

# Intelligent Video Analytics Pro



- ▶ Application-specific AI packages for advanced intrusion detection in and around buildings, perimeter security, traffic monitoring, and intelligent tracking
- ▶ Easy evidence retrieval with forensic search
- ▶ Easy configuration and calibration
- ▶ Seamless integration with video management systems from Bosch and other partners

Intelligent Video Analytics (IVA) Pro is an expert suite of video analytics that delivers valuable insights for improved efficiency, simplicity, security, and safety. With IVA Pro, an AI-driven video analytics software, Bosch supports security professionals, consultants, specifiers, and end users on their journey towards predictive solutions.

## System overview

IVA Pro is available as:

- IVA Pro Buildings
- IVA Pro Perimeter
- IVA Pro Traffic
- IVA Pro Intelligent Tracking
- IVA Pro Visual Gun Detection
- IVA Pro PPE (Personal Protective Equipment)
- IVA Pro Appearance
- IVA Pro License Plate
- IVA Pro Vehicle Make Model
- IVA Pro Dangerous Goods Signs
- IVA Pro License Plate + Make Model
- IVA Pro Privacy

IVA Pro is ideal for the following scenarios:

IVA Pro Buildings	<ul style="list-style-type: none"> <li>• General surveillance</li> <li>• Indoor and outdoor people counting</li> <li>• Parking lot occupancy</li> </ul>
IVA Pro Perimeter	<ul style="list-style-type: none"> <li>• Professional intrusion detection</li> </ul>
IVA Pro Traffic	<ul style="list-style-type: none"> <li>• Traffic monitoring</li> </ul>

	<ul style="list-style-type: none"> <li>• Automatic Incident Detection</li> </ul>
IVA Pro Intelligent Tracking	<ul style="list-style-type: none"> <li>• Intelligent Tracking and video analytics while the camera is moving</li> <li>• Applications in crowds and traffic scenes</li> </ul>
IVA Pro Visual Gun Detection	<ul style="list-style-type: none"> <li>• Designed to detect upright persons and brandished guns</li> </ul>
IVA Pro PPE	<ul style="list-style-type: none"> <li>• Detect personal protective equipment</li> </ul>
IVA Pro Appearance	<ul style="list-style-type: none"> <li>• Searches for people based on their appearance</li> </ul>
IVA Pro License Plate	<ul style="list-style-type: none"> <li>• Detects and recognizes license plates in stop and go city traffic scenarios</li> </ul>
IVA Pro Vehicle Make Model	<ul style="list-style-type: none"> <li>• Recognizes vehicle make and model</li> </ul>
IVA Pro Dangerous Goods Signs	<ul style="list-style-type: none"> <li>• Detects and recognizes the content of dangerous good signs (ADR)</li> </ul>
IVA Pro License Plate + Make Model	<ul style="list-style-type: none"> <li>• Detects and recognizes license plates in stop and go city traffic scenarios</li> <li>• Recognizes vehicle make and model</li> </ul>
IVA Pro Privacy	<ul style="list-style-type: none"> <li>• Ensures privacy by masking objects detected by other IVA Pro software</li> </ul>

**Functions**

**Tracking modes**

The following tracking modes are available:

IVA Pro Buildings	<ul style="list-style-type: none"> <li>• Base tracking (2D)</li> </ul>
IVA Pro Perimeter	<ul style="list-style-type: none"> <li>• Perimeter tracking (2D)</li> <li>• Perimeter tracking (3D)</li> <li>• People tracking (3D)</li> <li>• Museum mode (2D)</li> <li>• Ship tracking (2D)</li> </ul>
IVA Pro Traffic	<ul style="list-style-type: none"> <li>• Traffic tracking (2D)</li> <li>• Traffic tracking (3D)</li> </ul>
IVA Pro Intelligent Tracking	<ul style="list-style-type: none"> <li>• Auto mode</li> <li>• Click mode</li> </ul>
IVA Pro Visual Gun Detection	<ul style="list-style-type: none"> <li>• Visual gun tracking (2D)</li> </ul>
IVA Pro PPE	<ul style="list-style-type: none"> <li>• PPE tracking (2D)</li> </ul>
IVA Pro Appearance	<ul style="list-style-type: none"> <li>• Appearance tracking (2D)</li> </ul>
IVA Pro Privacy	IVA Pro Privacy can be used with another IVA Pro software that detects and tracks objects. The tracking modes depend on that other IVA Pro software.

**Object classes**

The following object classes are available:

IVA Pro Buildings	<ul style="list-style-type: none"> <li>• Person</li> <li>• Vehicle</li> </ul>
IVA Pro Perimeter	<ul style="list-style-type: none"> <li>• Person</li> <li>• Bike</li> <li>• Car</li> <li>• Truck</li> </ul>
IVA Pro Traffic	<ul style="list-style-type: none"> <li>• Person</li> <li>• Bicycle</li> <li>• Motorcycle</li> <li>• Car</li> <li>• Truck</li> <li>• Bus</li> </ul>
IVA Pro Intelligent Tracking	With IVA Pro Buildings: <ul style="list-style-type: none"> <li>• Person</li> </ul>

- Vehicle

With IVA Pro Traffic:

- Person
- Bicycle
- Motorcycle
- Car
- Truck
- Bus

IVA Pro Visual Gun Detection	IVA Pro Visual Gun Detection is designed to provide the following object classes: <ul style="list-style-type: none"> <li>• Person</li> <li>• “Gun in hand”, referred to as brandished guns in the datasheet</li> </ul>
IVA Pro PPE	<ul style="list-style-type: none"> <li>• Person</li> <li>• Vehicle</li> </ul>
IVA Pro Appearance	<ul style="list-style-type: none"> <li>• Person</li> <li>• Vehicle</li> </ul>
IVA Pro Privacy	IVA Pro Privacy can be used with another IVA Pro software that detects and tracks objects. The object classes depend on that other IVA Pro software.

**Object attributes**

IVA Pro PPE	<ul style="list-style-type: none"> <li>• Safety vest</li> <li>• Hard hat</li> </ul>
IVA Pro Appearance	<ul style="list-style-type: none"> <li>• Gender: male, female</li> <li>• Top color: black, grey, white, brown, beige, green, red, blue, yellow, orange, pink, purple</li> <li>• Top length: short, long</li> <li>• Bottom color: black, grey, white, brown, beige, green, red, blue, yellow, orange, pink, purple</li> <li>• Bottom length: short, long</li> <li>• Hair color: black, grey, brown, blond, red</li> <li>• Hair length: short, long</li> <li>• Hat / no hat</li> <li>• Glasses / no glasses</li> <li>• Bag / no bag</li> <li>• Backpack / no backpack</li> </ul>

### Alarm and statistic tasks

The following alarm and statistic tasks are available:

- Detect objects within, entering, or leaving a single or multiple (up to three) defined detection zones in specified sequence or timing
- Detect multiple line crossings from a single line up to three lines combined in specified sequence or timing
- Detect objects traversing a route
- Detect loitering in an area related to radius and time
- Detect objects that have started or stopped moving
- Detect left or removed objects (IVA Pro Perimeter only)
- Detect objects with properties, such as size, speed (IVA Pro Perimeter, IVA Pro Traffic, and IVA Pro PPE only), direction, and aspect ratio, that change within a configured time according to specification
- Count objects crossing a virtual line
- Count objects within an area and alarm if a predefined threshold is reached
- Combine tasks using scripts

### Filters

IVA Pro can be configured to ignore specified image areas and small objects to enhance robustness. Furthermore, object size, two-way direction, aspect ratio, color, and speed (IVA Pro Perimeter and IVA Pro Traffic only) filters can be used in any combination to create specific detection rules for objects. Statistics on object properties are stored and can be displayed for fine-tuning the object filters. Object properties can also be defined by selecting an appropriately similar object in the video.

### Real-world size, speed, and location

IVA Pro Perimeter and IVA Pro Traffic include the calibration possibility to transform 2D pixels into 3D real-world measures, including size, speed, and geolocation of objects for tracking use cases.

### Intelligence-at-the-edge concept

The intelligence-at-the-edge technology allows users to reduce bandwidth and storage in the absence of action and switch back to full image quality in case of video analytics alarms. Alarm conditions can be signaled by a relay output on the unit or an alarm connection to stream video to a decoder, a roadside unit (IVA Pro Traffic), or a video management system. Alarms can also be transmitted to a video management system to start extended alarm scenarios. As well as creating alarms, IVA Pro produces metadata describing the content of the analyzed scene. This metadata is sent over the network and may also be recorded with the video stream or used independently of the video stream.

### Forensic search

The recorded metadata can be used for a full forensic search in which the rules can be changed within Bosch Video Management System (Bosch VMS), even after the fact. New tasks can be defined and adapted for each search, and the recorded metadata is then scanned and evaluated accordingly. Forensic search is very time efficient and can scan a huge recording database for events within seconds.

### Intuitive graphical user interface

The setup is available via the Configuration Manager software. A wizard-based graphical user interface guides the user through the configuration. It provides all the necessary tools to set up IVA Pro and specify detection or counting tasks. All configuration options are visualized as feedback overlays and can be edited directly for intuitive configuration.

When movement is detected, the object is outlined in yellow on the display and its motion is displayed as a green trajectory. If an object and its motion match the rule conditions defined for one of the detector tasks, an alarm is created and the object outlines change to red. Additionally, an idle object is marked with [I] and a removed object is marked with [X].

### Configuration

With minimal configuration, the following detection and alarm scenarios are possible:

IVA Pro Buildings	Detects upright persons and vehicles and alarms on any object in the scene while suppressing any other objects or motion, with minimal configuration and without calibration. Select a task and mark the area of interest in the image. Up to 64 objects can be tracked in real time.
IVA Pro Perimeter	Detects and alarms on any moving object in the scene. To achieve the best performance with respect to detection rate, detection distance, and false alarm resistance, add calibration and switch to 3D processing.
IVA Pro Traffic	Detects pedestrians, bicycles, motorcycles, cars, trucks, and buses and alarms on any object in the scene while suppressing any other objects or motion such as shadows, headlights, and changing weather conditions. Select a task and mark the area of interest in the image. Camera calibration and switching to Traffic (3D) tracking mode enables speed data and geolocation of all objects. Up to 64 objects can be tracked in real time.
IVA Pro Intelligent Tracking	Detects objects or persons and can automatically activate the Intelligent Tracking feature, which controls the pan/tilt/zoom actions of the camera to track objects or persons and keep them in view.

IVA Pro Visual Gun Detection	Is designed to detect upright persons and brandished guns while suppressing any other objects or motion. Select a task and mark the area of interest in the image. Up to 64 objects can be tracked in real time. <b>Notice:</b> This version of IVA Pro Visual Gun Detection does not support camera rotation. Therefore, only mount the camera in a way so that the image is already upright and does not need to be rotated in the software.
IVA Pro PPE	Detects upright persons and analyzes them for wearing personal protective equipment. Alarm on missing safety vest or hard hat.
IVA Pro Appearance	Detects and separates upright persons and vehicles. Extracts the appearance of persons for use in later forensic search.
IVA Pro License Plate	Detects and recognizes license plates in stop and go city traffic scenarios or parking applications. Reliable and precise data capture for automated ticketing systems, traffic enforcement, and smart parking solutions.
IVA Pro Vehicle Make Model	Recognizes vehicle make and model in stop and go city traffic scenarios or parking applications. Reliable and precise data capture to ensure reliable search results in the video management software.
IVA Pro Dangerous Goods Signs	Detects and recognizes the content of dangerous good signs (ADR). Specifically tailored for applications in urban traffic management and logistics, enhancing safety and operational efficiency.
IVA Pro License Plate + Make Model	Detects and recognizes license plates in stop and go city traffic scenarios or parking applications. Reliable and precise data capture for automated ticketing systems, traffic enforcement, and smart parking solutions.  Recognizes vehicle make and model in stop and go city traffic scenarios or parking applications. Reliable and precise data capture to ensure reliable search results in the video management software.
IVA Pro Privacy	Ensures privacy while still getting actionable insights with using another IVA Pro software that detects and tracks objects. IVA Pro Privacy can mask static areas or dynamic IVA Pro objects.

Scenario defaults provide example configurations for the most common tasks. More complex setups are also supported: Up to 16 independent tasks can be set up in the GUI, and the alarm objects for each task can be restricted according to their properties. A task script editor is available for fine-tuning and combining predefined tasks.

### Assisted calibration for IVA Pro Perimeter and IVA Pro Traffic

The calibration uses internal sensors from the camera and user input. User input can be given by marking ground points on a map or by measuring heights and distances on the ground, for example, by marking a person walking through the scene. The calibration tool guides users through all necessary steps. It supports calibration from recordings, allowing a person to walk through the scene and be used as a known reference in the calibration process afterwards.

IVA Pro Buildings does not need calibration.

### Technical specifications

#### Compatibility

For information on supported cameras, refer to the Bosch Video Product Selector:

[www.videoselector.boschsecurity.com](http://www.videoselector.boschsecurity.com)

#### Configuration

Configure IVA Pro with Configuration Manager, a free software available for download from this website:

<https://downloadstore.boschsecurity.com/>.

### Ordering information

#### MVC-IVA-BLD IVA Pro Buildings

Free of charge video analytics software based on deep neural network technology for intrusion detection and operational efficiency in and around buildings.

Order number **MVC-IVA-BLD**

#### MVC-IVA-PER IVA Pro Perimeter

Video analytics software for mission-critical perimeter security.

Order number **MVC-IVA-PER**

#### MVC-IVA-TRA IVA Pro Traffic

Video analytics software based on deep neural network technology for traffic monitoring and Automatic Incident Detection.

Order number **MVC-IVA-TRA**

#### MVC-IVA-IT IVA Pro Intelligent Tracking

AI-based Intelligent Tracking and video analytics while the camera is moving for applications in crowds and traffic scenes.

Order number **MVC-IVA-IT**

#### MVC-IVA-VGD IVA Pro Visual Gun Detection

Video analytics software based on deep neural network technology, designed to detect upright persons and brandished guns.

Order number **MVC-IVA-VGD**

#### MVC-IVA-PPE IVA Pro PPE

Video analytics software based on deep neural network technology for detecting personal protective equipment.

Order number **MVC-IVA-PPE**

**MVC-IVA-APC IVA Pro Appearance**

Video analytics software based on deep neural network technology for extracting people appearance for a later forensic search; can be used as a surveillance or counting solution

Order number **MVC-IVA-APC**

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**MVC-IVA-LPR IVA Pro License Plate**

Video analytics software based on deep neural network technology for detecting license plate information.

Order number **MVC-IVA-LPR**

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**MVC-IVA-MMR IVA Pro Vehicle Make Model**

Video analytics software based on deep neural network technology for detecting vehicle information.

Order number **MVC-IVA-MMR**

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**MVC-IVA-DGS IVA Pro Dangerous Good Signs**

Video analytics software based on deep neural network technology for detecting dangerous good signs.

Order number **MVC-IVA-DGS**

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**MVC-IVA-LPRX IVA Pro License Plate + Make Model**

Video analytics software based on deep neural network technology for detecting license plate and vehicle information.

Order number **MVC-IVA-LPRX**

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**MVC-IVA-PRI IVA Pro Privacy**

Free of charge video analytics software based on deep neural network technology for ensuring privacy while using another IVA Pro software that detects and tracks objects.

Order number **MVC-IVA-PRI**

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