

How to

Deployment of Axis-K410-V1

August 2024

Contents

1.	<u>INTRODUCTION</u>	4
2.	<u>PREREQUISITES</u>	4
3.	<u>EXAMPLE PARTS LIST</u>	5
4.	<u>INITIAL SERVER CONFIGURATION</u>	5
5.	<u>IGNITION SENSE CONFIGURATION</u>	7
6.	<u>NETWORK CONFIGURATIONS</u>	8
7.	<u>CAMERA CONFIGURATIONS</u>	9
8.	<u>SERVER AXIS CAMERA STATION CONFIGURATION</u>	11
9.	<u>RECORDING REPLICATOR</u>	16
10.	<u>EVENT BRIDGE FOR ONLOGIC</u>	18
11.	<u>CREATING A CLIENT USER</u>	22
12.	<u>LICENSING AXIS CAMERA STATION</u>	25
13.	<u>AXIS CAMERA STATION CLIENT INSTALL MDT</u>	27
14.	<u>PHYSICAL INSTALLATION</u>	29
15.	<u>CENTRAL SERVER SETUP</u>	35
	<u>WIRING DIAGRAMS</u>	40
	<u>PRIMARY POWER AND CONNECTIVITY</u>	41
	<u>POWERING THE DIO</u>	42
	<u>EVENT TRIGGER WIRING</u>	42

INDICATION LED WIRING **43**

MANUALLY PROGRAMMING IGNITION-SENSE **44**

1. Introduction

Axis Communications launched the body worn solution in 2020. Axis manufactures numerous components which are used in this solution; however, a 3rd party server is used for the in-vehicle server appliance. The model chosen was the [OnLogic K410](#) for its size, capabilities, and functionality. Axis developed a custom Windows® image for this server which supports direct integration with the servers DIO and ignition sensing. Axis also developed wireless offload capabilities. All of these functionalities and software components come pre-installed on the Axis build from OnLogic, the **Axis-K410-V1** which can be ordered through OnLogic with the Axis image and pre-configured with the Axis chosen components.

The primary use case for this solution will be for law enforcement or security force type end customers who need both an in-vehicle camera system and a body worn system that work together. However, body worn cameras are NOT required for this solution to be used, meaning this solution can be used in a variety of segments and solutions with just the in-vehicle component.

This document will guide you through the deployment of this system. This document **will not** discuss how to acquire power from a battery and deploy a constant power and switched power distribution system or how to program and generate triggers from a lightbar controller. This document assumes these systems are already in place and the integrator has prior knowledge of these types of systems.

2. Prerequisites

Axis body worn camera deployment
AXIS Camera Station - central server
Robust wireless network
Bench configuration

Prior or during the deployment of the Axis in-vehicle solution, it is recommended to deploy the Axis body worn camera solution. In the camera profile section, ensure that Broadcast and Receive Wireless signal has been toggled too on. In the about section of the AXIS W800 System Controller you will find the system ID which will be deployed into the Event Bridge for OnLogic component further along in this guide.

This guide is primarily focused on the deployment of the in-vehicle solution, however there needs to be serious consideration of how the central server receives the in-vehicle video as well as the body worn camera video. The server needs to be licensed and sized accordingly. This will be covered in more detail later in this document.

- A typical officer will record around 3hrs of video per shift. That could potentially generate 32GB of data total which will then need to be replicated. With that in mind as a data point, if you have 10 officers per day with a retention time of 90 days: (10 officers) x (32GB) = 320GB per day (90days) = 29TB. This math is based off of the above information and 2 1080p cameras; one forward facing and one transportation area camera, recording at 30FPS.
- The amount of storage required for the body worn camera (BWC) will also need to be calculated. 1hr of 1080p BWC video will generate 5GB of data. An officer records rough 3hrs per shift. (5GB) (3hrs) = 15GB per shift per officer. Multiplied by the number of retention days will help size the system appropriately.

One of the most critical aspects of this entire solution is the network infrastructure. With the potential for multiple vehicles, needing to offload at one point:

- The network should be provisioned to be able to handle the load that is about to be placed on it.
- The access points should support 1GB or above depending on the anticipated network load.
- Whatever access point are used, if more than one is required, ensure they do not overlap and are tuned to work together.
- Size out the number of access points depending upon how many vehicles will be allowed to connect to each AP at one time.

It is highly recommended to **pre-configure as much of this system as possible prior to physical install.** If the Axis-K410-V1 server is pre-programmed with the Axis F91 series and all of the wireless information, then the vehicle upfitter will just need to do the physical install, and the rest of the system should function upon leaving the upfitter.

3. Example parts list

Example Parts List Per Vehicle					
Make	Model	Part Number	Suggested QTY per Vehicle	Description	Additional Note
Axis	F9114	01991-001	1	Sensor Main Unit	Required
Axis	TF9902	02360-001	1	F91Mounting plate	Required
Axis	F2115	02639-001	1	Forward facing sensor	Required
Axis	F4105	02364-001	1	Mini-dome	Required
Axis	T8355	01561-001	1	Digital mic	Required/Swapable
Axis	TU6004-E	02250-001	2	Sensor cables	Required
Axis	TW4100	02978-001	1	Windshield mount	Required
Axis	Indication LED (4 pack)	01765-001	1	Red indication LED	Suggested/Swapable
Axis	ACS License	0879-010	1	ACS License	1 Required per F91
Axis	S1296	02543-001	1	Central server	Suggested/Swapable
OnLogic	OnLogic K410	Axis-K410-V1	1	In-vehicle server	Required
Taoglas	Stingray Antennas	WA.500W.301151	2	Wireless/BT Antennas	Suggested/Swapable

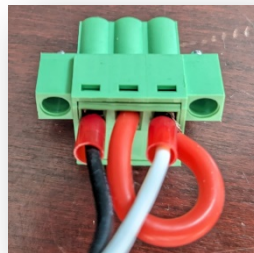
Not included: Wireless network nor body worn camera parts list

4. Initial Server Configuration

Upon receiving all of the equipment, it is recommended to organize all equipment per vehicle. It is also recommended that each equipment's hardware be pre-programmed as much as possible prior to physical installation.

Once everything is laid out, connect the server to a screen, keyboard, and mouse. Ensure that a network connection is available for windows updates.

The Axis-K410-V1 should ship with a power supply and connector. Ensure that the middle ignition sensing pin is connected to the positive pin. This will simulate an ignition power source for when Ignition Sense is enabled. Having power supplied to the ignition sense pin prior to enabling ignition sense will not negatively impact the system.



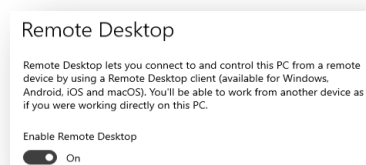
Now that power is supplied, boot the system on via the power button.

Follow the Windows boot prompts, name your system, and apply a password. Once the initial Windows setup is complete, the desktop will begin to load and install AXIS Camera Station.

Once the system has booted, rename the PC with the **car number** it will be installed in. This will ensure that when the recorded video is transferred to the central server, it will label each camera lens with the car number its associated to, making managing video easier.

Set up the date and time to match the region.

Go to Remote Desktop settings and Enable Remote Desktop. This will make trouble shooting and making any system changes easier once the system is installed.



It is recommended to connect the server to a network with internet and perform all Windows system updates at this time as well.

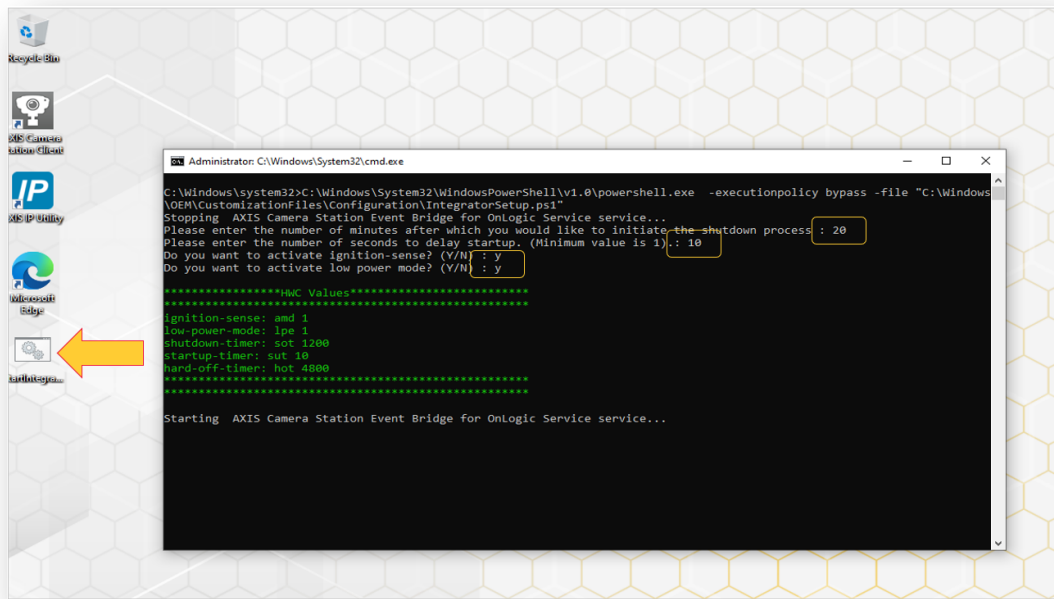
Once the windows updates have completed, it is time to setup ignition sense.

5. Ignition sense configuration

The server supports ignition sense, which allows the server to be programmed to perform different actions based upon the state of the ignition. It is not enabled out of the box and has to be turned on and configured.

On the desktop there is a **power shell script** that assists in programming the ignition-sense.

- Right-click and **Run as Administrator**
- Follow the system prompts
 - Enter the number of minutes you want the server to stay on after the vehicle has been shut off.
 - At this time, it is recommended to let the server run for 2.5 – 3hrs after the vehicle has turned off to give the vehicle enough time to transfer recordings based upon a law enforcement shift. *Please adjust based upon your own network capabilities.*
 - Enter the number of seconds the server should be delayed for start-up once ignition has been turned on.
 - The recommended time is 10 secs and this is the default setting. This setting will ensure that the server boots on after the vehicles initial power surge when the vehicle is turned on. When ignition is applied a vehicle can see a short voltage drop which could result in the server not booting properly.
 - Activate ignition-sense.
 - Enter a Y for yes.
 - Activate low-power mode. This reduces idle power consumption.
 - Enter a Y for yes.
 - The hard-off-timer will be automatically set for 1hr after the ignition timer sequence has finished.
- Once you run this script, the ignition sense will be enabled, and the non-required components of AXIS Camera Station will be removed.
 - **For example:** AXIS Camera Station Cloud, Secure Entry, Smart Search, System Health Monitoring, and Vehicle Data will all be removed. This will make AXIS Camera Station boot up faster when the vehicle turns on.
- At this point you need to **REMOVE POWER** from the server and allow it to restart. Keep the power removed for at least 10secs. Re-apply power. This will allow ignition sense to take over and the Auto Ignition and Watchdog lights on the server will now be on.



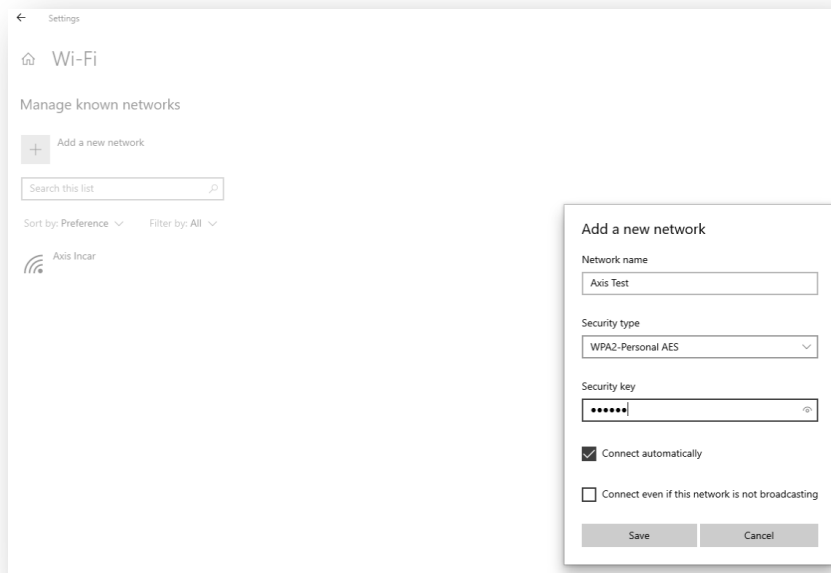
6. Network configurations

The server comes with 2 network ports and a wireless network card.

It is recommended that the wireless card on the Axis-K410-V1 have a reserved IP address on the central network to ensure it always can connect to the central server.

For the two local ports, one should be set with a static IP address that would match the AXIS F91 series camera subnet. The other port should use DHCP or match the network scheme of the MDT/Laptop can communicate with the Axis-K410-V1 via AXIS Camera Station Client.

It is recommended to pre-configure the server with the wireless network it will be connecting to. If the SSID will be hidden, enter the hidden network name, security type, password and check off **Connect Automatically**. This way the server will automatically connect to the wireless network when it is within range or when it returns to the station to begin the offload of video to the central server.

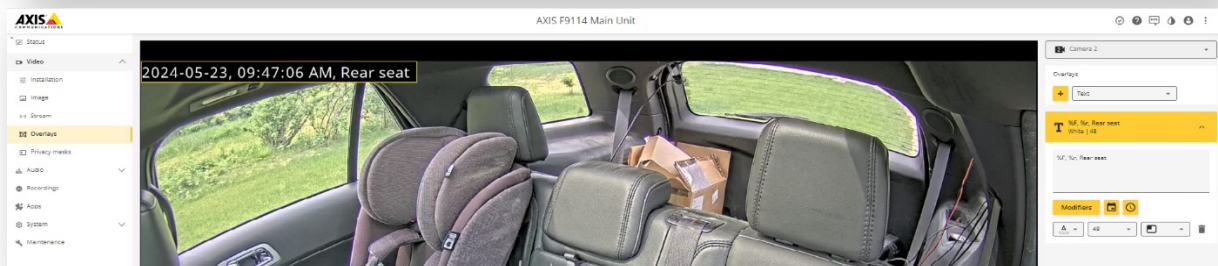
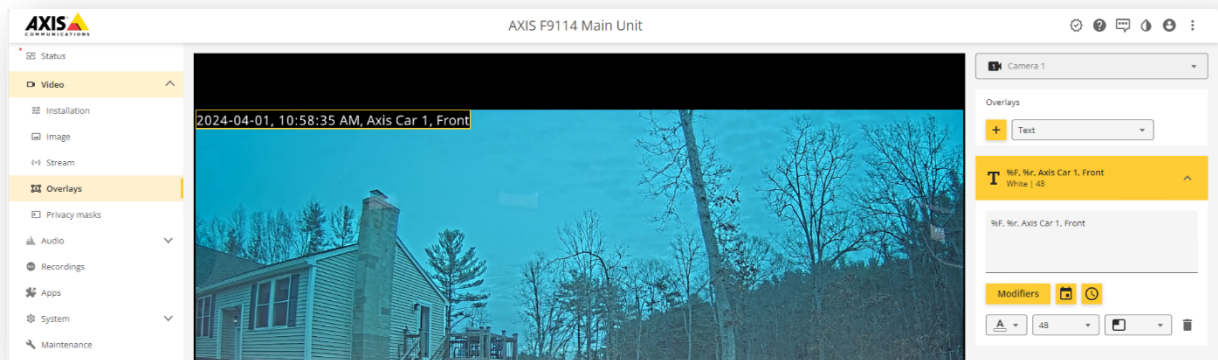


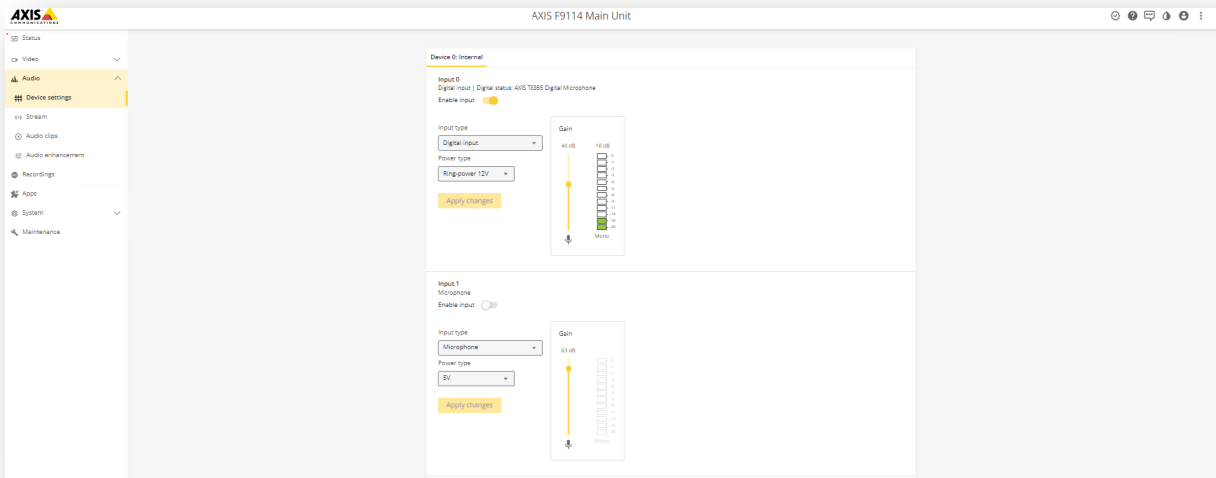
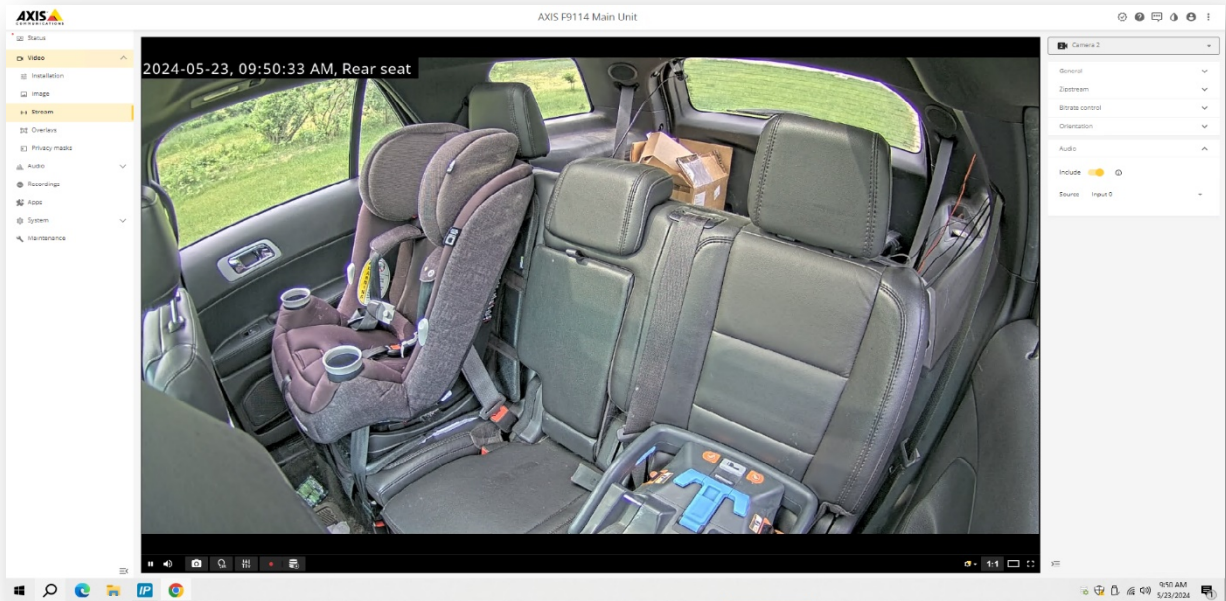
7. Camera configurations

The F91 series will be connected to one of the network ports of the server. The server will supply POE power to the F91 series. For initial programming, both lens should be connected to the F91 and the digital mic should be connected to one of the audio in ports.

- **Username and password:** Log into the F91 series and setup a username and password
- **Overlays:** Go to Video > Installation > Select the Lens on the right side that represents the forward-facing camera > click overlays on the left-hand side
 - It is recommended to add the date and time overlay, name of car and view type. Repeat for 2nd camera.

- **Enable mic:** Go to Audio > Device settings > Enable the Mic input that your using > Select Digital input > Power Type Ring-power 12V > Apply changes
 - If using a 3rd party mic, select the right input and power type
 - Adjust dB threshold as needed
 - Apply changes
 - Assign the mic channel to the right sensor. **For example**, if the mic is installed in the rear seat area, ensure that the rear seat lens is associated with the mic.
 - Video > Stream > Select the sensor > Audio > Include > Select the right input source. Input 0 = Mic 1 and Input 1 = Mic 2
 - It is possible to add this same audio channel to both video streams so the audio is recorded on both streams.
- **Network:** Leave the F91 series as a DHCP network address or configured to work within the vehicles network IP scheme.



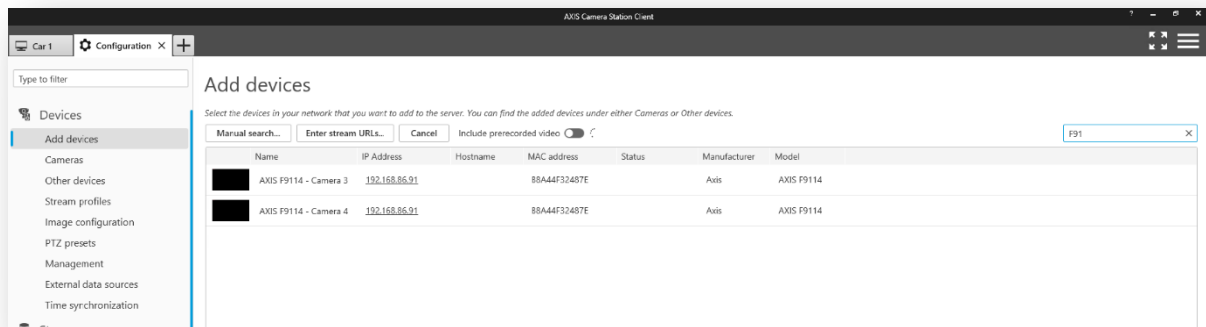


8. Server AXIS Camera Station Configuration

In this section we will add and configure the Axis F91 series to AXIS Camera Station running on the Axis-K410-V1.

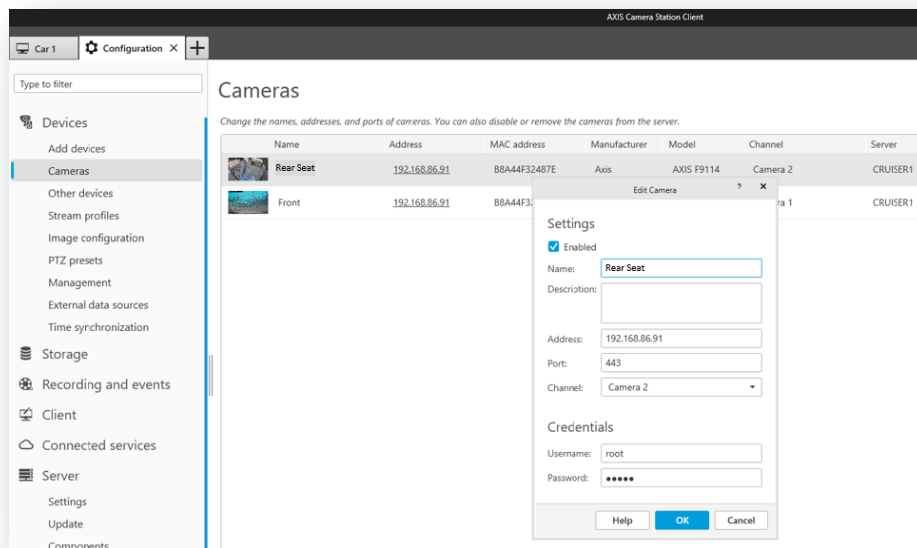
- Ensure AXIS Camera Station (ACS) service controller is running in the bottom right-hand corner and then open ACS.

- Go to Configuration > Devices > Add Devices > Discover the F91 series lens and add the Active lens' > Choose Quick configuration > Retention time should be unlimited > Recording storage Automatic > Recording Method None



Once the cameras have been added, it is recommended to rename them with where they are placed.

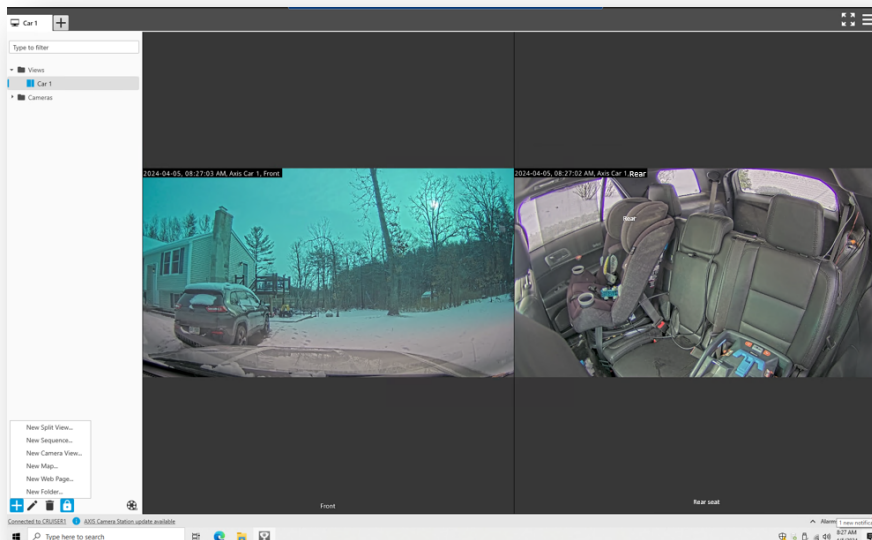
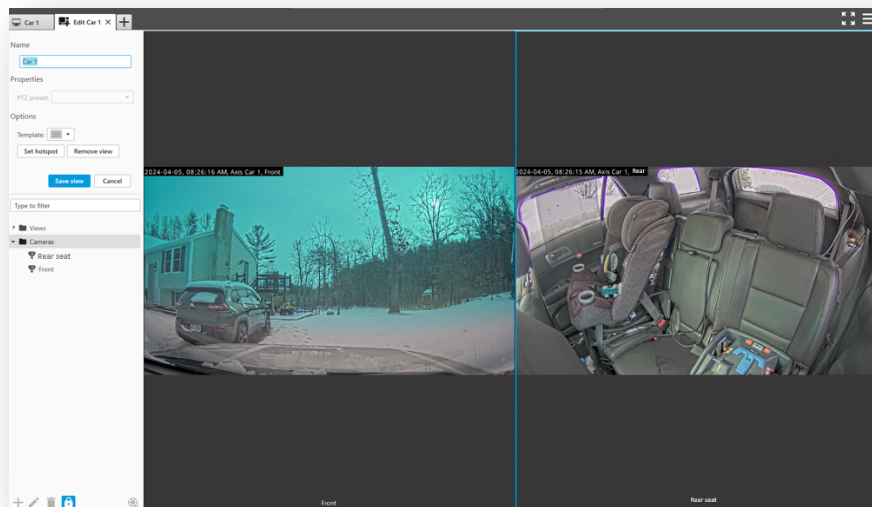
- Go to Devices > Cameras > Right click > Edit



Now

create a view with these 2 cameras.

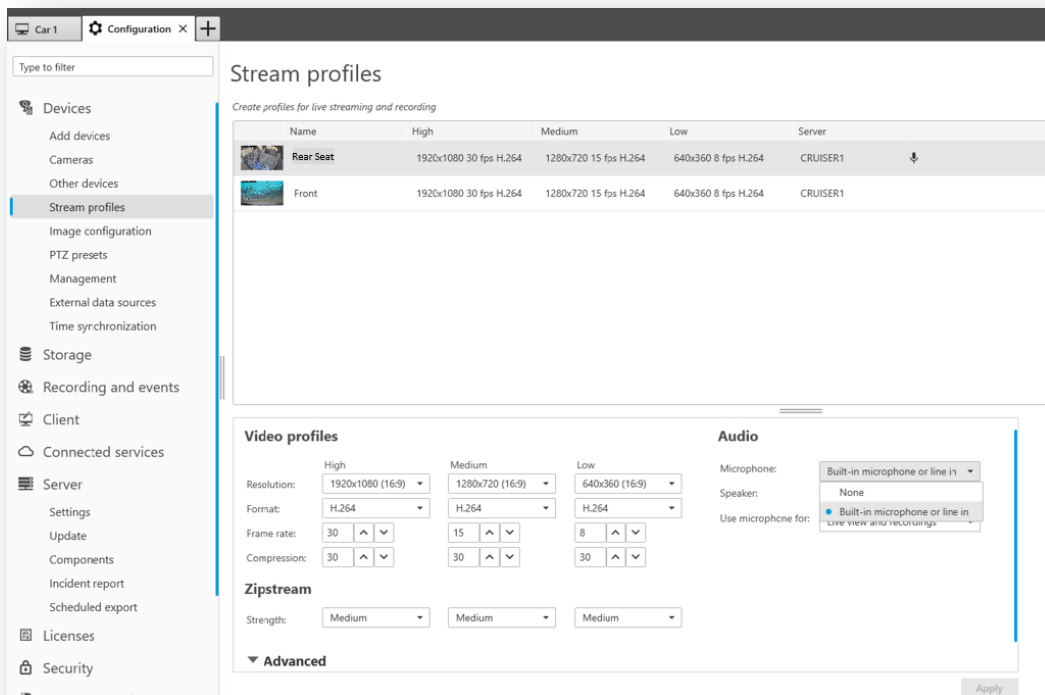
- Bottom left corner click the + sign > New Split View > Name the view > drag the 2 cameras in side by side > save the view



The microphone now needs to be added to the camera it belongs to.

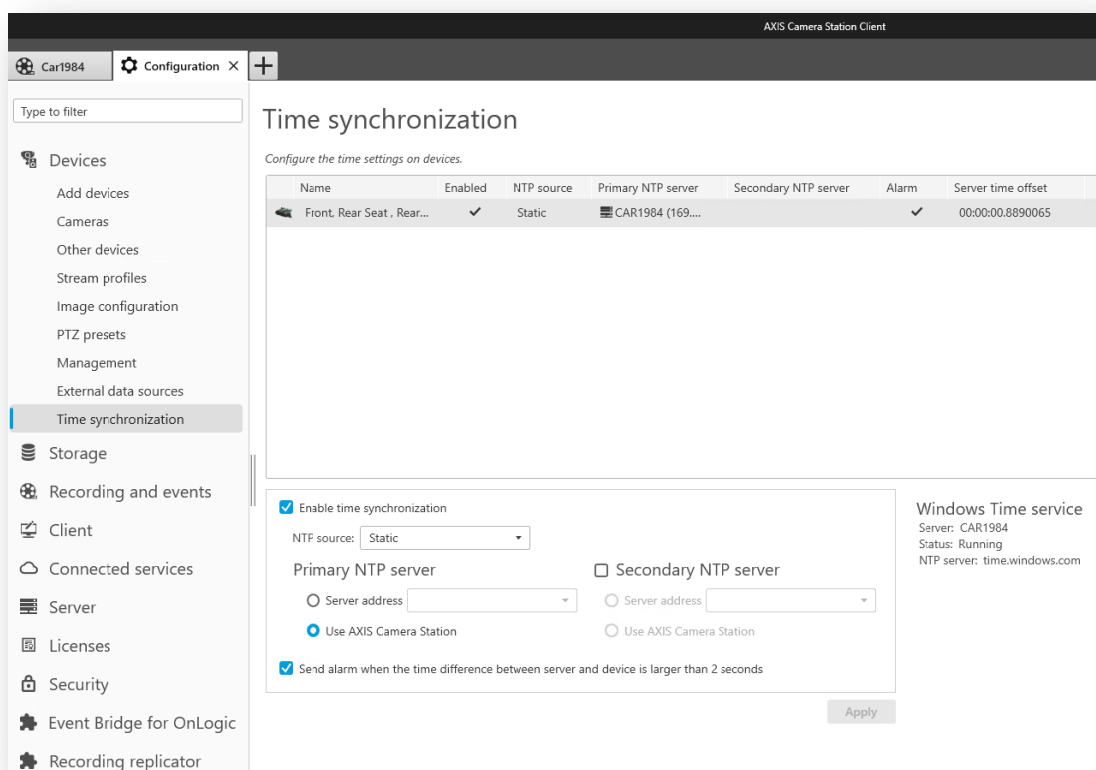
- Devices > Stream profiles > Select the “rear seat” camera > In the microphone drop down menu select the Built-in or line in mic > Apply

- If using the audio stream on both channels, repeat for 2nd video channel.



It is important for all of the systems to be **time sync'd** to ensure both the in-vehicle video syncs with the body worn camera video. The F9114 shall use the in-vehicle server ACS installation as the NTP server. The in-vehicle server shall use the same NTP time server as the central ACS server and the body worn solution server. This is why we will add the central server as the primary time sync server for both the body worn system and the in-vehicle system. To make the in-vehicle server sync with the central server:

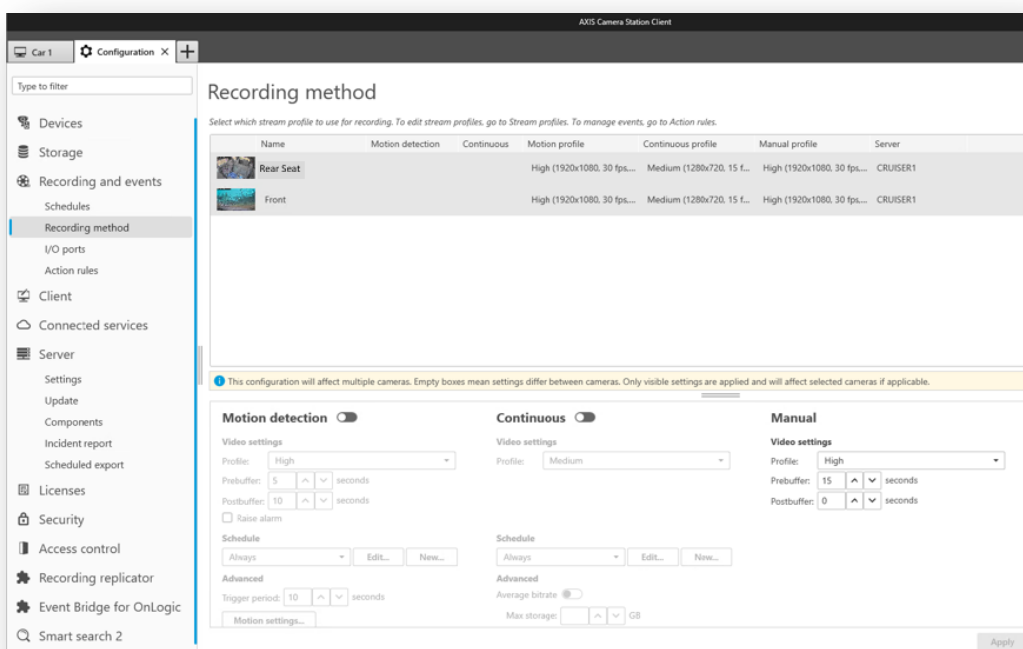
- Go to > Devices > Time synchronization > click on the F91 series camera > Enable time synchronization > Set the primary NTP server to use Axis Camera station > Apply
- Now the in-vehicle server/cameras will retain the time sync with the same server as the body worn cameras.



The Axis Event Bridge uses the Manual Recording profile. The standard setting records the High profile setting which will be 30FPS and 1080p per stream. A pre-buffer can be applied when the event trigger to start recording is activated.

To configure a pre-buffer:

- Go to Recording and Events > Recording Method > Click on both cameras > Under Manual change the pre-buffer to however many seconds is required. It is recommended to match the same pre-buffer settings as the body worn camera.
 - If the pre-buffer is enabled, audio will always be recorded in the pre-buffer. *There is no way to configure the audio to be muted in the pre-buffer settings.*



9. Recording Replicator

Recording Replicator uses the same JSON connection file as the Body worn system. When video is recorded on the in-vehicle server, and then connects back to the central server, the recorded video will be replicated onto the central server for long term storage. The recorded video on the in-vehicle server will get over written based up the storage retention time or storage available/allocated.

At this time, there is no check sum to ensure that video does not get over written before it has had time to transfer.

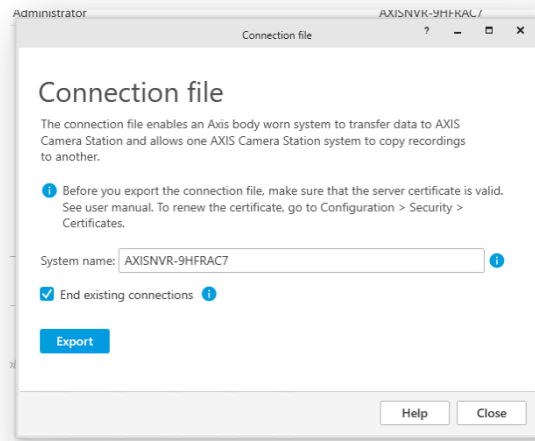
Based upon the normal working shift of an officer, the in-vehicle server should provide at least 30 days of storage/30 days to allow recordings to transfer based up 3hrs of recordings per officer per day.

Prior to generating the connection file and applying it to the in-vehicle server, it is recommended that the central server running ACS and receiving the video, be updating to the latest version of ACS 5, version 5.57.23929.

After ACS has been updated, it is recommended to renew the ACS certificate and generate a new connection file before applying it to the in-vehicle server.

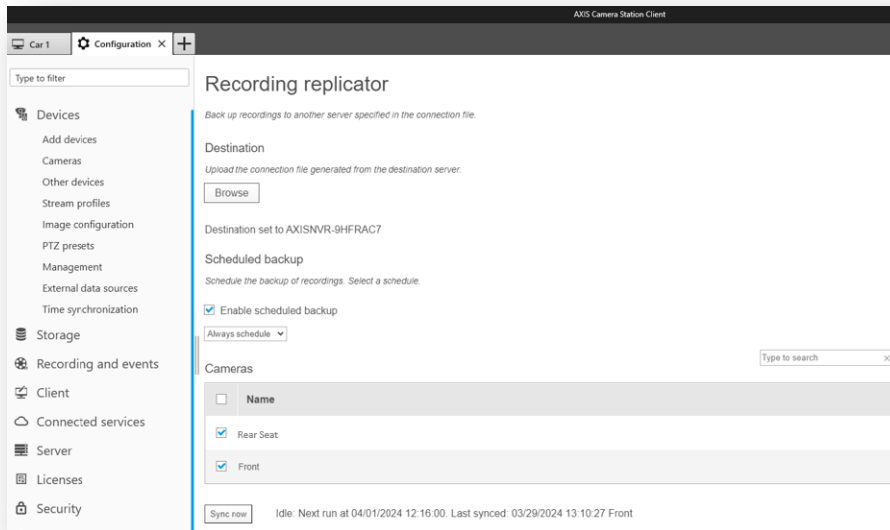
- Go to the central server > configurations > Security > Certificates > click on Renew
- Close ACS > Restart the ACS service controller > Open ACS > Generate a JSON Connection file

- Go to the central server > open AXIS Camera Station (ACS) > go to the hamburger button in the top right corner > Other > Connection File > Export
 - Save this connection file to a thumb drive and transfer it to the in-vehicle server. This file can be used with all of the in-vehicle servers.
 - **You will need to update the connection file in the body worn system as well with this new file.**



Now that the connection file has been generated, it can be applied to the in-vehicle server. Ensure that the server is connected to the same network at the central server and connect the USB drive with the connection file on it.

- Go to the in-vehicle server > ACS > Recording Replicator > Under destination click browse > select the connection file > apply it
 - If applied correctly, a Destination server name should populate
- Enable Scheduled backup
 - Schedule should be set to ALWAYS. Recording Replicator will look for connectivity every 3 mins and then begin offloading once connection has been established.
- Select the cameras that have been installed in the vehicle
- Click Sync now to test the connection. If there is no recorded video, nothing will transfer.
 - *It is recommended to create a manual recording on each camera inside of ACS and then stop recording and test the connection to ensure video transfers to the central server.*
 - *The in-vehicle server cameras will not appear in the central server until there is video to be transferred.*

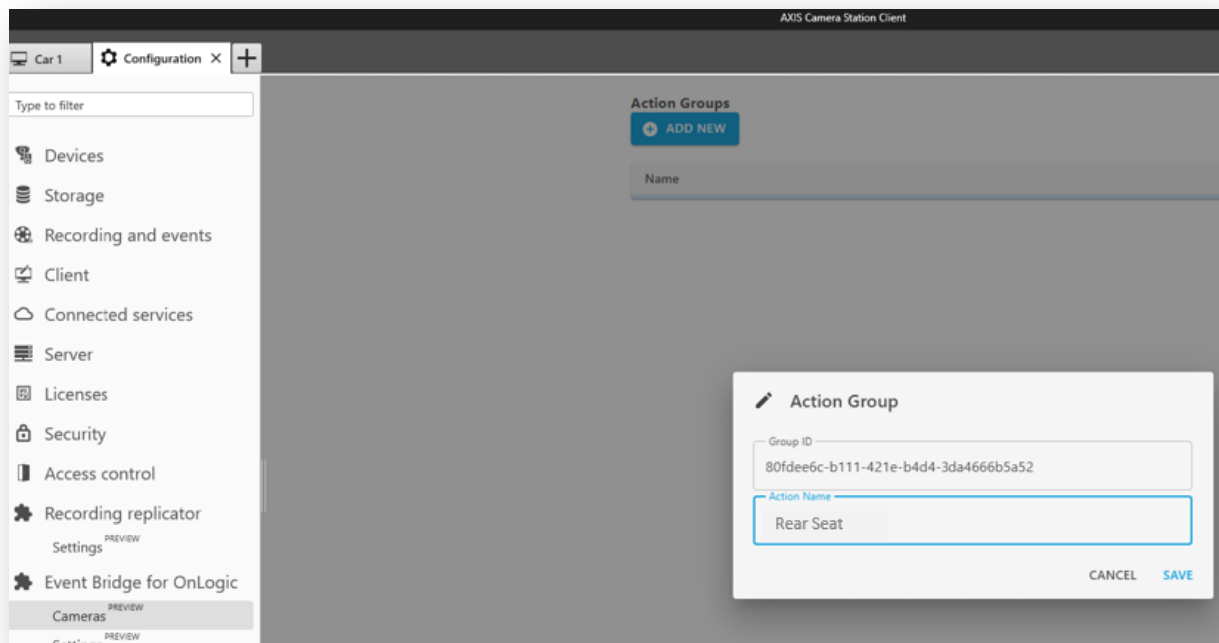
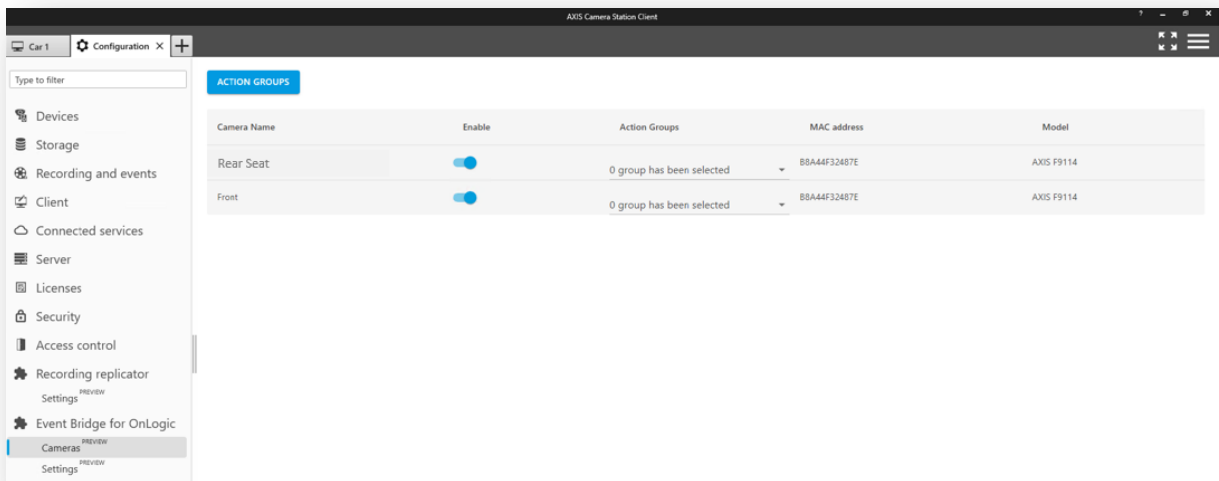


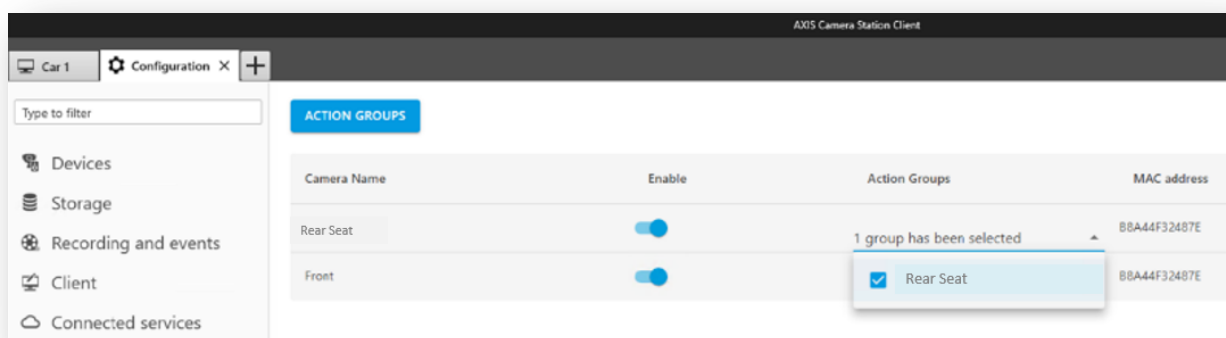
10. Event Bridge for OnLogic

The Event Bridge for OnLogic, is a component of ACS that establishes a direct integration between the DIO of the OnLogic server and the Bluetooth card, as well as the ACS recording engine. This component makes the integration of event triggers with camera recording and activation seamless. There are pre-defined Actions that can be used, but Actions are highly customizable depending on which cameras you want to activate and when.

The first thing that needs to be done is to enable the cameras to be used. Inside of ACS, go to the Configuration tab:

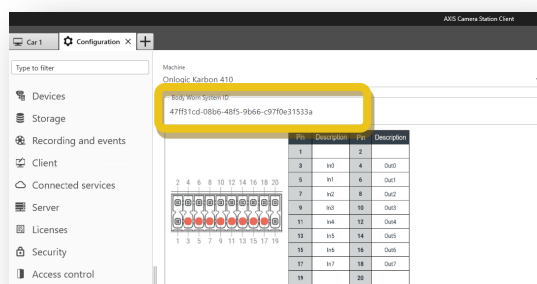
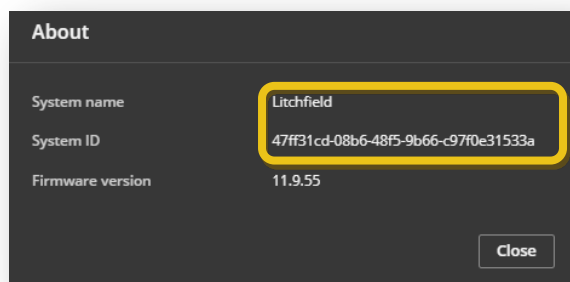
- Event Bridge for OnLogic > Cameras > Toggle the cameras ON
- This is also where you can create custom Action Group's which can be programmed to start specific cameras for specific events.
 - **For example**, if you wanted the rear seat camera to **ONLY** start recording when the rear door is open, you can create an Action Group and name it "Rear Seat Camera"; then add that camera to that Action Group.
 - An Action will then populate in the Action Tree "Start recording on group: Rear Seat Door Open".
 - Associate that event trigger with the right input on the DIO and wire the trigger wire to it.



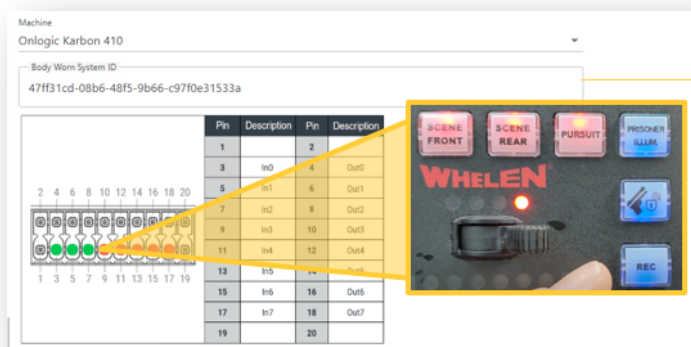


Now that the cameras are enabled, go to the Setting Tab under Event Bridge for OnLogic. This is where we will begin to populate the Action event tree for inputs and outputs as well as associate the end users body worn camera system with the in-vehicle server.

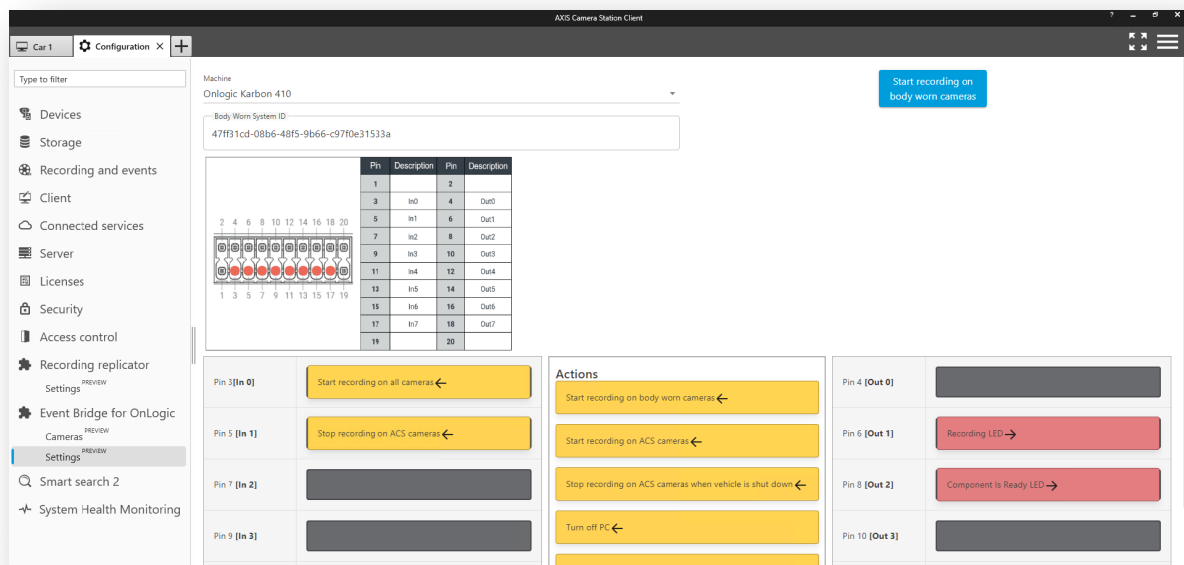
- Log into the end users body worn system via the AXIS W800 System Controller. Go to the 3 ellipses in the top right-hand corner and click on About. Copy the System ID into a notepad file and save it to the same thumb drive as the connection file.
- Copy and paste this System ID into the Event Bridge under Body Worn System ID. This will embed the AXIS W800's system ID into the Bluetooth Beacon when it's generated, only activating BWC's that belong to that end customers system.



- The DIO supports 8 inputs and 8 outputs. When Pins 1 (Power) and 2 (Ground) are wired, the inputs if the DIO will show RED. When the DIO is not powered, or when a grounded input is triggered, they color will change to green. The isolated digital inputs/outputs are enabled by default and require an external power source (9 ~ 48 VDC) in order to operate. The outputs function as open-**drains**, and should not be used to source more than 150mA of current. The input of the DIO is pulled **high when floating**.
- Ensure that any event trigger applied to the input or output is a **grounded source**.
 - This may require the use of an automotive, 12v, SPST relay to convert the positive voltage trigger from the lightbar controller to a grounded voltage trigger.



- The Event Bridge supports drag and drop programming. It is important to plan out which Pins will perform which actions and document this, so the vehicle upfitter wires the correct triggers to the correct pins.
 - **For example:** In this demo, I have Pin 3 wired to “Start recording on all cameras” and Pin 5 set to “Stop recording on ACS cameras”. Start recording on all cameras will trigger both the in-vehicle cameras to start recording and will create a Bluetooth beacon to automatically activate the BWC. Stop recording on ACS cameras will ONLY stop recording on the in-vehicle cameras. The officer will need to manually stop the BWC from recording.
 - The Bluetooth beacon will continue to transmit for as long as the PIN is in an active state. Meaning that if any other people arrive on scene wearing a body worn camera associated with that end user, and their camera is not active, it will automatically turn on until the trigger is deactivated.
 - If there is a desire to have the trigger be timed, the trigger source can be configured as a timed relay if possible or a physical timed relay could be put inline between the trigger source and the DIO on the in-vehicle server.



In the example above, there are also 2 output Actions which are pre-populated.

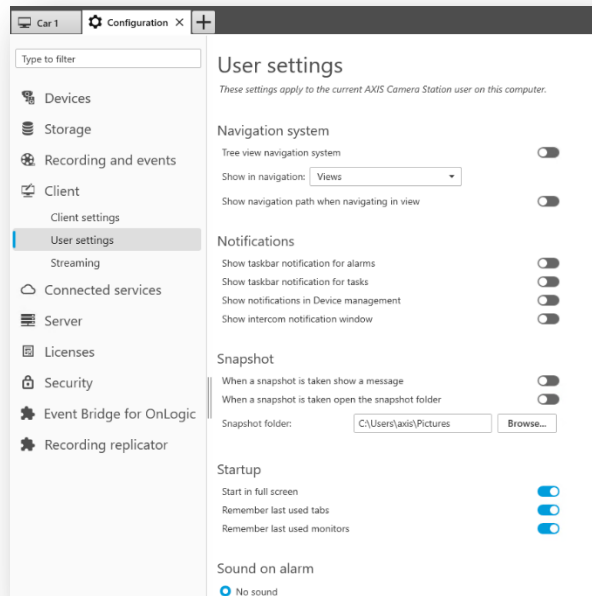
These are meant to support indication LED's which can be utilized to inform the officer that the system is up and running, and that there is an on-going recording and that the system is up and running.

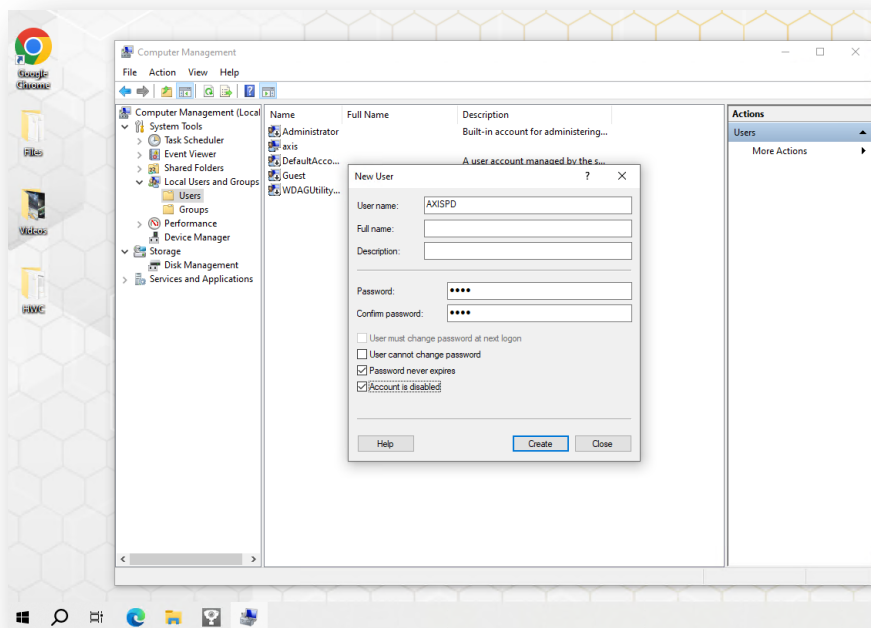
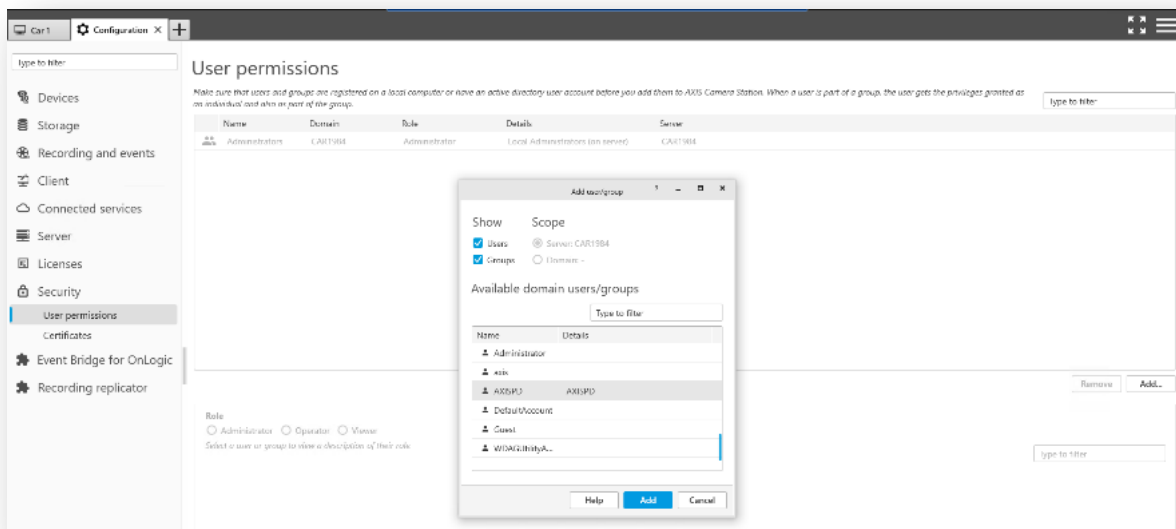
- These LED Actions should be dragged to the corresponding output pins. The output pins are the even numbers on the DIO.
- **For example:** When an officer starts their shift they need to know their system is up and running. This can be done by logging into the ACS client on their Mobile Data Terminal or by visually seeing an LED which signifies the system is up and running. Also, the most common method for starting a recording is to activate the lights and sirens. When this action is used the in-vehicle cameras will start recording and the recording LED (if supplied) will turn on. When the lights and sirens are turned off, it does not stop the recording. This recording indication LED will stay lit until the officer presses the stop recording button.
 - *Axis LED's or any 3rd party 12v LED's can be used in this application.*

11. Creating a client user

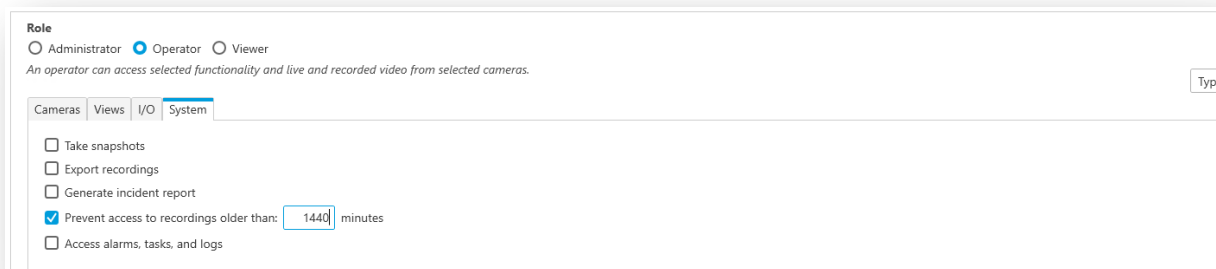
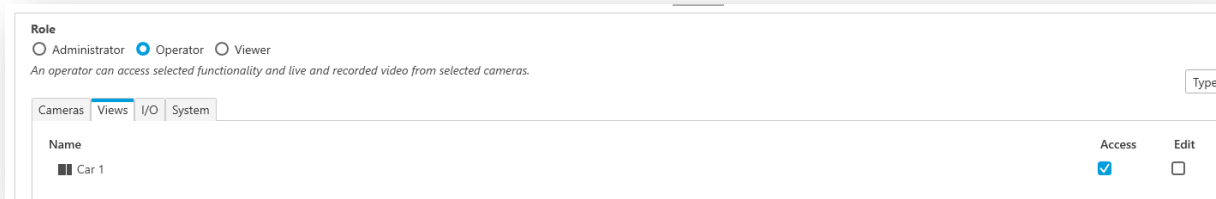
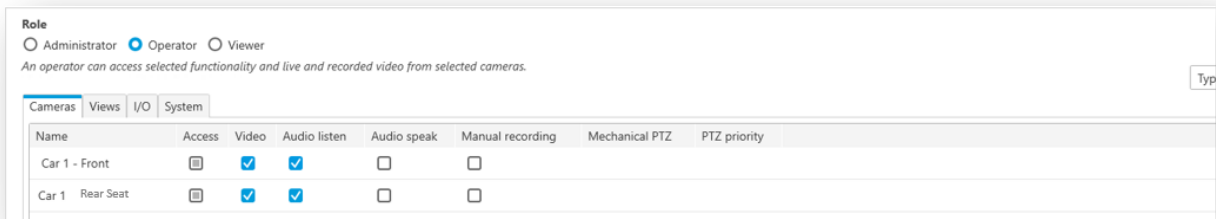
The local MDT/laptop in the vehicle can connect back to the in-vehicle server using ACS Client which should be loaded and installed onto the vehicle's MDT/laptop. This can be don't by setting up a guest user on the in-vehicle server for the person in the car to use as a login.

- Navigate to computer management on the server > Local users and groups > users > add a user as the Police Dept. name > add a password > uncheck user must change password at next login > checkoff password never expires.
- In ACS add the user you just created under User permissions
 - Configuration > Security > User permissions > Discover the windows user > add





- Assign the user permissions to ensure they only have access to view the video and have very limited access rights.
 - **For example:** assign the user to be an operator > under Role click on Cameras > check off access to video and audio > Click Views > check off Access to the View you create above > under System ensure that the only item checked off is Prevent access to recordings older than: X minutes > Save
 - *In this example 1440 minutes is used as that represents 1 day*
 - *This is all highly customizable*



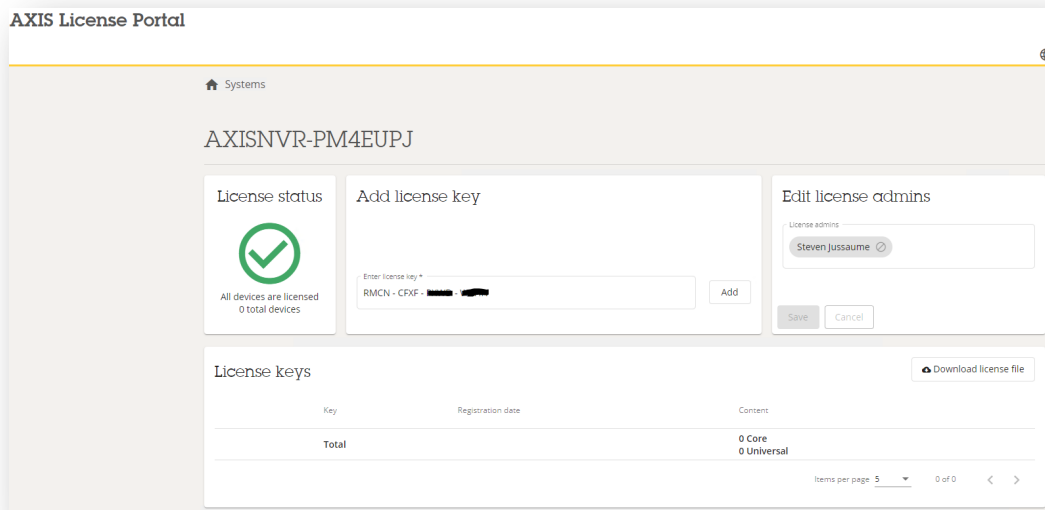
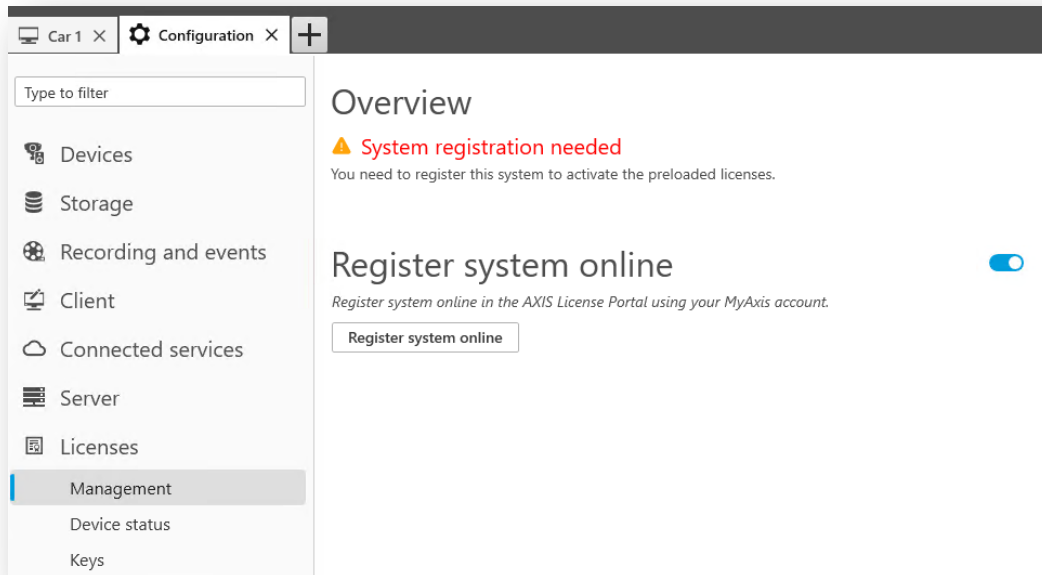
- Adjust the User Settings for when the officer logs in to the ACS client it appears the same way every time.
 - For example, copy the setting below:
 - Configuration > Client > User settings > copy settings in image below

12. Licensing AXIS Camera Station

The in-vehicle server needs to have a license applied to AXIS Camera Station. This is the only license that needs to be applied to the in-vehicle server. The F91 series brought into ACS, requires 1 camera license.

- To apply the license you must have an [Axis Communications My Axis Account](#).
- Once you have an account and have purchased the required licenses go to:

- Configuration > Licenses > Management > Register system online > Sign into your account and apply the license key to the server in the AXIS License Portal
 - *This system can be registered offline as well.*



The central server receiving the video will also have to be licensed and require 1 license per stream.

- **For example:** If every vehicle has 2 cameras, the central server will need 2 licenses per vehicle.



Ensure that when license are ordered, they are ordered per vehicle and not as 1 large batch. For the central server, the license can be order in 1 large batch. If the central server is an Axis Server, it will come pre-loaded with some licenses, so the math will just have to be done to ensure there is enough licenses to support all the vehicles.

13. AXIS Camera Station Client Install MDT

The officer may need to check the system status or want to view the video from within the vehicle. The best way to accomplish this would be to install [AXIS Camera Station Client](#) on the mobile data terminal and link it back to the server running in the back of the vehicle. The client software is only a client so it will not install the server application.

- Download AXIS Camera Station Client on a USB Thumb Drive
- Install the application on the vehicle MDT
- Open ACS client
- Under Remote server add the IP address of the Axis-K410-V1 in the back of the vehicle
- Point the client to the IP address of the server in the rear of the vehicle
- Now when the user logs in they will only see the View that was created and have access to:
 - See if the cameras are up and running
 - The current state if their recording or not
 - And have the ability to go back and see recordings from 1 day

Welcome to
AXIS Camera Station 5.

Connect to server(s)

- Last used servers
- This computer
- Remote server: 10.10.10.1

Sign in to AXIS Secure Remote Access

- Log in as current user

Log in

Welcome to
AXIS Camera Station 5.

Connect to 10.10.10.1

- Current user
- Other user

Username: AXISPD

Password: ****

- Remember me

Log in

Change Server



14. Physical installation

In this section, we will cover the physical installation of the various components of the Axis in-vehicle solution. The two primary components of this solution will be the AXIS F91 main unit and the Axis-K410-V1 server. Both of these devices should be installed in a secure location in the vehicle, preferably close to one another.



Using the supplied mounting brackets, install the server to a secured surface. Ensure the server is close to the power distribution panels for access to power.

- Attach wall mounting brackets to the chassis using the provided screws. To assemble, locate the four holes in the chassis that line up to the two countersunk holes in each wall mount bracket.
 - Screw type: M3x0.5 FH 120 Degree Length: 4 mm
- Take care to ensure that the brackets are oriented correctly and that the part of the brackets in contact with the mounting surface is positioned away from the system to ensure a **small air gap is maintained between the mounting surface and the system**. Install the four supplied screws.
- Fasten system to the mounting surface (hardware not provided). The mounting bracket systems are required to secure 3x the hanging weight of the computer system. The mating substrate must be capable of maintaining the same rating.

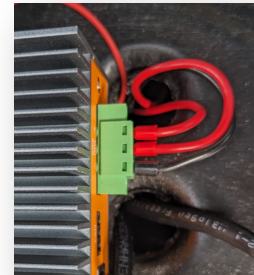
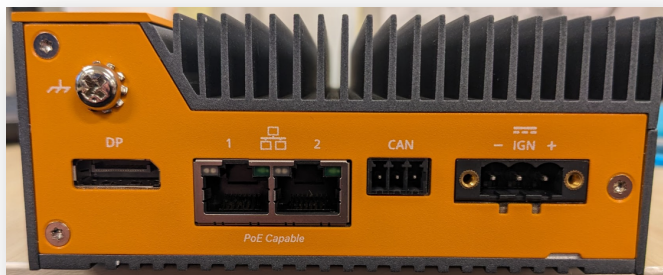


Use the supplied terminal block and wire the server to the power distribution panel supplying both positive, ground and ignition voltage.

- This server supports 9 – 48 V DC power.
- This server will draw at max power 34.2 watts, in addition the POE power available is 36watts, therefore a **7.5amp fuse** should be used in-line between the server and the power distribution panel.

The server has 2 network ports.

- Either port will supply connectivity and POE to the F91 main unit.
- The other port should connect into the vehicle network, allowing the mobile data terminal the ability to connect with the server.



Connect the DIO terminal block to the DIO port and supply 12v dc to pin 1 and ground to pin 2.

- The isolated digital inputs/outputs are enabled by default and require an external power source (9 ~ 48 VDC) in order to operate.
- The outputs function as open-**drains**, and should not be used to source more than 150mA of current. The input of the DIO is pulled **high when floating**.
- The inputs and outputs require a grounded signal to be able to trigger an event.
 - For example: When a lightbar is turned on, an additional pin can be activated on the lightbar controller sending voltage into the line. An

inline 12v, automotive, SPST, relay can be used in-line and wired to convert that 12v signal into a ground which would then be wired to the associated pin on the DIO.



Pin	Definition	Pin	Definition
1	Power	2	GND
3	In0/QEP0A	4	Out0/PWM0
5	In1/QEP0B	6	Out1/PWM1
7	In2/QEP0I	8	Out2/PWM2
9	In3/QEP1A	10	Out3
11	In4/QEP1B	12	Out4
13	In5/QEP1I	14	Out5
15	In6	16	Out6
17	In7	18	Out7
19	CANL	20	CANH

ModBay DIO Pinout

The server comes with a built-in wireless card and support for both 2.4GHz and 5GHz bands via an Intel wide-temp wireless-AC 9260 802.11ac Wi-Fi & BT 5.1 card. This card supports 2 RP-SMA Male connectors.

- Connect the wireless antennas directly to the supplied connectors and mount the antennas in an optimal location inside the vehicle or outside the vehicle.
 - **For example:** If using the [Taoglas Stingray antennas](#), these antennas can be mounted inside the vehicle on an available window in an optimal location, not requiring a hole to be drilled through the vehicle.
- Various antenna types and connectivity solutions can be used to connect the system back to the end customers wireless access points on the building.



The Axis-K410-V1 uses the Intel_AC-9260NGW which is a wide temp wireless card and when used in conjunction with the Taoglas Stingray antenna, the coax cable needs to be at least 1m in length to comply with the FCC regulations. Anything less will violate the radio grant allowance for gain on 5GHz.



The F91 main unit should be installed using the AXIS TF9902 Surface Mount mounting bracket securing it to a fixed mounting location inside the vehicle. The F91 series should be connected to the server via a cat5/cat6 cable, as the server will power the F91 main unit via POE power.



Run the coax cable for the 2 sensors through the vehicle from their install location back to the F91 main unit.

- The primary cable runs for the sensor unit will be from the front windshield back to the F91 main unit and from the transportation area back to the F91 main unit.
- Once the coax cables are run and connected back to the main unit, the camera sensors can now be installed.

The 2 primary sensor install locations will be the forward facing camera and the rear seat area camera.

The forward-facing lens will use a combination of the AXIS F2115-R Varifocal Sensor varifocal sensor and the AXIS TW4100 Front Windshield Mount. The AXIS F2115-R has a 107-56 degree field of view.

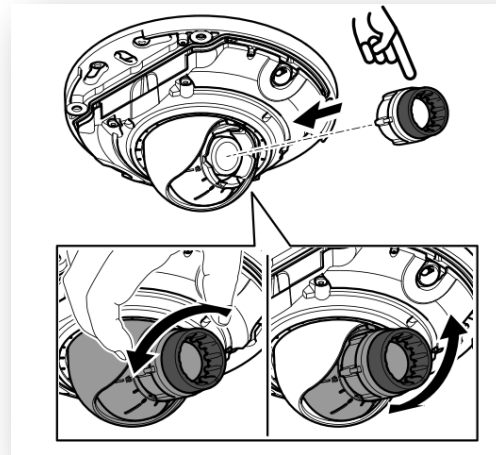
- The AXIS TW4100 mount and the AXIS F2115-R both have alignment markers to assist with ensuring the sensor is mounted level. Align the sensor marker with the marker on the adjustment ring from the AXIS TW4100.
- Place the adjustment ring inside the mount and align the horizontal markers.
- Connect the coax cable to the sensor.
- Secure the coax cable using the supplied zip tie.
- Prep the windshield surface with an alcohol wipe and let it dry.
- Remove the 3M adhesive label.
- Secure the mount to the windshield firmly holding it there for 10 secs.
- Adjust the sensor unit as needed for the desired field of view.



The transportation area camera will use the AXIS F4105-LRE Dome Sensor unit. This unit is IP6K9K rated with an adjustable lens and integrated IR allowing the camera to see at night. It has a 110 degree field of view.

- The AXIS F4105-LRE should be securely mounted in an optimal location in the transportation area to achieve the best field of view.
- Once the location has been determined, connect the coax whip on the AXIS F4105-LRE to the other end of the coax cable that was previously run.
- Use the supplied lens adjustment tool to both adjust the field of view of the lens and adjust the focus of the lens if needed.

If the project requires a wider field of view to capture more of the transportation area, a [144 degree field of view lens](#) can be purchased separately



The AXIS T8355 Digital Microphone has a max spl of 130dB and is a hemispherical microphone. It is IP65 rated and needs 9-13 V DC power supplied by the F91 main unit.

- The mic has various mounting options allowing it to be surface mounted or recessed behind a surface.
- Once an optimal location is found, route the mic cable through the vehicle back to the F91 main unit and ensure the 3.5mm connector is plugged into the mic port that is associated with the current lens.
- It is recommended that the mic be installed somewhere in the transportation area to ensure important audio is captured from the person being transported.



15. Central server setup

Now that the cameras and the Axis-K410-V1 are programmed and installed, it is time to set up the central server and organize the in-vehicle cameras and body worn cameras as well as user access rights for an optimal end user experience. This

section will be a high-level overview of the best practices when configuring the central server.

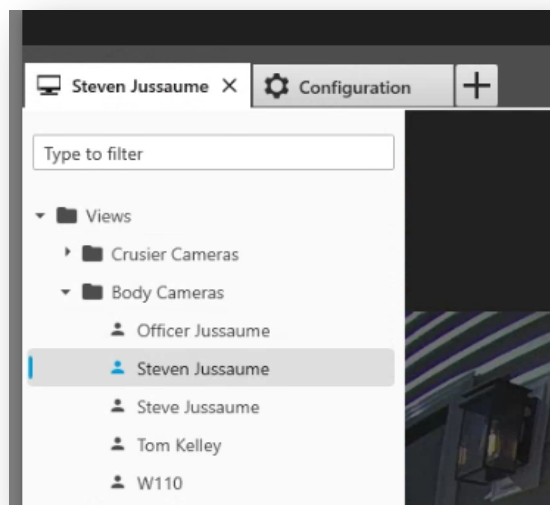
The topics that will be covered are:

- Video management
- How video transfers
- User access rights
- Folder and view creation
- Video playback and Exporting video

AXIS Camera Station is a video management software which allows for the unique organization and management of recorded video. In this case ACS is being used to manage in-vehicle and body worn camera video.

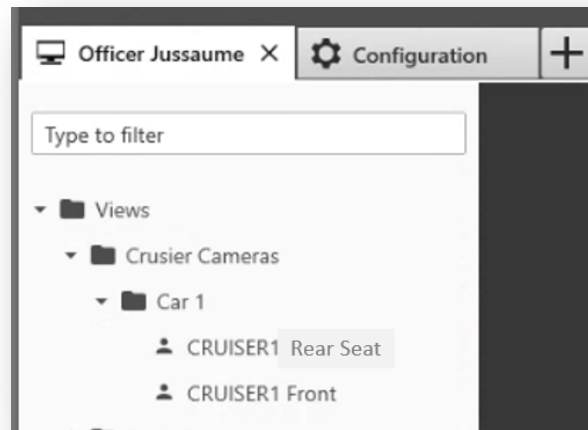
Axis body worn cameras can be assigned to a user. Once a user is added into AXIS Body Worn Manager, the username will populate inside of ACS. All these users will populate as a “camera” and as a “view”. Once all the users have been populated, it is recommended to create a folder in VIEWS and add all the BWC users into one folder.

- Right click on Views > New Folder > Rename folder Body Worn Cameras > OK > Drag all the body worn camera users into that folder; *click on a user then click shift and down to multi-select users*



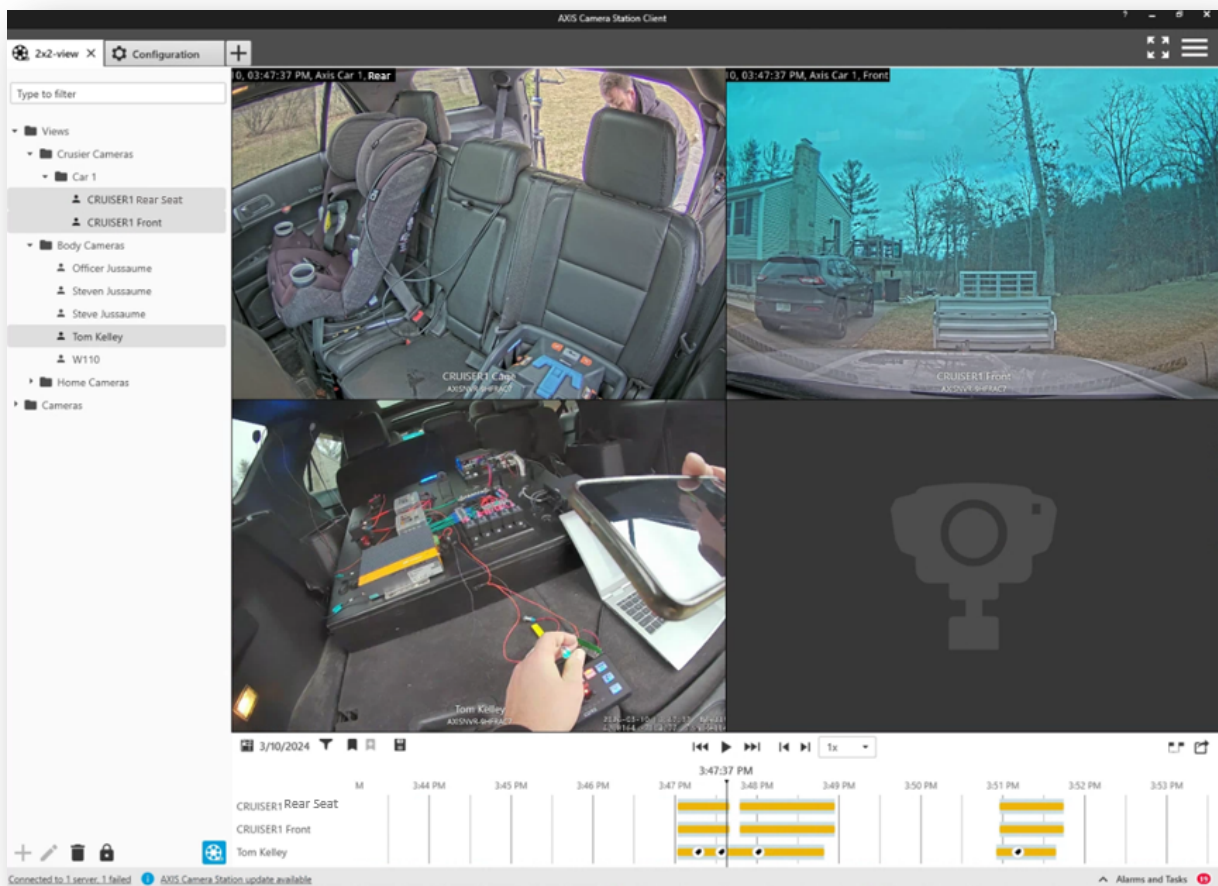
The vehicles today cannot be assigned to a user. This is why the server was given a server name that relates to the name of the vehicle. When recorded video transfer over to the central server, it will come in with the server's name and camera name. Video will only populate once the video has been recorded and replicated to the central server. During setup, recording test clips should be performed and test footage transferred to the central server, which will allow for verification that everything is working, and easier vehicle organization on the central server. Once all the vehicles have replicated some video, they will appear as a “camera” and a “view”.

-
- Right click on Views > New Folder > Rename folder Cruiser Cameras > OK
 - Right click on Cruiser Cameras > New Folder > Rename folder with the name of a vehicle
 - Repeat and create an individual folder for each vehicle
 - Drag and drop each vehicle view/camera into the associated folder

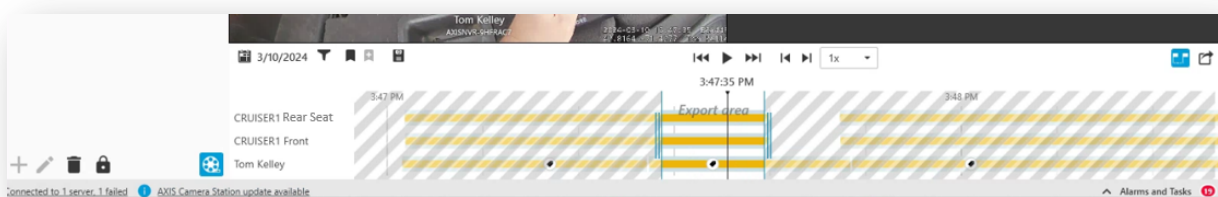


Now that all the video is organized, a user will be able to open the body worn folder and the associated vehicle folder that they were assigned that day.

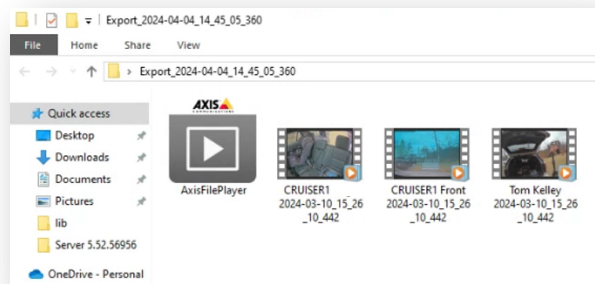
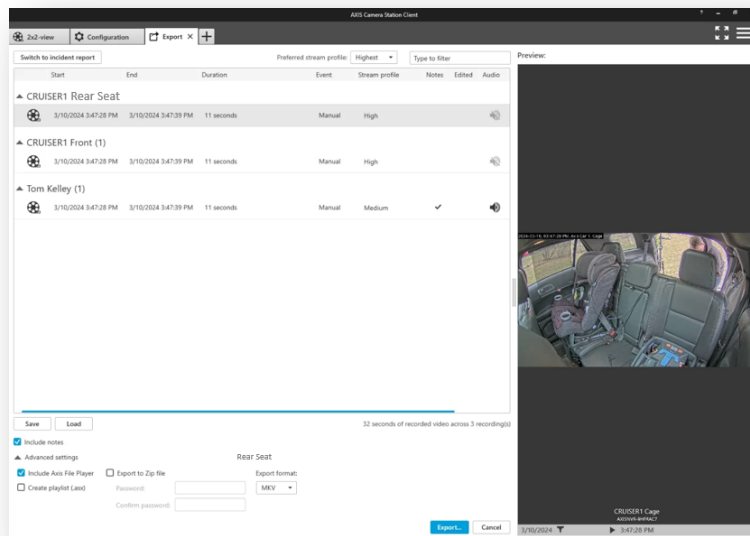
- Hold ctrl and select the body worn camera and the vehicle cameras and drag them into the view area.
- Go to the recordings symbol and go to the date and time of the BWC incident.
- Because the vehicle was assigned to that user on that day, the body worn camera video will be aligned with the in-vehicle video.
- The user can play the video back all at the same time and export the required clips at the same time.



- Click on the export marker flags and adjust the timeline markers to the area of footage that needs to be exported.
- Then click the Export button

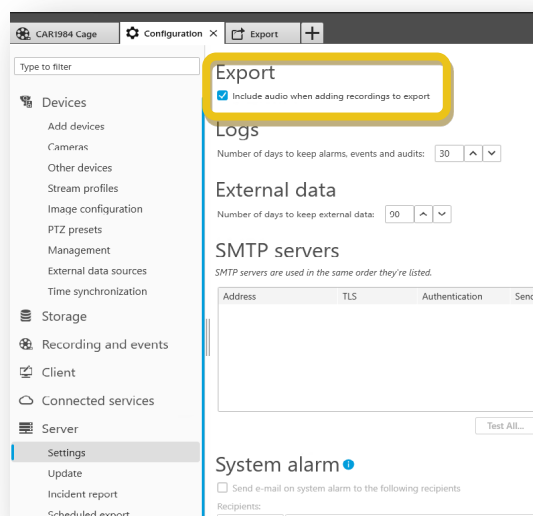


- Select the destination you want the file to be sent to
- Click export
- Now you in-vehicle video and BWC video are all in one folder with a file player

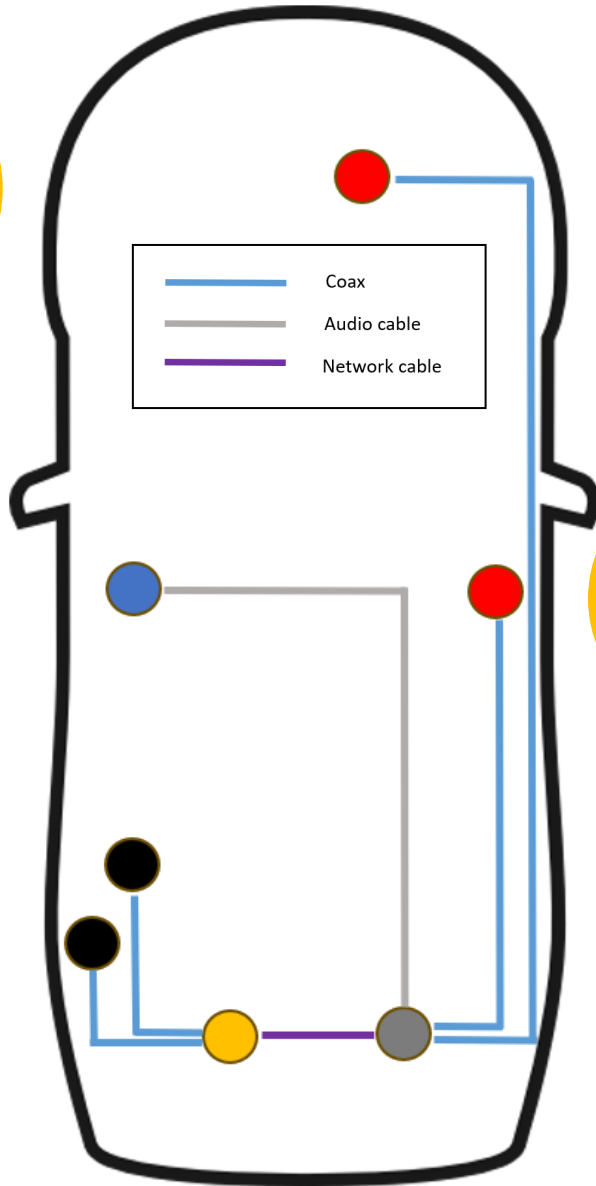


When exporting video ensure that audio is included in the stream if audio was recorded. This setting can be configured on the central server to always be enabled by going to:

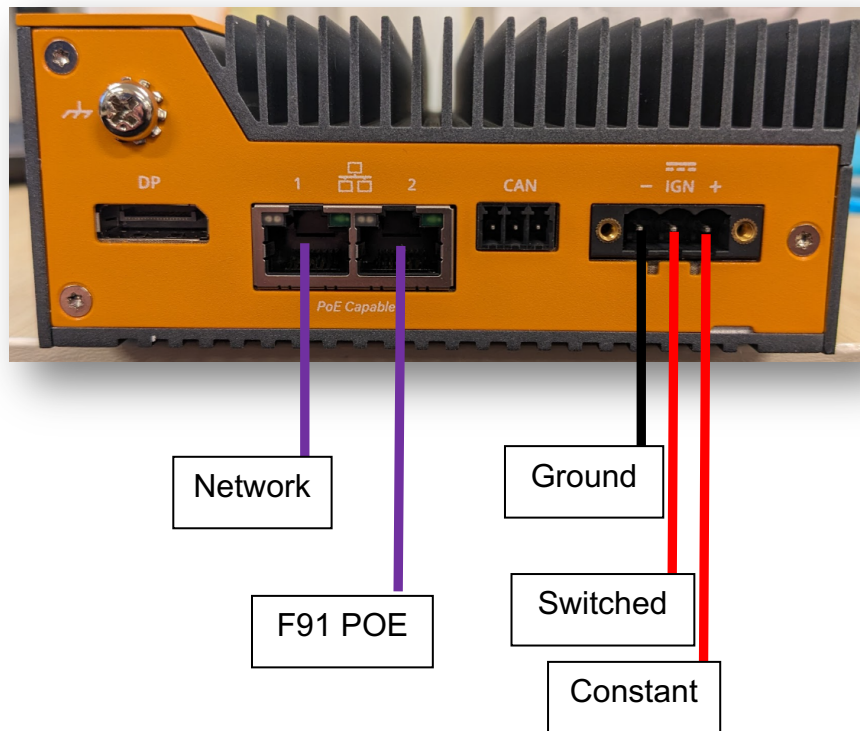
Configuration > Server > Settings > Check off “Include audio when adding recordings to the export”



Wiring Diagrams



Primary power and connectivity

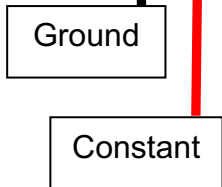


Wire Size and Fuses

It is recommended to use 16AWG wire from the power distribution unit to the server.

The server should have a 7.5amp fuse inline from the positive power source to the server.

Powering the DIO

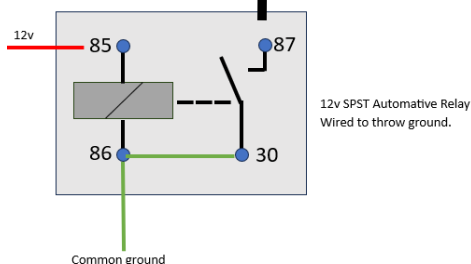


Wire Size and Fuses

It is recommended to use 18AWG wire to supply power and ground to the DIO.

The DIO should have a 1amp fuse inline from the positive power to the server. It has a max output of 150mA.

Event Trigger Wiring

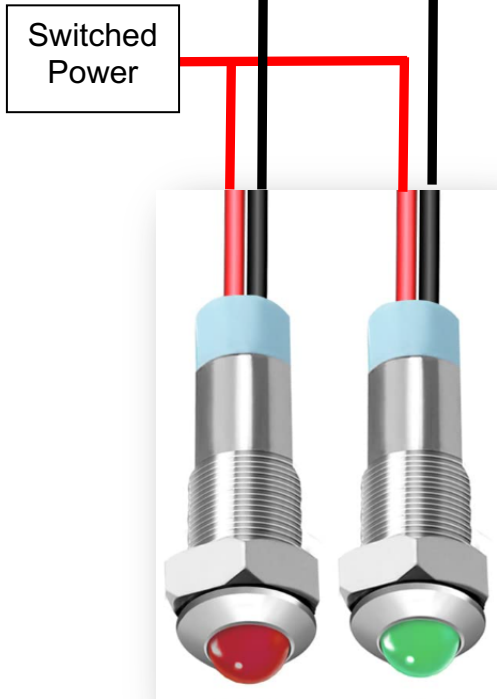


Wire Size and Fuses

It is recommended to use 18AWG wire to supply a grounded event trigger to the DIO.

To trigger an input/output, the DIO needs to receive a grounded event trigger. The most common method will be to use a 12V SPST automotive relay in-line from the 12v trigger source such as a lightbar.

Indication LED Wiring



Wire Size and Fuses

It is recommended to use 18AWG wire to supply a grounded event trigger to the DIO.

The LED's will be grounded to the output terminals and will become lit when the Component is ready and when a recording is on-going.

Any 12v LED will work. The DIO supports no more than 150mA.

Manually Programming Ignition-sense

Ignition-sense can be manually programmed. The pre-programmed PowerShell script should be used initially, however the need to adjust the hard-off-timer or the shutdown-voltage threshold may arise. After running the PowerShell script, this is how additional settings can be applied.

Make sure that you have downloaded the OnLogic Hardware Control Application and placed it on the desktop of the in-vehicle server. The file can be download here:

https://static.onlogic.com/resources/firmware/utilities/hwc_1.2.0.zip

- Unzip the file and place the folder on the desktop
- Rename the folder on the desktop to HWC
- Open the folder and rename the HWC file HWC
- Go into AXIS Camera Station > Server > Components > right click on Event Bridge > Stop

Programming

- 1) Run command prompt as the Administrator
- 2) Now you will need to "cd" (change the directory) to direct the commands to the hwc folder
- 3) Type: **cd c:**
- 4) Type: **cd users\axis** (axis = PC admin name)
- 5) Type: **cd desktop**
- 6) Type: **cd hwc**
 - a. Now you will be able to begin programing the timer shut down sequence
- 7) Type: **hwc ign set ignition-sense -v 1** (This will enable ignition sense and the server may reboot)
- 8) These are the additional commands you can program. Just by enabling ignition sense, the default times are set below, but can be updated by executing these command lines with the time/power levels you desire.
 - a. **hwc ign set low-power-mode -v 1**
 - b. **hwc ign set shutdown-timer -v 10**
 - c. **hwc ign set startup-timer -v 10**
 - d. **hwc ign set hard-off-timer -v 3000**
 - e. **hwc ign set shutdown-voltage -v 600**
 - i. *Make sure that hard hard time is in addition to the shutdown-timer*
 - ii. *If you set 10,800 secs (3hrs) for shutdown, hard timer should be 10,800 (3hrs) + 3600 (1hr) = 14400*
 - iii. *This is all very customizable*

Command	Description	Possible Values
ignition-sense	Enables or disables ignition sense	0=off, 1=on
low-power-mode	Reduces idle power consumption (recommended on when ignition sense is used)	0=off, 1=on
startup-timer	The delay between IGN power being applied and the unit turning on	1-2147483647 (seconds)
shutdown-timer	The delay before Windows is shut down when IGN power is cut	1-2147483647 (seconds)
hard-off-timer	After the shutdown timer has completed, power will be fully cut after X number of seconds. This is useful in case the system freezes at shutdown.	1-2147483647 (seconds)
low-voltage-timer	The low voltage shutdown can be delayed by X number of seconds. A value of at least 10 is recommended to avoid voltage drop related shutdowns – i.e. when the engine is started.	30-2147483647 (seconds)
shutdown-voltage	The unit can shut itself down when a certain low voltage threshold is reached. This helps prevent over discharging a battery. (1150 => 11.5V)	600-4700 (centi-volts)

If you want to see the current state of ignition sense, or any of the other settings, you can type:

- iv. hwc ign **get** ignition-sense
- v. You can check the state of other settings by typing their command with **get** and without the -v (value)