

# Innovating for a smarter, safer world

Viridian Connected Technologies 2024  
Jason Chiu

# Axis at a glance

# #1

Industry leader  
in video surveillance

# 1984

Founded in Lund, Sweden

## Network solutions

in video surveillance,  
access control, intercom  
and audio systems

# 1.6B

 USD

SEK 17.4B, EUR 1.5B  
Full year 2023

# Canon

Part of Canon Group  
since 2015

# 2N

Part of Axis Group  
since 2016

Committed to  
**UN Global Compact**

since 2007

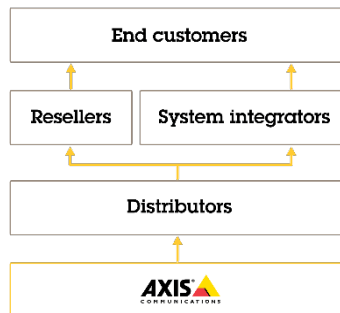
# ISO/IEC 27001

Certified

Trusted  
**ECO SYSTEM**  
of partners



**2-tier  
BUSINESS  
MODEL**



# Agenda

- > Why Analytics?
- > What is ACAP?
- > Why Move to The Edge?
- > Use Cases and Project Examples

# Why Analytics?



**Security**

**Beyond Security**

# Why Analytics?

## Security

- Enhanced Situational Awareness
- Reduce Cost
- Fewer Nuisance Alarms
- Data Insights
- Response Optimization

## Time in Area

- Loitering

## Object Detection

- Human
- Vehicle

## Sound Detection

- Gun Shot
- Break glass
- Aggression

# Why Analytics?

Security

Beyond Security

# Why Analytics?

## Beyond Security

- Safety
- Operational Efficiency
- Quality Control
- ...

## Safety

- Blocked Exit
- Smoke Detection
- Jaywalking

## Operational

- Customer experience
- Process monitoring
- Time tracking



There are around **a billion** surveillance cameras in the world

How can we make use of all this data?





BMW GROUP

**LAST  
CALL**

## **INSIDE THE AI REVOLUTION**

**HOW BMW IS USING AI TO IMPROVE ITS MANUFACTURING**



Axis provides an open application platform for **software-based** solutions and systems built around Axis devices.

# What is ACAP?



**An open platform for developing applications for Axis devices**

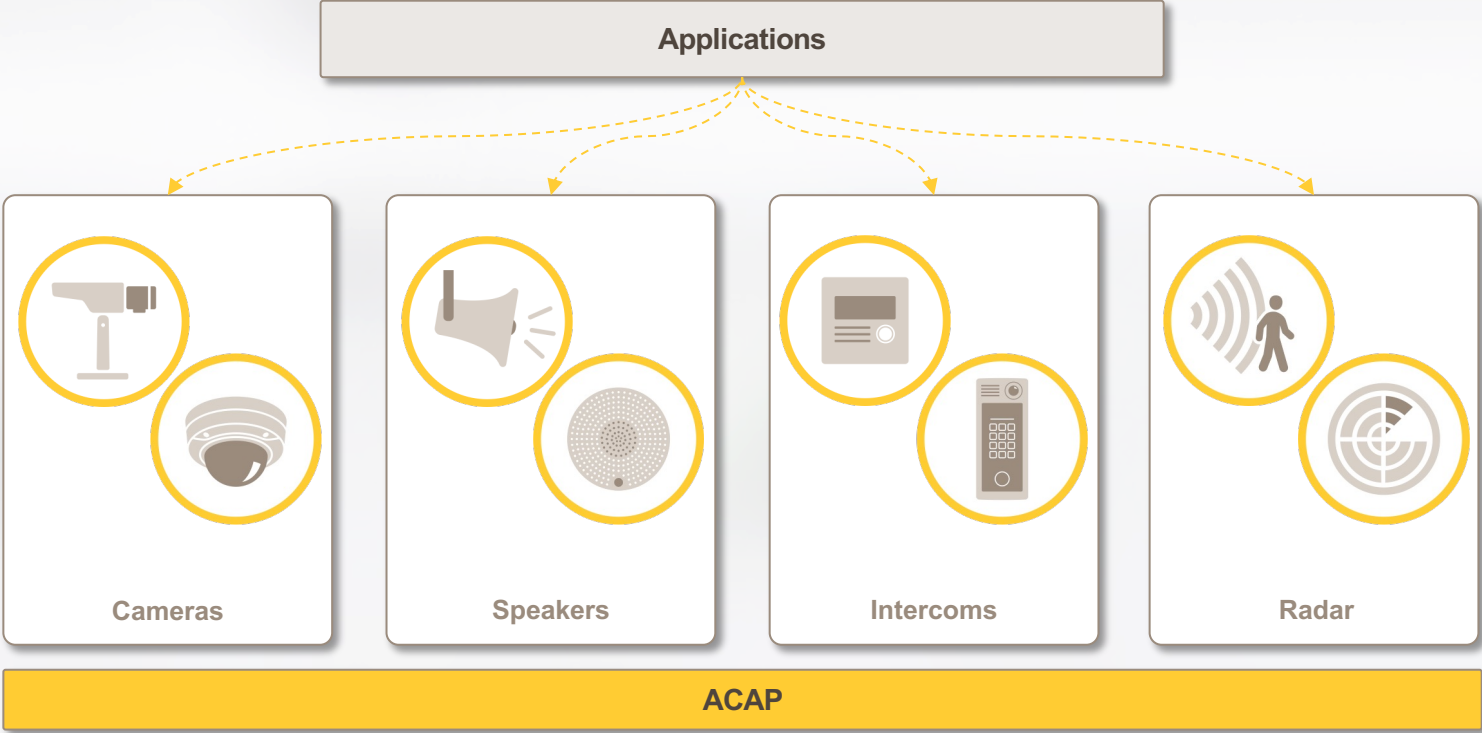


**Provides a consistent API and contract to the underlying firmware platform**



**Additional tools for operational support**

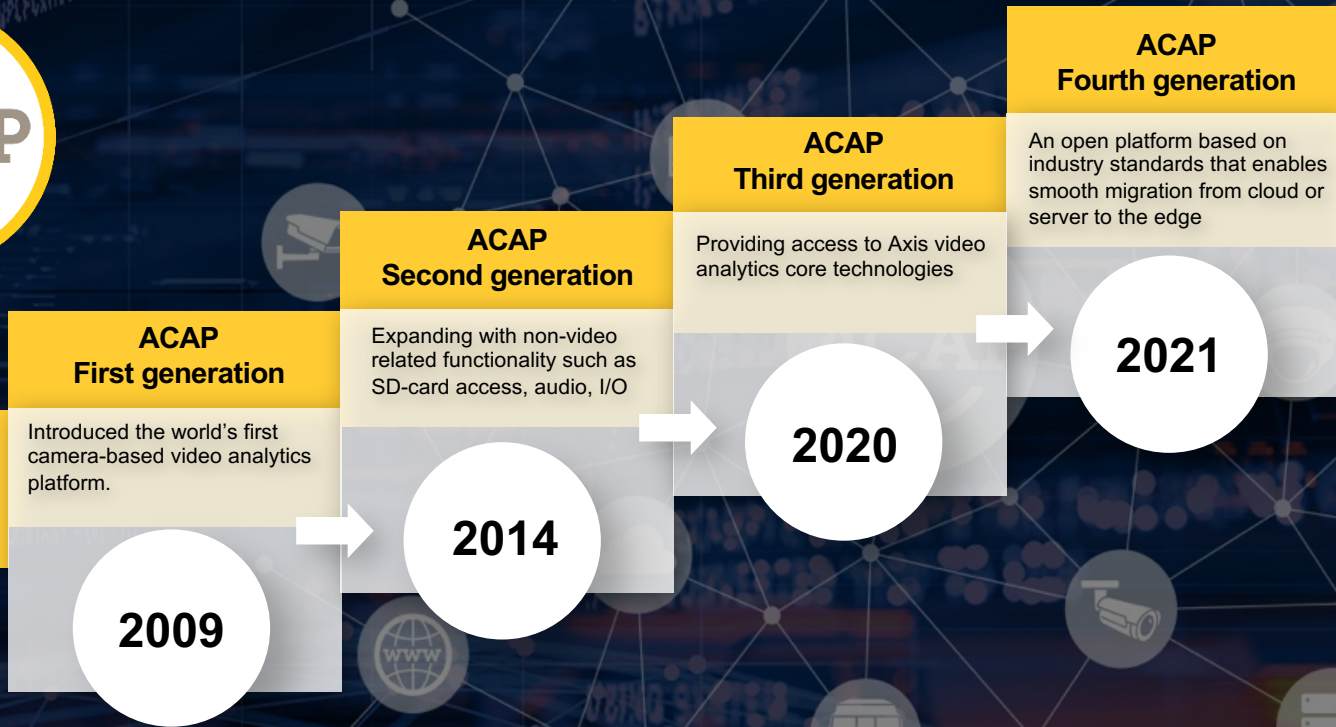
# Support for a wide range of Axis products



**2009**

**ACAP**  
**First generation**

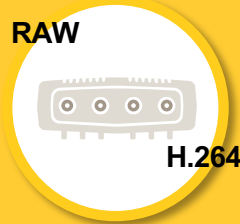
# The ACAP evolution



# Why move to the edge?

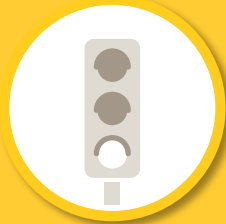
**Eliminates  
decoding**

RAW



H.264

**Reduces  
network traffic**



**Improves  
scalability**

AI-  
accelerator



**Enables  
real-time  
processing**



**Reduces costs – improves performance**

## Industry Standards

- > Video Surveillance
  - ONVIF
  - Signed Video
- > Automation Protocols
  - Message Queuing Telemetry Transport (MQTT)
  - Open Platform Communications Unified Architecture (OPC UA)
  - Modbus



# Development Support

## Axis Developer Community



## Axis Technology Integration Partner Program



# ADP Offering

## DEVELOPMENT TOOLS

- ✓ VAPIX
- ✓ ACAP SDKs
- ✓ Windows SDKs
- ✓ AXIS Virtual Loan Tool
- ✓ AXIS Metadata Monitor
- ✓ Step-by-step guidelines
- ✓ Sample code

## TECHNOLOGY SUPPORT

- ✓ Dedicated developer information
- ✓ Integration tips
- ✓ Troubleshooting guidelines
- ✓ Support guidelines
- ✓ Developer forum

## Development & customization

Product customizations

ACAP development

Custom firmware



February 2023

# AXIS Object Analytics

AI-based object detection and classification





AXIS  
COMMUNICATIONS

Shipping

Receiving

AXIS

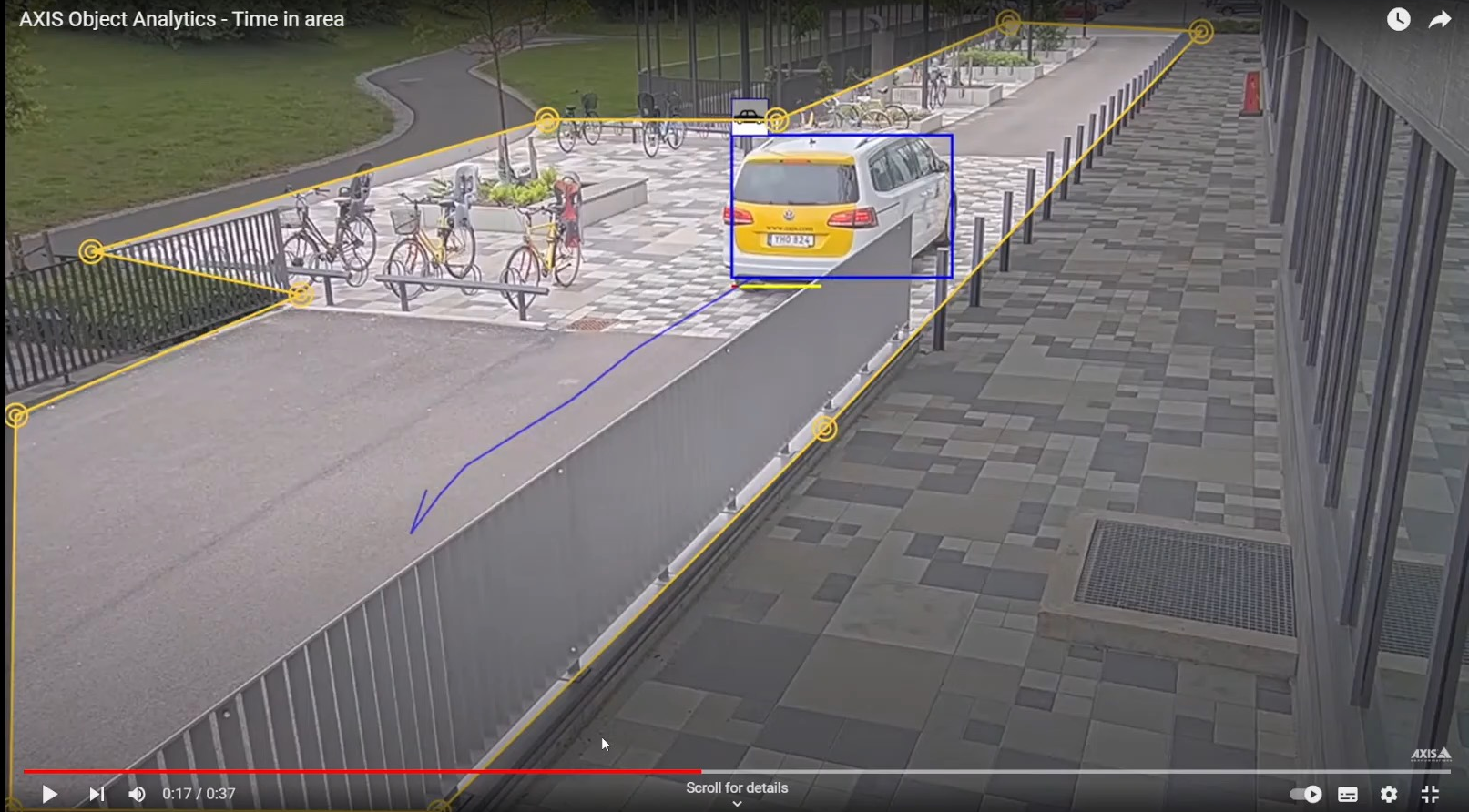
# AI-based object detection and classification

- ▶ Edge-based video analytics
- ▶ Classifies humans, vehicles, and vehicle types
- ▶ Runs multiple scenarios simultaneously
- ▶ Flexible and easy configuration
- ▶ Preinstalled at no extra cost

```
mirror_mod.use_x = False
mirror_mod.use_y = True
mirror_mod.use_z = False
elif operation == "MIRROR_Z":
    mirror_mod.use_x = False
    mirror_mod.use_y = False
    mirror_mod.use_z = True

#selection at the end - add back the deselected mirror modifier object
mirror_ob.select=1
modifier_ob.select=1
bpy.context.scene.objects.active = modifier_ob
print("Selected" + str(modifier_ob)) # modifier ob is the active ob

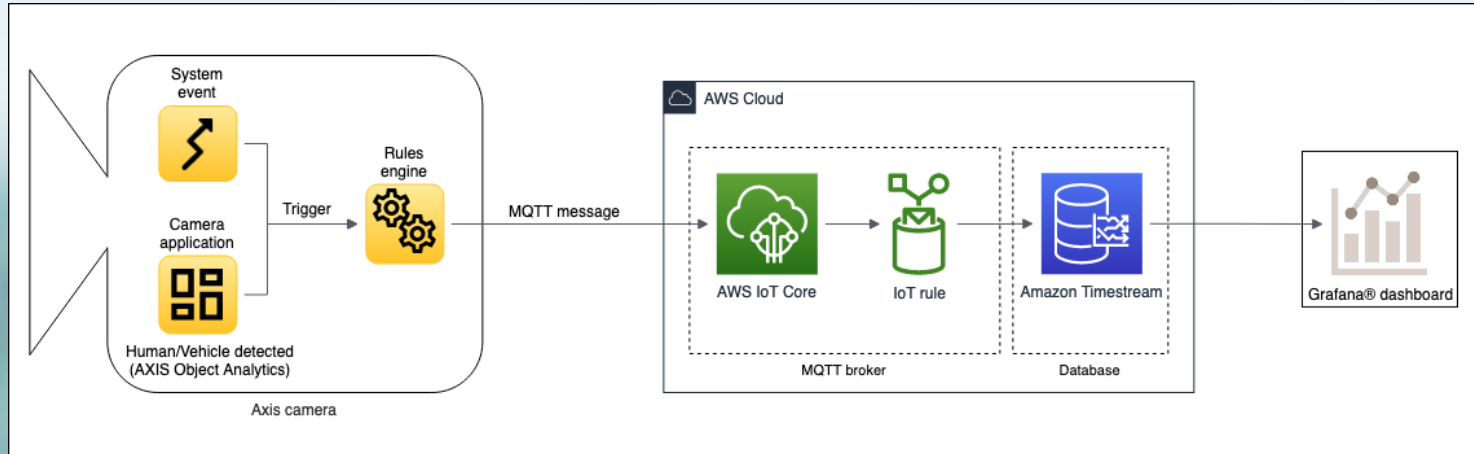
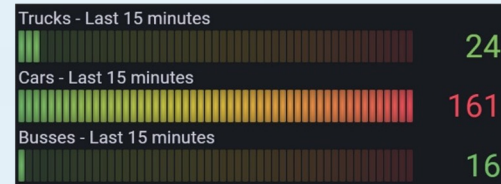
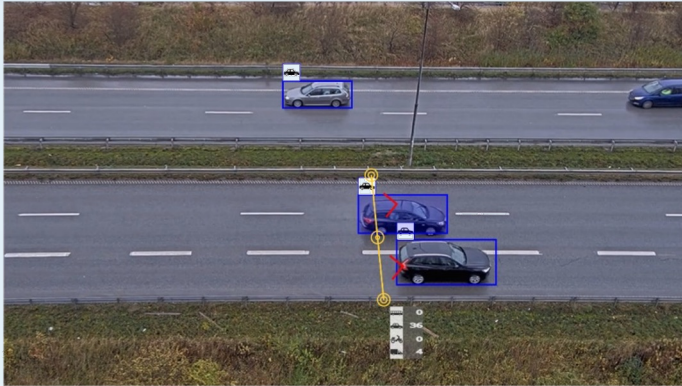
mirror_ob.select = 0
bpy.context.selected_objects[0].select = 1
```



0:17 / 0:37

Scroll for details

# AOA Metadata: MQTT to BI Dashboard





Name

AOA Counting with Grafana Interface

Properties

PTZ preset:

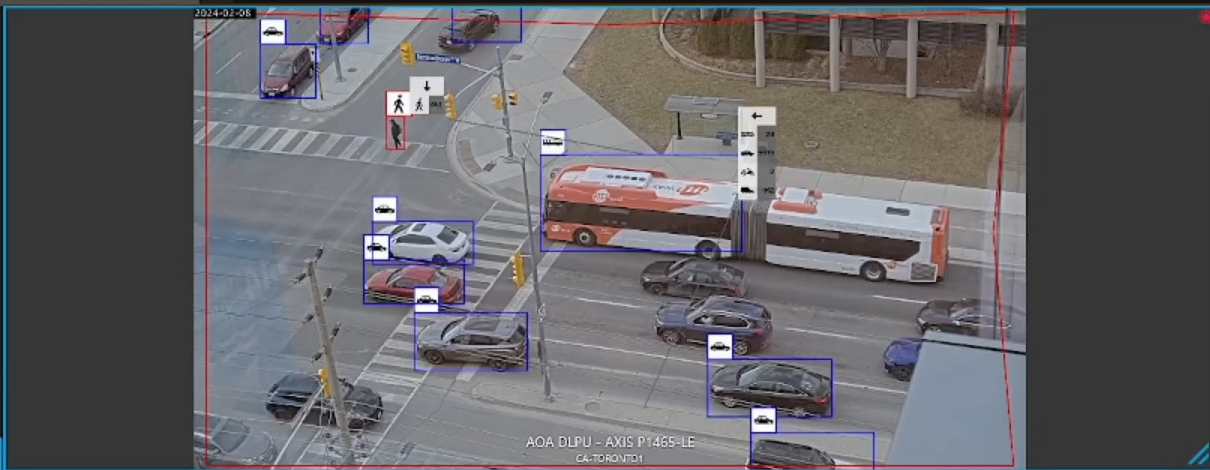
Options

Template:

Set hotspot Remove view

Save view Cancel

Type to filter



AOA DLPU - AXIS P1465-LE  
CA-TORONTO1

- Views
- Cameras
- 2N IP FORCE
  - 2N IP SAFETY
  - 2N IP SOLO
  - 2N IP STYLE AEC
  - 2N IP STYLE Main Entrance
  - 2N IP VERSO AEC
  - 2N IP VERSO Shipping Door
  - AIDANT Aware - AXIS P3255-LVE
  - AIDANT Care - AXIS P3255-LVE
  - Ali G.
  - ALPV AXIS P3265-LVE-3
  - Amanda V.
  - Andrew C.
  - Andrew K.

AOA Dashboard Toronto

Vehicles Crossing



Humans Crossing



Vehicles Crossing

powered by Grafana

AXIS P14 SERIES

AXIS P1465-LE Bullet Camera



5 YEAR WARRANTY

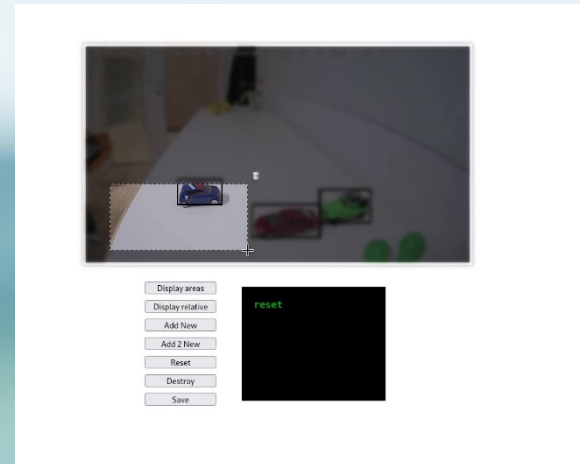
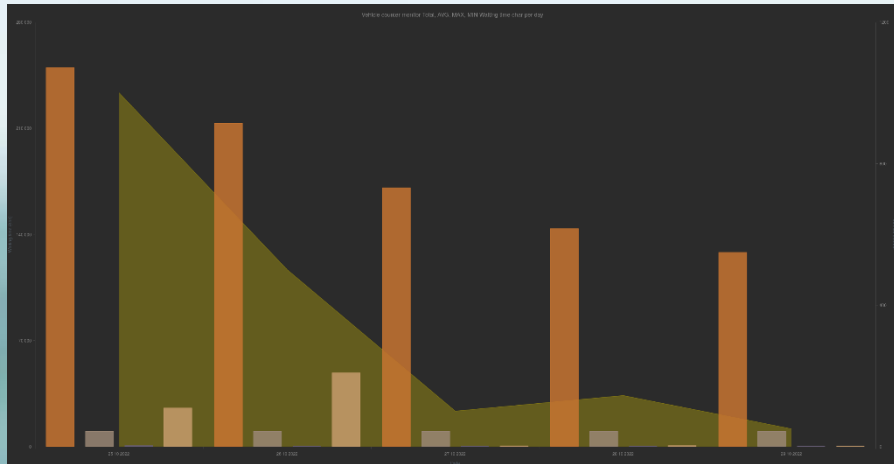


Fully featured, all-around 2 MP surveillance

- Lightfinder 2.0, Forensic WDR, OptimizedIR
- Analytics with deep learning

# AOA Metadata: Edge Based Wait Time Analysis

- > Detect people or vehicles in wait areas (QSR drive through and pull over spots, online pickup areas, valet parking, queuing)
- > Capture amount of time a person or vehicle spends in an area
- > Store data onboard camera in .CSV format for offload



Vehicle counter: 0 || CC: 0 || total waiting time: 0H 0M 0S | AVG: 0 ||  
MIN: 0 || MAX: 0



1:1



- Display areas
- Display relative
- Add New
- Add to New
- Reset
- Save

```
0: 324:135 223x196  
1: 135:196 169x144
```

# Blocked Exit ACAP

- > Prevent objects from being left in areas of egress
- > Avoid costly fines due to code violation
- > Ensure pathways are clear in case of fire/emergency for life safety

Configuration Audio

Detection

Low Medium High

Sensitivity

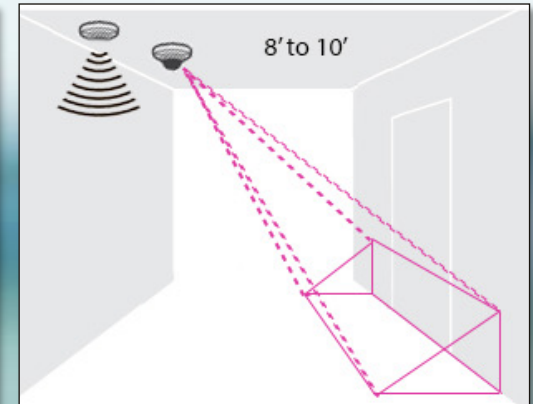
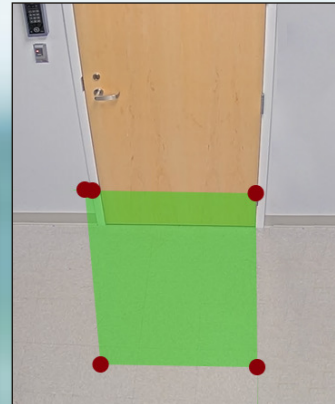
Calibrate to scene

Trigger Period

Minimum blocked door time (seconds)

150

Save





AXIS Emergency Exit Monitor

Help About



Configuration **Trigger1** Trigger2 Export

AXIS Audio Speaker Device Info

IP Address:

Username:

Password:

Media Clip:  [Get media clips](#)

[Save](#)

Trigger Period

Minimum blocked door time (seconds):

[Save](#)

An event will be created on the camera that will cause the speaker to play the specified media clip when the door alarm is triggered

## Light Colour Detection ACAP

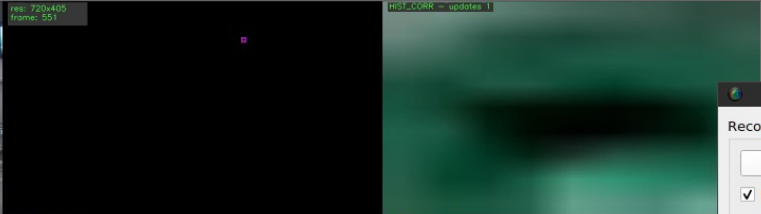
- > Configure normal and alarm states of status lights
- > Detect changes in state of external systems (production lines, equipment, machinery)
- > Early warning in video management system of systems and equipment requiring in person verification or in difficult to monitor locations.
- > Monitoring state change additionally allows for time tracking between state changes.



## Light Colour Detection ACAP Use Case

- > Detect door open status light on train
- > Capture amount of time door remains open
- > Store data on board camera for offload to BI system for analysis
- > Determine if train operators are opening doors for too short or too long period of time





Goto HomePreset

Analyze @HomePreset only

Reset Analyt...

```
next check in: 09:04 | #checks: 0 | previous detections: []
[2023-03-14 17:23:29] Subway doors are OPEN
[2023-03-14 17:23:29] Subway doors are CLOSED
[2023-03-14 17:23:29] Subway doors are CLOSED
[2023-03-14 17:23:29] Subway doors are CLOSED
[2023-03-14 17:23:29] Subway doors are CLOSED
[2023-03-14 17:23:29] Subway doors are CLOSED
[2023-03-14 17:23:28] Subway doors are CLOSED
[2023-03-14 17:23:28] Subway doors are CLOSED
[2023-03-14 17:23:28] Subway doors are CLOSED
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[2023-03-14 17:23:27] Subway doors are CLOSED
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Record

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Hotk

Inform

Total

FPS i

FPS c

Size

Size

File r

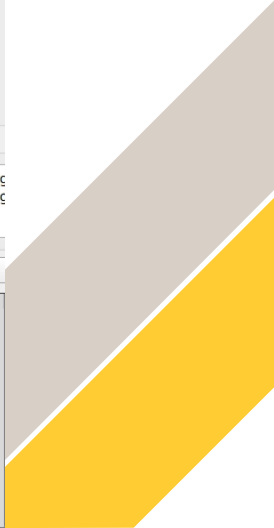
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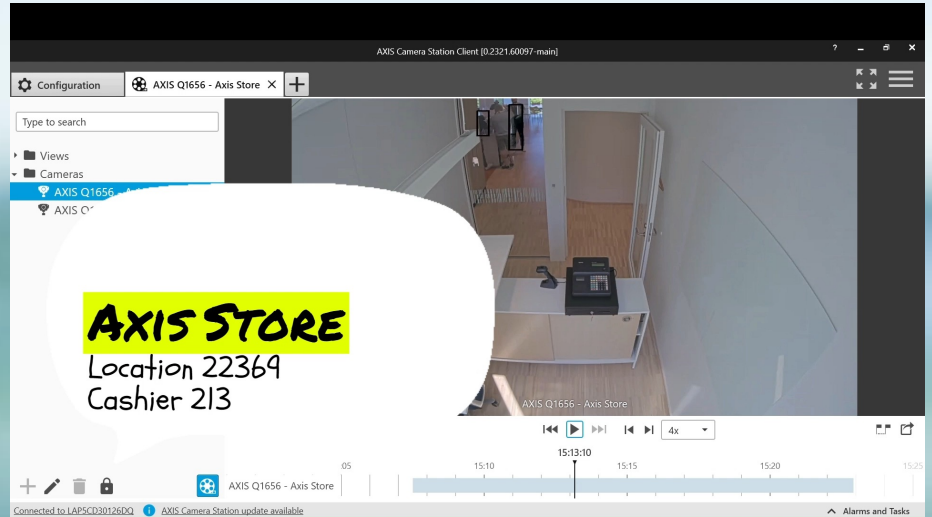
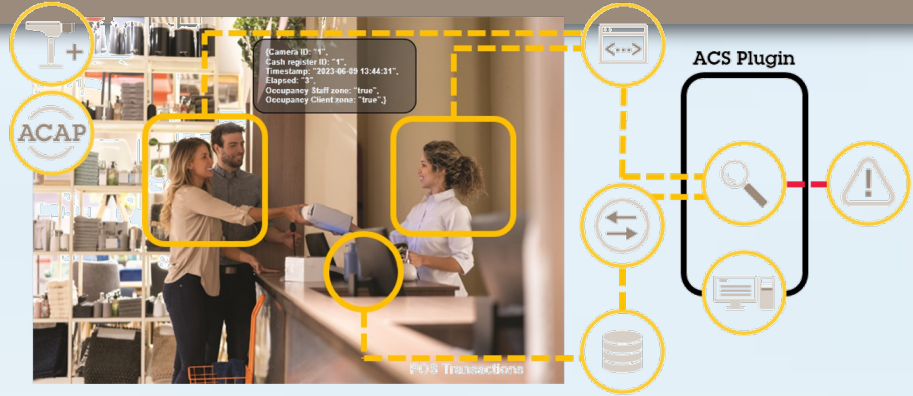
# Production Line QA

- > Create trained AI model for completed propane tanks
- > Detect production faults during final capping process



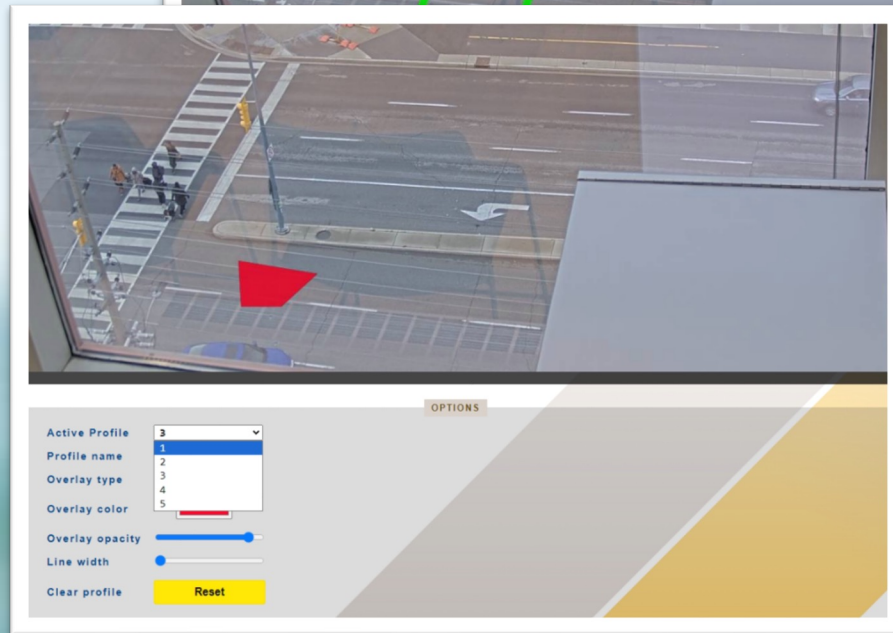
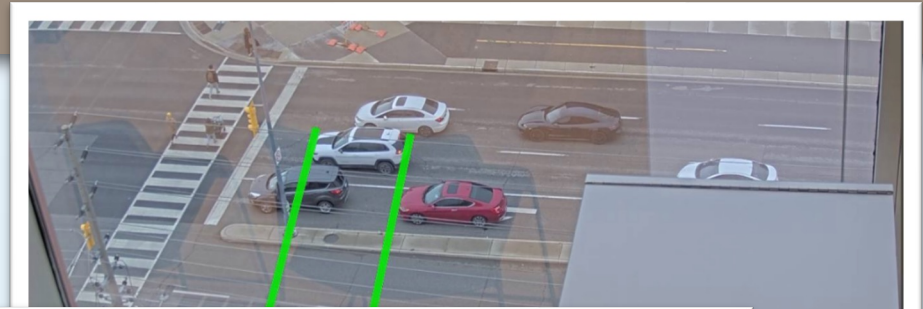
# Retail Fraud Analytic

- > Create edge-based ACAP and VMS plugin
- > Detect potential retail fraud conditions:
  - Cash transactions
  - Refund w/o customer
  - Customer in cashier area
- > Compare POS transactions against metadata, bookmark potential fraud for investigation



# Grid/Alignment for Production

- > Edge-based ACAP to create overlays in camera FOV
- > Assist with alignment of materials on production lines
- > Selectable line or polygon
- > Selectable colours & opacity
- > Added oval & circular overlay



## Flow Level Estimator

- > Edge-based ACAP to detect anomalies in flow during materials movement
- > Set range for nominal operation
- > Set thresholds for abnormal/trouble conditions
- > Alerting customization



## In Summary

- > Cameras today can be used for both Security and Beyond Security applications
- > Beyond Security = Operational & Business Intelligence
- > ACAP = A platform for development and deployment of applications
- > Analytics development use cases
  - Redirecting existing analytics & metadata to different systems for capture and analysis. To suit business or operational needs.
  - Development of brand new analytics or trained AI models to suit new use cases.
- > Faster ROI than security system implementation

