLY REMOTELY CONTROLLED BY OTHERS.

**THE INSTALLATION OF THIS EQUIPMENT SHOULD ONLY BE DONE BY QUALIFIED PROFESSIONALS.**

System Overview

The PTZFusion Pan-Tilt Platform is a unique device that allows users to take nearly any ONVIF complaint fixed / box camera and when combined with our device results in an enhanced, unified, pan-tilt platform.

The PTZFusion Platform is comprised of three main components.

- ONVIF fixed / box IP camera
- 802.1q VLAN capable / 802.3at PoE+ switch
- PTZFusion Pan-Tilt Platform

When the system is properly configured, the PTZFusion Platform becomes a transparent device, only the fixed / box ONVIF camera is discoverable as a full featured ONVIF pan-tilt conformant device.
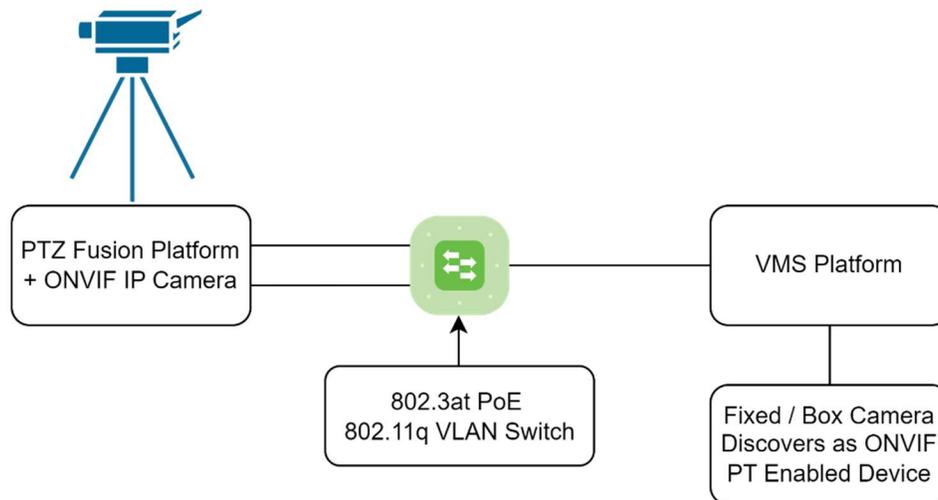
This allows specialized cameras, including thermal imagers, auto focus zoom box cameras, starlight cameras, and others, the ability to pan and tilt within an NVR Platform without the need for RS-232/485 serial to Ethernet converters. This unique functionality simplifies the overall system design, consumes less power, and yields higher system reliability.

The PTZFusion Platform is powered via 802.3at PoE and is controllable via a web browser on a PC, tablet, or smart phone such as Chrome, Edge or Firefox. There is no need to install any special software or apps to utilize the system.

A fully documented rest API for control from 3rd party software or systems is located at this address.

http://docs.j-systems.com

Some of the Platform features include:

- Ability to Utilize Nearly any ONVIF Conformant Fixed IP Camera
- IPv4/IPv6 Support
- Web Based Setup and Control
- User Interface Supports Live Video with Pan-Tilt Controls
- Variable Speed for Pan and Tilt Axes
- Preset and Patrol Functionality
- Auto Tuning (PID) Motor Control
- 802.3at PoE+ Powered
- Rugged / Weatherproof / Embedded Controller
- -30C to +60C Operation – No Heating or Cooling Required
- Fully Documented Rest API
- Support for Pelco-D / RS-485 Physical Joysticks
- Support for Cameras with Built in Zoom Lens / Digital Zoom

Rev 1.0

Pre-Installation Requirements

The PTZFusion Lite product is designed for use on an Ethernet network and requires a valid IP for access. The default IP address, when a DHCP server is unavailable, is 192.168.1.100. If a DHCP server is available, the PTZFusion Finder utility can be used to locate the device or via Windows network discovery. The Finder utility can be downloaded at the following link. http://www.j-systems.com/support

An 802.3at PoE+ / 802.11q VLAN capable Ethernet switch is required for proper operation of the system.

Step 1:

Ensure that the ONVIF camera is set to DHCP and that an administrator username and password have been established.

Note: The camera will obtain all required network parameters automatically from the embedded DHCP server running inside the PTZFusion Platform. This DHCP server is only active for a single port on the VLAN switch and does not offer DHCP addressing to any other device in the system.

Note: Some camera manufacturers have a dedicated username and password for ONVIF access that is separate from the username and password used to administer the camera itself. Later in this guide when searching for a camera and asked for the camera credentials make sure to use the ONVIF specific user credentials if your camera requires this.

Step 2:

For the video to play successfully in the Fusion Web UI a few requirements must be met.

- At least one H.264 Baseline encoder profile setup in the camera; Main and High profiles are not supported.

- The bit rate should be less than 5 Mbps.

- The image should be set to 1920x1080 or smaller.

Note: Modern IP cameras are designed to output RTSP video streams with either H.264 or H.265 compression. However, major browsers do not support direct access to RTSP streams. To facilitate live video within the PTZFusion web interface along with pan-tilt controls, the video must be converted to a format compatible with browsers. This is achieved by ingesting the RTSP stream and converting it to WebRTC for extremely low latency playback that works in any modern browser. As a note MJPEG and H.265 codecs are not supported due to a WebRTC limitation.

Keep in mind, the above constraints only apply when viewing live video in the Fusion's web interface. When the system is accessed from a VMS, additional encoder streams that are setup inside the camera with larger image sizes, higher bit rates or even H.265 are supported. In this capacity, the camera's video stream is simply passed through the Fusion's network interface directly to the VMS which can ingest RTSP streams and multiple codecs directly.

PTZFusion Lite User Guide

Step 3:

Setup a VLAN switch as shown in the below example. The VLAN ID shown can be any value from 2-4094 and will depend on your network equipment and environment. During the initial setup of the PTZFusion device the user specified VLAN ID can be entered to match the configured value in the switch.

WAN Connection Port# 1

(Connection to Network with VMS)

Camera Web UI accessible at http://x.x.x.x

Ethernet Cable

IEEE 802.3at (PoE) 802.1q (VLAN) Capable Ethernet Switch

Ethernet Cable

Ethernet Cable

ONVIF Fixed / Box Camera DHCP Port# 3

PTZ Fusion Platform Port# 2

http://x.x.x.x/ptzfusion

Port	VLAN ID	Untagged	Tagged	PVID
1	1	X		1
2	1	X		1
2	20		X	1
3	20	X		20
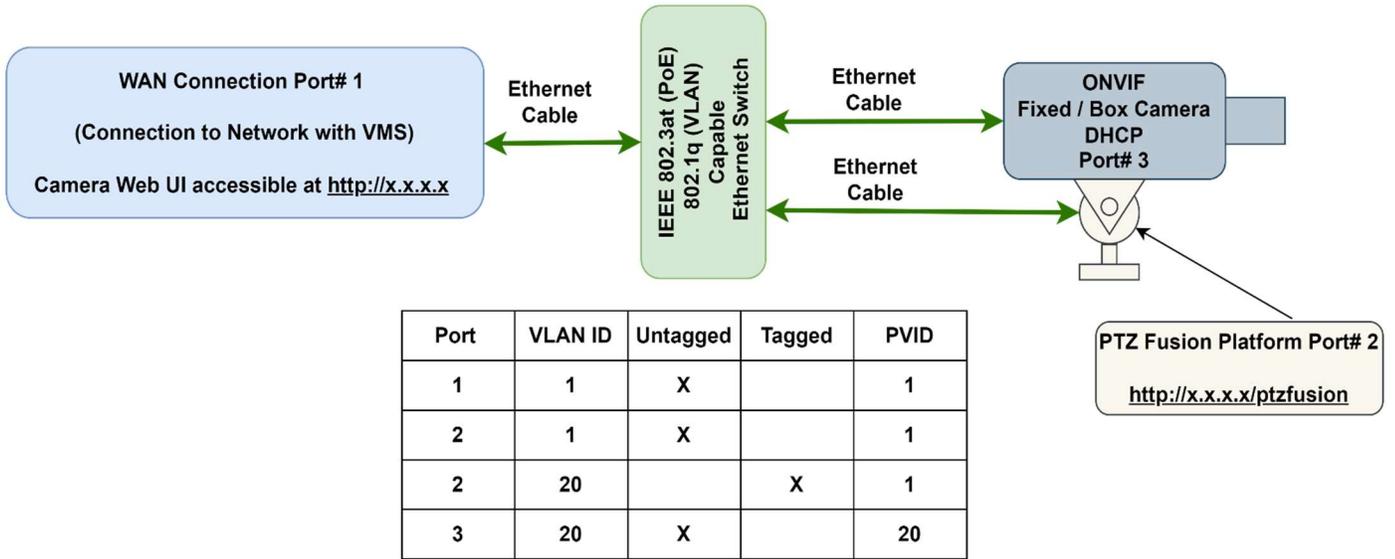
Note: If you are unfamiliar with VLANS or how to configure them, a pre-configured industrial grade 802.3at PoE+ switch that is VLAN capable is available for purchase.

Getting Started

Using the switch configured as outlined in step 2, plug in the WAN, PTZFusion Platform and camera; utilize the finder utility to locate the IP address of the device.

If no DHCP server is present on the network, the default address is 192.168.1.100.
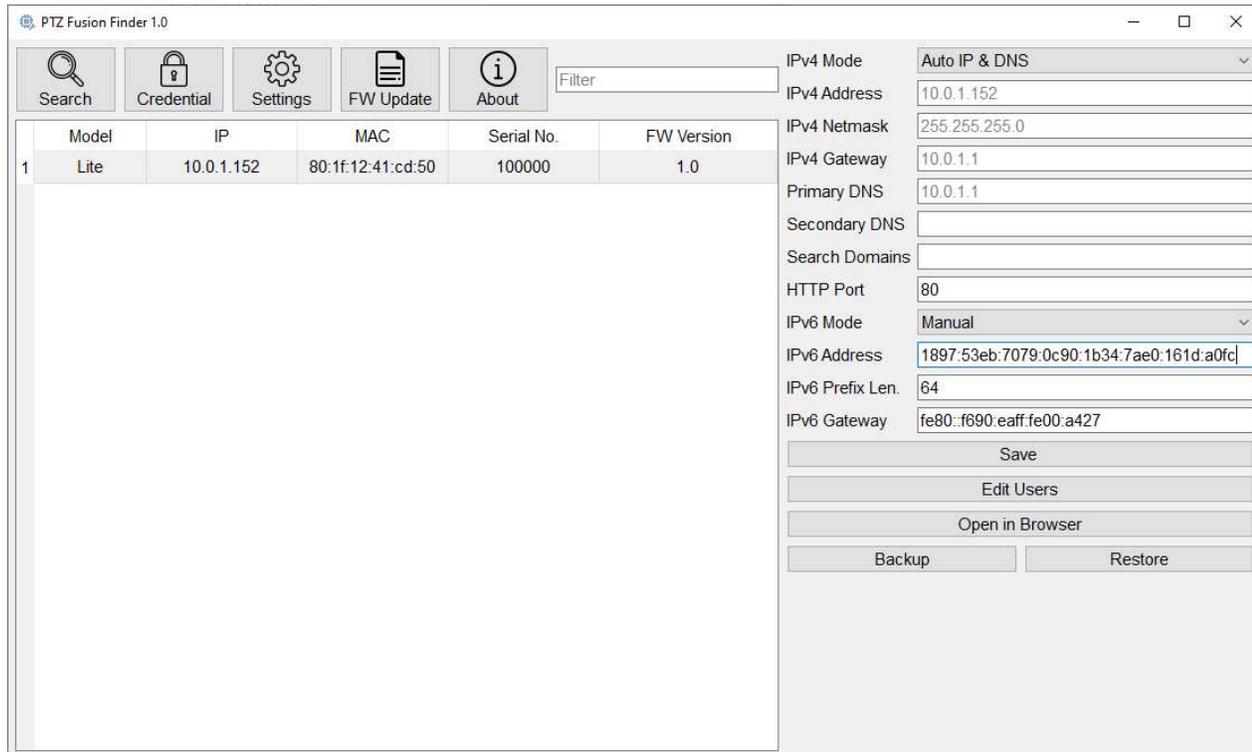
Note: When entering the IP address is entered into a browser's address bar manually, if the /ptzfusion portion is not included as part of the URL, you will be directed to the attached camera's web interface.

e.g. http://10.0.1.152 will go directly to the camera's web interface vs http://10.0.1.152/ptzfusion will go to the PTZFusion's web interface.

**If the device was installed without the presence of a DHCP server, the camera will not be accessible until all networking parameters have been established. **

Step 1:

Establish a username and password to protect access to the system.

Note: Passwords must be a minimum of 8 characters and should include a variety of upper- and lower-case letters, numbers, and special characters.

Step 2:

Setup the networking parameters.

There are two sections, WAN (External Network) and the LAN (ONVIF Device Network)

The WAN (External Network) address will be used access to the PTZFusion's Web UI.

IPv4 and IPv6 are supported including both static as well as Automatic (DHCP) configurations.

Rev 1.0

The LAN (ONVIF Device Network) is strictly used to deliver network settings to a single attached ONVIF camera.

If the LAN interface is set to automatic, the system will automatically choose a private IP address scope and subnet that will not conflict with the WAN address.

Keep in mind the LAN network parameters, if set to Static IP mode, must be unique and cannot overlap or be in the same network or subnet as the WAN interface.

The VLAN ID is set to 20 as a default but can be changed to any value between 2-4094 as required for your networking environment.

LAN (ONVIF Device Network)

IPv4 Network

Configuration Mode
Automatic
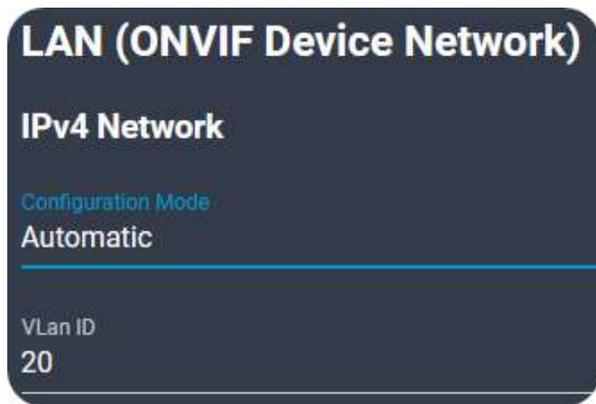
VLan ID
20

VLAN Setup
802.3at (PoE) / 802.1q (VLAN) Capable Switch

WAN Connection /
Connection to network
with NVR
PORT# 1

PTZ Fusion
Unit
Port# 2

ONVIF Camera
Port# 3

Port Based VLAN Configuration Example

Port 1 Untagged traffic VLAN 1 (default)

Port 2 Tagged traffic VLAN 20 (trunk port)

Port 3 Untagged traffic VLAN 20

Port	VLAN ID	Untagged	Tagged	PVID
1	1	X		1
2	1	X		1
2	20		X	1
3	20	X		20

PTZFusion Lite User Guide
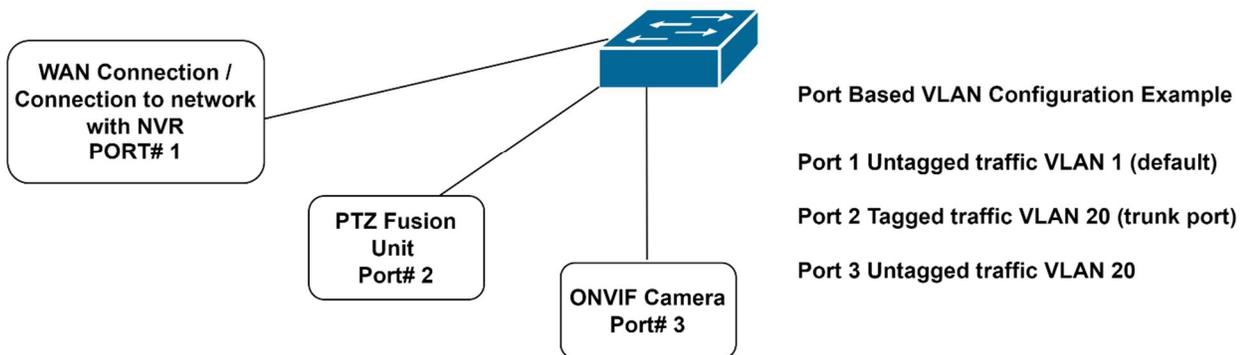
Step 3:

In this step we will establish a connection with one or more-time servers to keep synchronized time.

The first selection is to choose a 'Time Zone'.

Current System Date & Time
06-07-2024 11:22:39 CDT

Time Zone

(GMT-12:00) International Date Line West

(GMT-11:00) Midway Island, Samoa

(GMT-10:00) Hawaii

(GMT-09:00) Alaska

(GMT-08:00) Pacific Time (US & Canada)

(GMT-08:00) Tijuana, Baja California

The next selection is to choose how the date and time are established, this can be either from a private NTP server, a public NTP server or manually if the system is operating in a closed network environment with no access to a synchronized NTP source.

Note: A synchronized time source for both the NVR as well as the PTZFusion platform is very important. The camera's configured date & time must not differ by more than +/- 5 seconds from the NVR platform you're connecting the camera to.

Network Date & Time (NTP)

Manual

The last step in this section is to enter NTP server addresses if using the 'Network Date & Time (NTP)' option.

Primary NTP Server Address
0.us.pool.ntp.org
Hostname or IP Address

Secondary NTP Server Address
pool.ntp.org
Hostname or IP Address
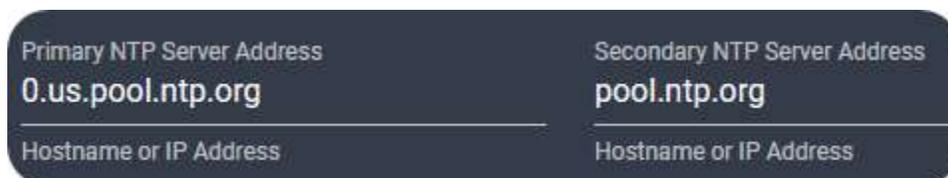
Only a Primary NTP Server Address is required, the Secondary is optional but recommended for redundancy.

Rev 1.0

Verifying NTP Servers can be done manually or automatically checked when going to the next step.

Step 4:

This is the last step in the setup is to 'Search For Camera' if one is attached and the credentials have been setup.

Note: If the system started up without a DHCP server present on the network Step 4 will not be presented. A camera can be added later via the Camera Settings menu after all system networking parameters have been established.

Note: If a camera isn't attached or you don't know the username / password, this step can be ignored by selecting the 'Skip Validation' checkbox and then 'Next'.

Search Results

Camera

☐ XNZ-6320
    urn:uuid:5a4b5752-3656-3452-3130-303030454e00

C Search Again   CANCEL   CHOOSE

Select the checkbox next to the camera and then the 'Choose' button.

After this, the IP address and ONVIF port are automatically filled in. The only details required at this point are the camera's 'Username' and 'Password' to establish a connection.

Camera IP Address
192.168.0.217

Username

Password

ONVIF Port
80

☐ Skip Validation
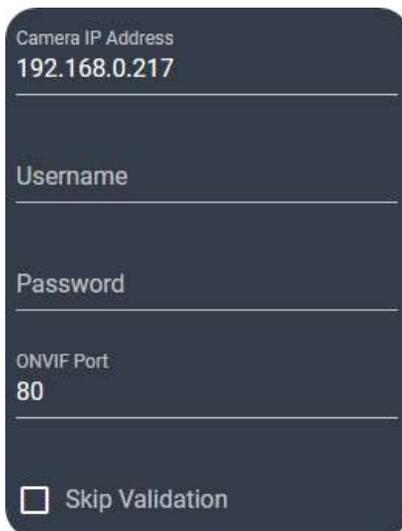
After the credentials are accepted the setup process is complete and the user can sign in to start using the system.

The initial device setup is now complete.
You may now sign in.

SIGN IN
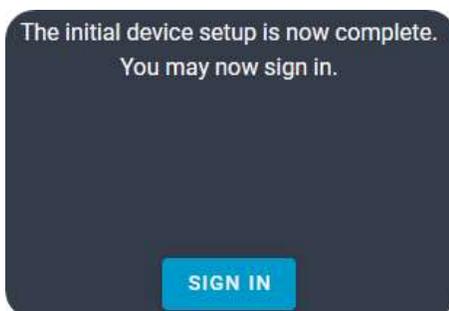
Accessing the Camera's Web UI

Despite the camera being isolated in a VLAN, the native web interface of the camera is still accessible. As an example, if the PTZFusion Platform is accessible at http://10.0.1.152/ptzfusion the camera's web interface is accessible by using the IP address http://10.0.1.152 and leaving off the /ptzfusion portion of the URL.

Even if the camera is reset to factory defaults, provided the LAN (ONVIF Device Network) as well as the camera are set to Automatic / DHCP, the camera will still be accessible at e.g. http://10.0.1.152 This allows the opportunity to establish a first-time username and password and from there re-add the camera to the PTZFusion Platform as required.

Note: If the board is factory reset, an attached IP camera will only be available after the initial setup wizard has been completed.

Device Login

One the device is logged into with the credentials that were established earlier in the setup process.
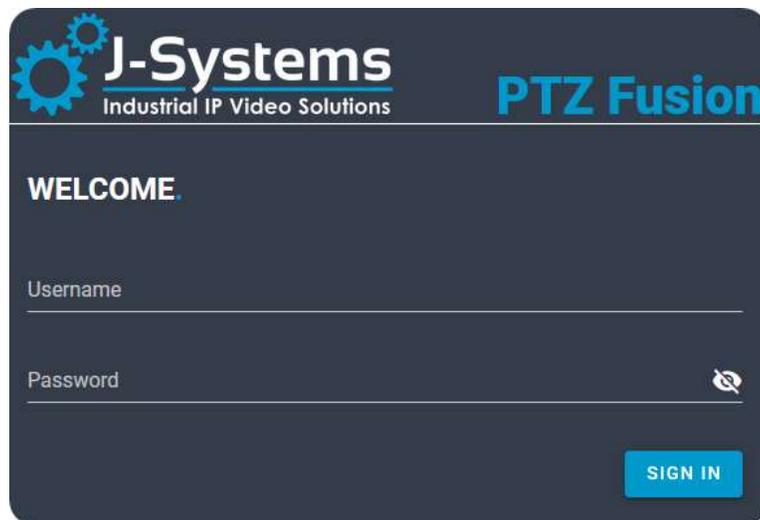
Live Video

Provided a camera was configured during the setup, the screen will look like this.
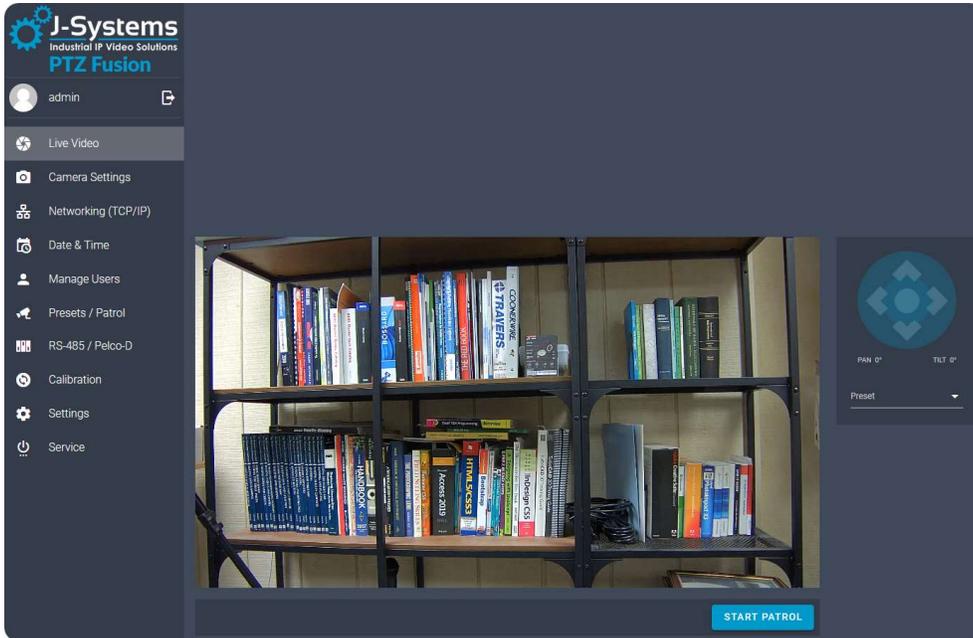
Menus will be on the left, video in the middle and PT controls to the right with a virtual joystick.

If a camera was **not added** during the initial install, the screen will look like the image below. A camera can be added at any time which will be detailed in the next step.
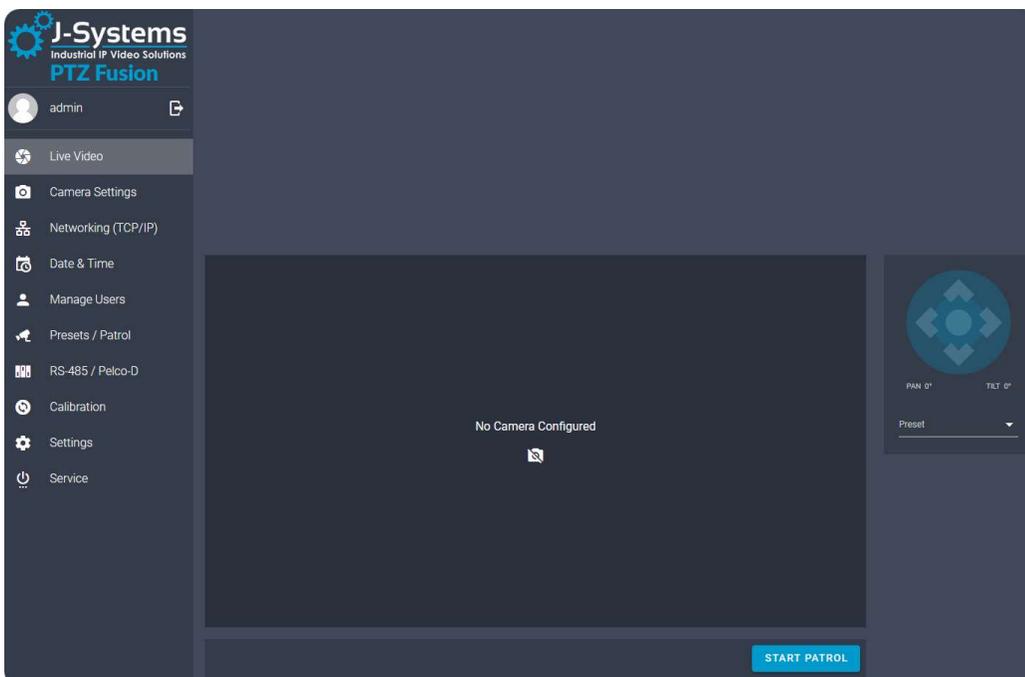
Camera Settings

If the system was initially setup without a camera adding one is simple.
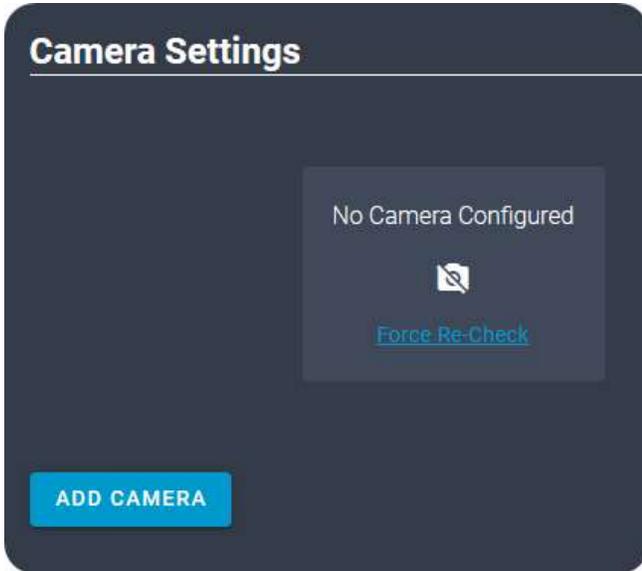
Click 'Add Camera'.
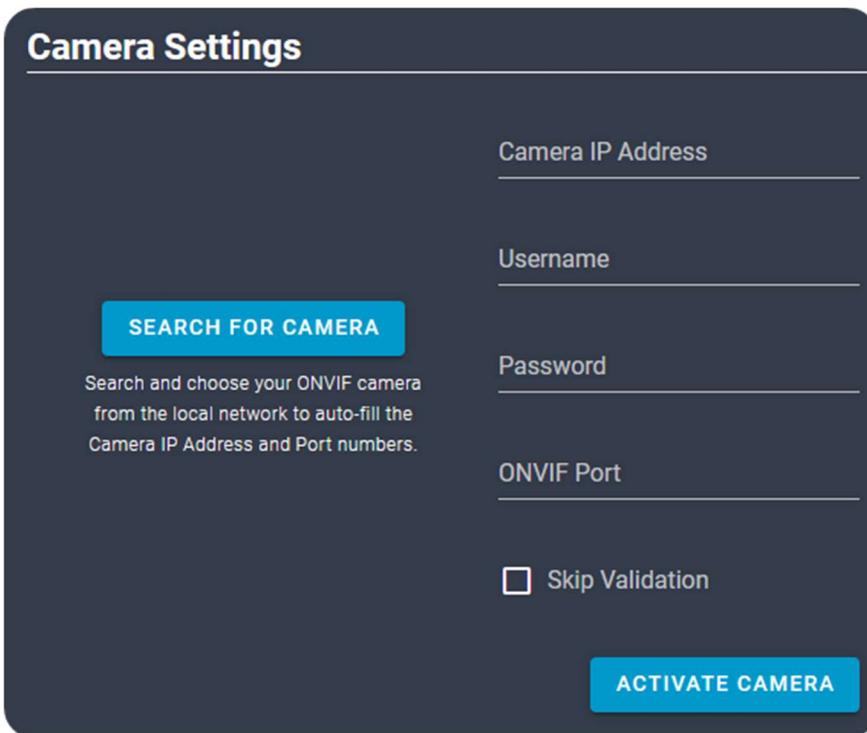
Click 'Search for Camera'.
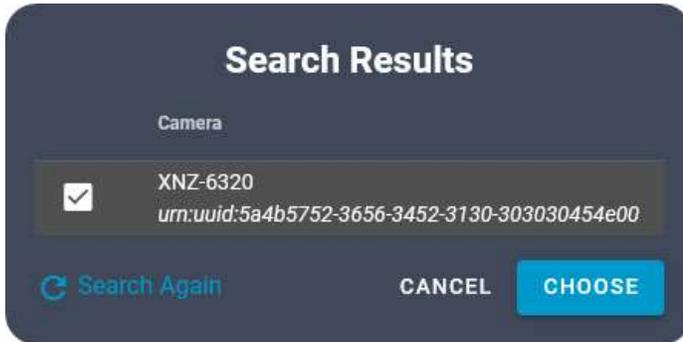
When an attached camera is discovered select the check the box. Next select 'Choose'; the system will assign an IP address automatically and fill in the ONVIF port.

Fill in the **username and password for the camera** which could be an established 'Username' and 'Password' in the camera, or some manufacturers have a separate ONVIF 'Username' and 'Password' specifically for ONVIF connections.

Once this has been completed click 'Activate Camera' and the active camera settings will be displayed.


From this panel it is possible to do the following

- Reboot Camera
- Factory Reset Camera

- Launch Camera Control Panel – This opens the web interface of the camera to handle administration tasks, upgrade firmware, setup users etc.
- Remove Camera Change out the camera due to failure or replacement
- Add Camera – This button is only visible when there is **no camera configured**

At this point if the 'Live Video' menu is selected, live video from the attached camera will be displayed along with a virtual joystick, access to presets and the ability to start a patrol sequence.
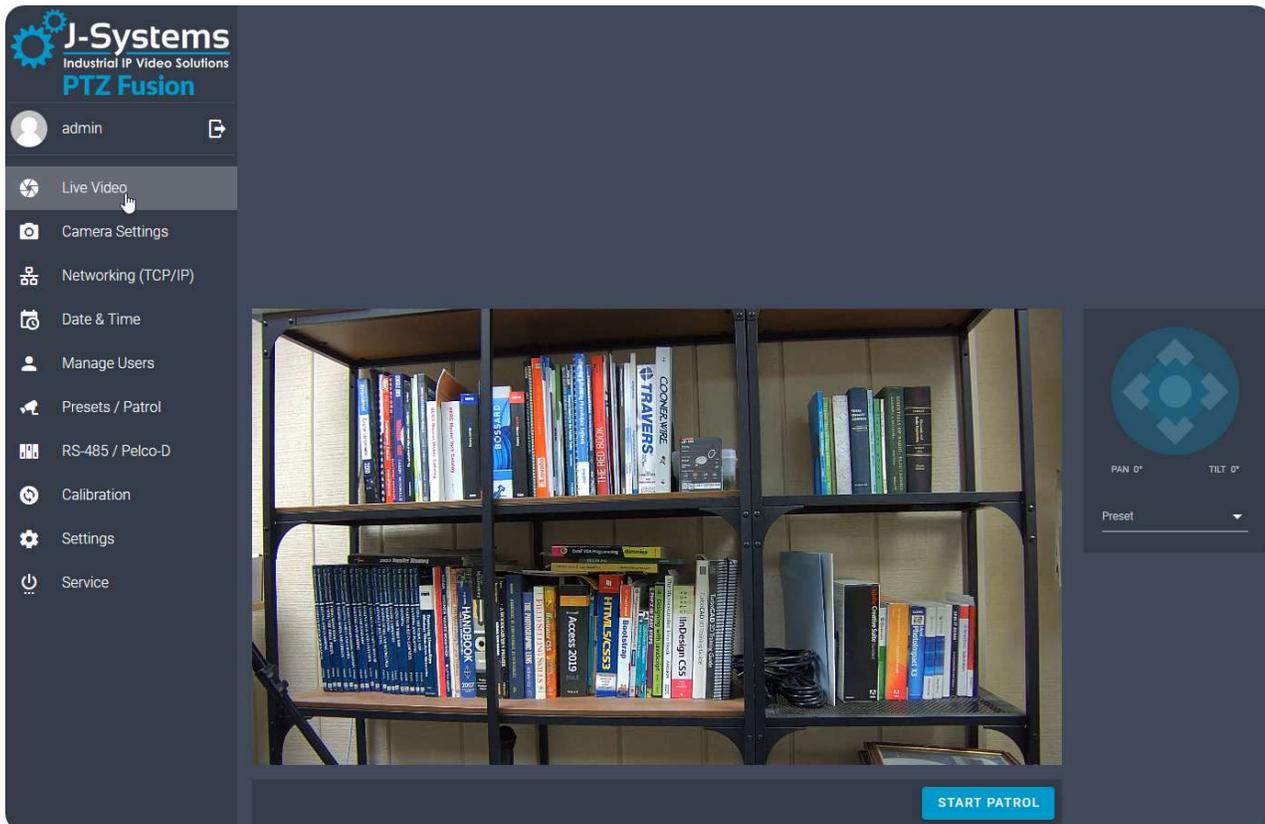
Networking (TCP/IP)

WAN (External Network)

IPv4 Network

Current Configuration
IP: 10.0.1.24 / Subnet: 255.255.255.0
Gateway: 10.0.1.1
Primary DNS: 10.0.1.1

Configuration Mode

Automatic (DHCP)

DHCP & Manual DNS

Static IP & Manual DNS

The WAN (External Network) can be configured for IPv4 using DHCP, DHCP & Manual DNS or Static IP and Manual DNS.

Configuration Mode
Static IP & Manual DNS

IPv4 Address	Subnet Mask
10.0.1.24	255.255.255.0

Default Gateway
10.0.1.1

Primary DNS Server	Secondary DNS Server
10.0.1.1	

Search Domains

Search Domains can be configured as necessary.

Search Domains

Your Domains:

Add Domain   +   None Added

Rev 1.0

WAN IPv6

WAN IPv6 can be configured as DHCP or Static IP.

IPv6 Network

Current Configuration
IP: 8ffc:762a:d761:6f26:fafe:1757:54b9:8baf/64
Gateway: fe80::f690:eaff:fe00:a427

Configuration Mode
Static IP

IPv6 Address
8ffc:762a:d761:6f26:fafe:1757:54b9:8baf

Prefix Length
64

Default Gateway
fe80::f690:eaff:fe00:a427
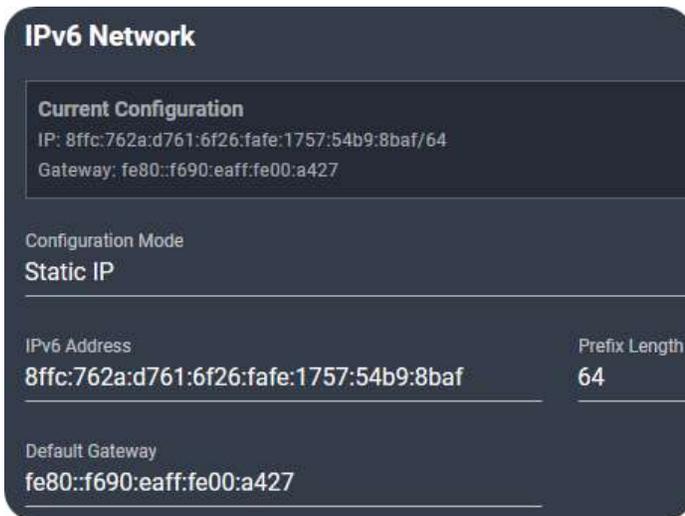
LAN (ONVIF Device Network)

For the LAN (ONVIF Device Network) the choices are Automatic or Manual.

PTZFusion Lite User Guide

IPv4 Network

Current Configuration
IP: 192.168.0.1 / Subnet: 255.255.255.0

Configuration Mode
Manual

IP Address
192.168.0.1

Subnet Mask
255.255.255.0

The LAN (ONVIF Device Network) is strictly used to deliver network settings to a single attached ONVIF camera.

Keep in mind the LAN network parameters, if set to Static IP mode, must be unique and <u>cannot overlap</u> or be in the same network or subnet as the WAN interface.

If the LAN interface is set to automatic, the system will automatically choose a private IP address and subnet that is unique and not in conflict with the WAN network.

Note: If an attached camera required a manual IPV6 address for a specific purpose an address is provided for this purpose. Keep in mind that the LAN (ONVIF Device Network) is closed and for the sole use by the attached camera.

IPv6 Configuration
READ ONLY

IPv6 Address: fd70:747a:6675:736E::1/64

VLAN ID

The VLAN ID is set to 20 by default but can be changed to any value between 2-4094 as required for your networking environment.

VLan ID
20

Date & Time

The date and time can be fully automatic after a time zone and NTP servers are input or manual if an NTP source is not available locally or via a public NTP server available on the internet.

Manage Users

It is possible to manage the 'Web Users' for the web interface for the PTZFusion Platform itself as well as 'ONVIF Users' for a configured camera.

'Web Users' can be added, deleted or the password can be changed by clicking on the wrench icon.

'ONVIF Users' have the same abilities with the additional function to modify the 'Access Level'.

Edit ONVIF User

Username
test

Access Level
Administrator ▾

NOTE: Administrator level accounts are required in camera connection settings.

ℹ️ Leave password blank unless changing it.

New Password 👁️‍🗨️

Confirm New Password 👁️‍🗨️

Password Strength: None ℹ️

CANCEL   SAVE

Access Level

Administrator

Operator

Media User

Note: Some cameras have a dedicated username and password for ONVIF access that is separate from the username and password used to administer the camera itself. When searching for a camera and asked for the credentials or entering the credentials later, make sure to use the ONVIF user credentials if your camera supports this.

Presets / Patrol

Presets are a simple way to save and recall the pan and tilt position of the device.
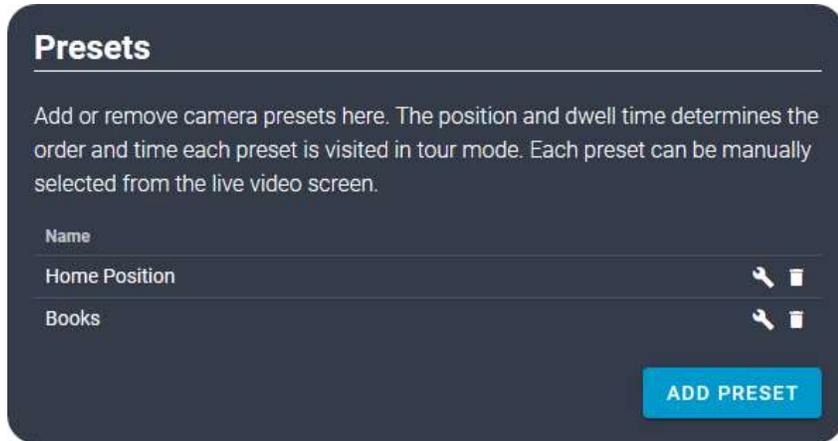
To add a preset click 'add preset' and you will be presented with a live video screen, a virtual joystick, and a box to name the preset as shown below. Each preset can have a label up to 14 characters long.

To edit a preset click on the wrench, to delete a preset click on the trash can.

Edit Preset

ℹ Using the controls above, set the camera to your desired position and settings for this preset, provide a name and click 'Save'.

Preset Name
Home Position

13 / 14

CANCEL   **SAVE**
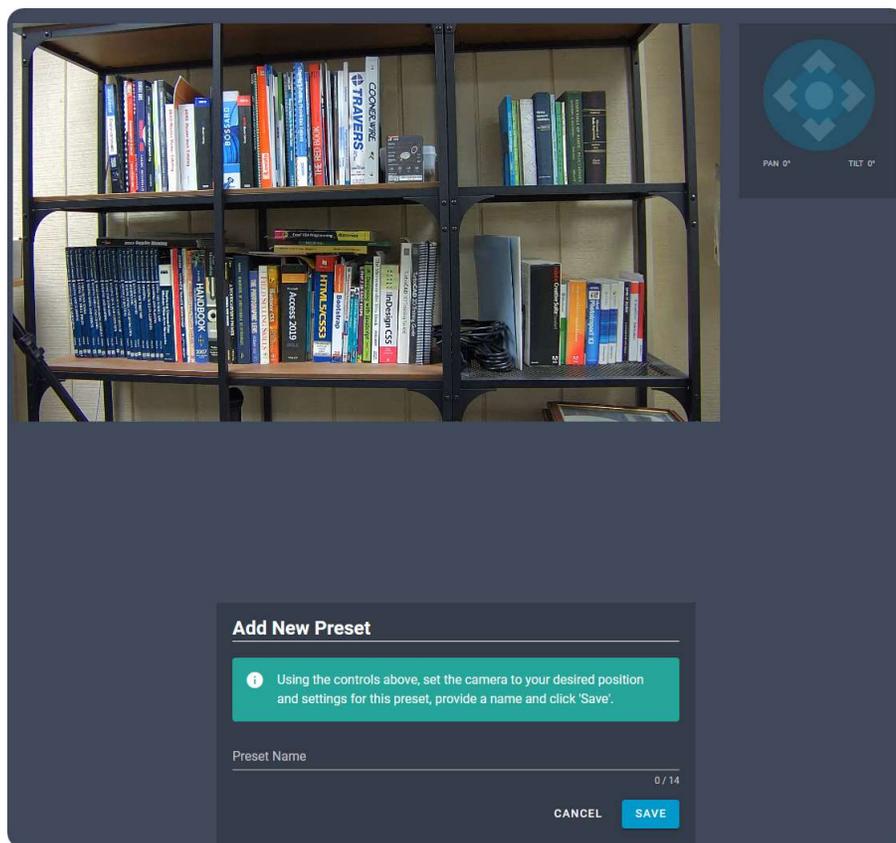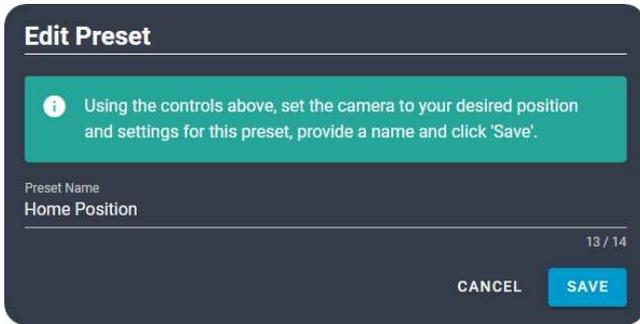
To establish a patrol sequence, choose from previously created presets and establish a dwell time.

Patrol Path

Add and organize your patrol path by adding presets and setting dwell times for each. After the last position dwell time expires, PTZ will be returned to the first position in the patrol path and the process will loop until stopped by the user or an alarm configured to go to a preset is triggered.

	Preset	Dwell Time		
✛	Preset Home Position ▾	Dwell Time (seconds) 10 ↕	🗑	
✛	Preset Books ▾	Dwell Time (seconds) 10 ↕	🗑	

+

SAVE PATROL PATH

To re-order the patrol sequence, use the ✛ icon to select and re-arrange the presets into the desired order. Once the sequence is set click 'Save Patrol Path' to save your settings.

To initiate the patrol path, go to the 'Live Video' tab and click on 'Start Patrol'

When the patrol is running the preset is shown with the dwell time for that preset.

📍 Books (⏱8s)   STOP PATROL

When the device is in motion between presets it will show a movement icon to signify this.

🏃 Books   STOP PATROL

To stop the patrol, click 'Stop Patrol'

RS-485 / Pelco-D

RS-485 (Pelco-D) Settings

Termination Resistance

Address (0-255)

1

Baud Rate

9600

If your unit was ordered with an RS-485 cable installed, use this menu to set the address and baud rate as necessary.

Calibration

This area of the Platform is typically setup once and unless the device is re-installed typically does not need to be changed.

PTZ Axis Settings

Pan Axis Settings	Tilt Axis Settings	Zoom Axis Settings
Enabled	Enabled	Enabled
✓ Calibrated	✓ Calibrated	

Pan Axis Travel Limits

Left: -171 ° SET Current Value
Right: 171 ° SET 114°

Tilt Axis Travel Limits

Up: 45 ° SET Current Value
Down: -45 ° SET 1°

PTZ Axis Calibration

ⓘ Each axis must be "enabled" above to be included in the Auto Tuning process. Once the desired Axes are enabled, click "Start Auto Tune" to begin.

START AUTO TUNE

PTZ Axis Settings

Pan and Tilt Axis Settings can be enabled or disabled depending on your use case.

The Zoom Axis Setting only applies to ONVIF box cameras that have an auto focus power zoom lens built in.

Travel Limits

The travel limits shown for left, right, up, and down are the maximum limits set at the factory. It is possible to set more restrictive limits though by moving the unit and clicking the respective 'set' button to save the value for a chosen axis.

PTZ Axis Calibration – Auto Tune

This function is best run once after the unit has been installed and the payload has been mounted on top.

When this function is run, the unit is driven to the middle of the feedback readings e.g. 0° pan and 0° tilt. The unit will jitter both axes for a few seconds and then stop. This process takes samples of the PID motor controller values. When the process is complete the device will have smooth motion control as both axes are now tuned based upon the mounted payload.

Settings

Session Idle Timeout

The purpose of this is to prevent sessions being left open and forgotten about which can contain a video stream or a control socket for motion.

Only one control session is allowed at a time. An easy way to think of this is only one person can control the unit at any given point in time. If someone accidentally left their browser open and on the web interface of the unit and someone else wanted to use it at a different computer, it would not be possible unless the original control session was terminated. This is an automated timer that will end a user session automatically if there is no user input after 120 seconds as shown in the example below.

A warning will pop up when this timer expires to advise that the session has been closed in the original web user interface session.
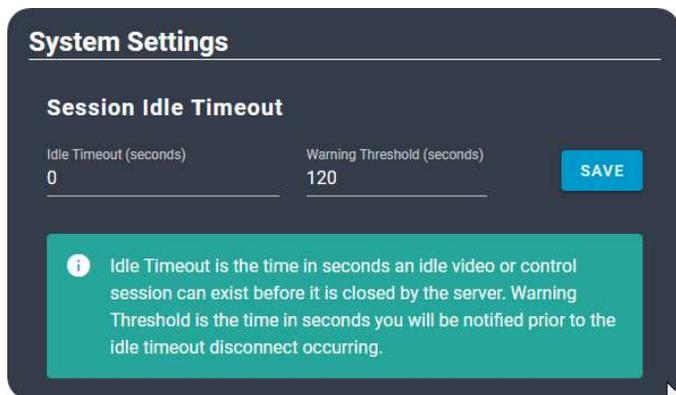
Manage SSL Certificate

If your environment supports PKI or the device needs to have an SSL certificate installed this is the area to handle this. Some helpful commands are listed, however support on how to generate a key pair is outside of the scope of this manual.

Manage SSL Certificate

Installed Certificate:

Subject CN	localhost
Issuer CN	localhost
Valid From	Sun Feb 13 2022 20:26:43 GMT-0600 (Central Standard Time)
Valid To	Wed Feb 11 2032 20:26:43 GMT-0600 (Central Standard Time)
Signature	ecdsa-with-SHA256

Install Certificate

📎 Certificate File

📎 Private Key File

[UPLOAD FILES]

Generate a Private Key File:

```
openssl ecparam -genkey -name prime256v1 -noout -out pkey.pem
```

Generate a Certificate File:

```
openssl req -new -x509 -key pkey.pem -out cert.pem -days 3650
```

This command references the generated key file!

Manage API Keys

The device features a REST API and to utilize this from a 3rd party application, an API key is required.

API Documentation is located at http://docs.j-systems.com

Manage API Keys

☐ **API Key**

No data available

Delete selected API Keys   [CREATE API KEY]

API Key Created!

Your new API key is:

`3dacb48030fd0c9674d1ec099737c605f62549cb`

[CLOSE]

Service

In 'Service Options' a user can do the following

- Update the PTZFusion firmware
- Backup the device configuration
- Restore the device configuration
- Download Log Files
- Reboot the Device (PTZFusion and Camera)
- Factory Reset the PTZFusion, the Attached Camera or Both

Configuration & Logs

BACKUP CONFIG   RESTORE CONFIG

Download Log Files

Reboot & Reset

REBOOT DEVICE   FACTORY RESET

Choose Your Factory Reset Target

You may factory reset the attached camera (if one is currently configured), the PTZ board, or both devices at the same time. Please choose the reset mode that best suites your needs:

Reset Mode   ▾

! Factory resetting a device will cause you to lose any configuration data that you have not backed up.

Are you absolutely sure you want to preform a factory reset?

CANCEL   RESET

PTZ Board Only

Camera Only

PTZ Board & Camera

PTZFusion Lite User Guide