

# hyperION

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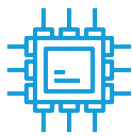
INNOVATION OVER THE NETWORK

## A3iu

ADVANCED  
AUTONOMOUS  
ARTIFICIAL  
INTELLIGENT  
UNIT

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### SALES SHEETS



# Hardware Architecture Overview

A3IU is a VMS with embedded Video Analytics for the classification and the tracking of the objects (people, vehicles, ships and more).

It is also an advanced PSIM with sensors fusion to create an optimal situation awareness.

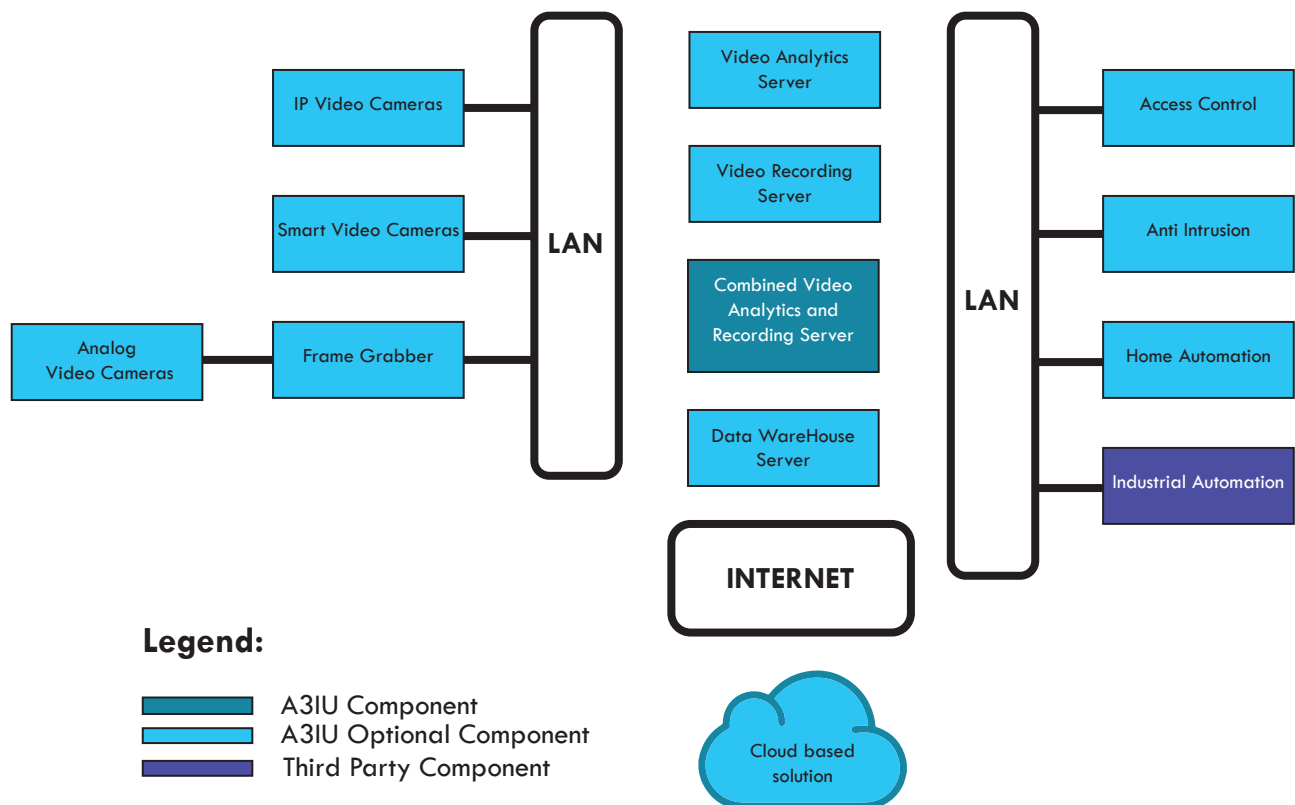
Moreover, A3IU is a proactive and autonomous control security system leading to a maximum level of security ensuring at a minimum cost.

A3IU is a modular, scalable solution that easily integrates with pre-existing security systems.

A3IU supports standard as well as proprietary communication protocols for the control of video cameras, access control systems, anti-intrusion systems, home and industrial automation systems.

Hyperion's provision ranges from a software server based solution up to a complete solution including all the controlled security systems.

The VMS software module of A3IU can run on different servers and on the cloud in case of security, computational or logistics needs.



A3IU software application is based on a patent protected technology that correlates data coming from multiple concurrent sources (standard 2D video cameras, and sensors used in access control, anti-intrusion, home and industrial automation systems) and maps it into a 3D space (*US PATENT 9.286.791.B2* *PCT/EP2014/003255/EUROPE/CHINA/BRASIL*).

A3IU feeds a self-learning Artificial Intelligence based engine with 3D geo-referenced information to implement the behavior analysis, which is essential for the security threat identification.

In addition to the major advantages in utilizing VMS and PSIM, A3IU offers the following benefits:

- **High quality data**

Data is considered of high quality if it correctly represents the real-world construct to which it refers.

3D video analytics using 2D video cameras is not appropriate for the analysis of objects (people, animals, vehicles, aircrafts, ships) that occupy a volume.

As an example it doesn't allow to make accurate size rules to filter small objects like animals from causing alarms.

A3IU's patent protected technology enables the three-dimensional reconstruction of the objects.

This technology allows the mapping of the 2D video camera captured scene into a three-dimensional virtual model of the real world, with the purpose of obtaining the 3D location of every pixel of the scene.

- **Three-dimensional object tracking**

As opposite to video analytics with 2D and GPS object mapping, A3IU applies the 3D mapping.

It allows the tracking of objects on different ground planes as building floors, street planes levels and staircases. It also facilitates the auto-steering of PTZ cameras along three axes.

- **Improved data accuracy**

A3IU implements a 3D collaborative multi-tracking of the object across multiple video cameras and sensors. Object data (classification, volume, direction, speed) is not merely passed from sensor to sensor, but it is correlated to the occupied 3D space.

It reduces possible blind spots.

A3IU enables the three-dimensional reconstruction of the objects by merging the streams of video cameras capturing different angles of the same scene.

It solves the problem of targets overlapping.

The three-dimensional reconstruction of the object trajectory allows the definition of from to zones based on target direction and speed beneficial for the behavior analysis.

- **Easy video camera calibration**

A3IU doesn't use markers to three-dimensionally calibrate the video camera, but it maps the camera view on the virtual 3D scene by simply clicking on the 3D model references.

- **Minimized number of required video cameras**

3D video analytics products on the market require that all objects move on a single, flat ground plane. Multiple floors, staircases and vertical object motion can lead to wrong results.

Typically multiple video cameras associated to different ground planes are employed to overcome these limitations.

Conversely, A3IU enables the three-dimensional object tracking on different ground planes using only one video camera.

A3IU also allows the simultaneous object tracking with one camera on water and ground surfaces.

- **Optimal situation awareness**

The 3D geo-referenced sensors data fusion, implemented by A3IU, makes the information of the objects classification and tracking more accurate, this improving the situation awareness.

- **Nuisance alarms reduction to the absolute minimum**

A3IU uses an Artificial Intelligence engine to identify the behavior of the 3D geo-referenced objects that can lead to a security threat.

The self-learning AI engine analyzes the behavior patterns for consistency to identify the ones that better match the security rules.

- **Increased flexibility**

Rules can be set on the fly to specify the behaviors that can be considered a threat for the security.

- **Effective User Interface**

VMS products on the market provide a user interface consisting on different camera views (wall of monitors), which could result in dispersive and over-whelming information.

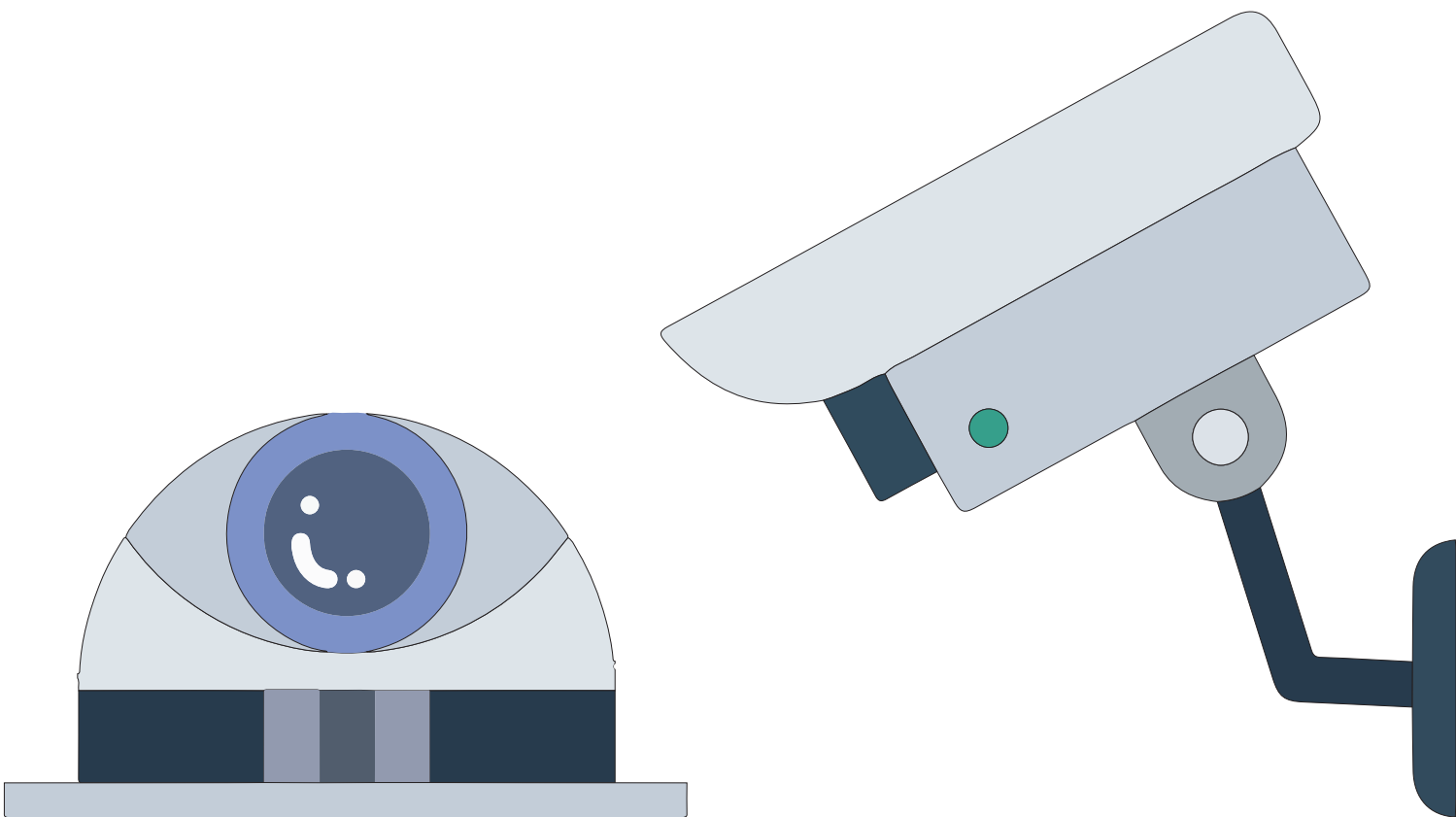
Conversely, A3IU provides an effective holistic view of the protected area by merging all the camera views into a single 3D virtual reality based user interface.

- **Anonymization**

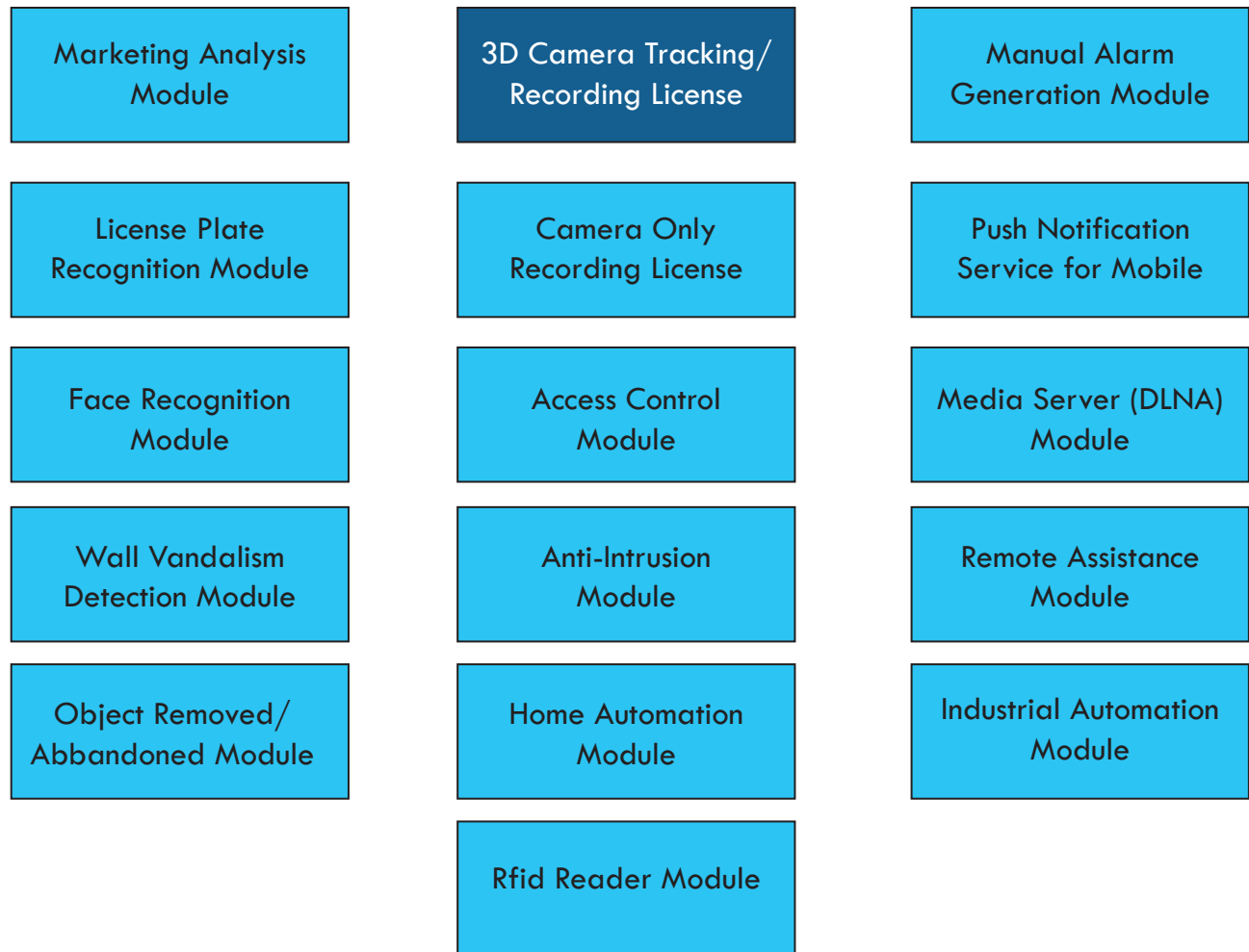
Conforming to the latest standards of privacy set forth by the European Union, our platform removes personal identifiable information for privacy protection, while maintaining data's aggregate usefulness for safety and security needs.

- **Avatars**

Virtualizing real environments in 3D space allows the use of avatars to represent objects, animals and people. Customers can control every information is stored about them, determine who can see it and whether that data is "anonymized" or deleted entirely. Users control the access to the analyzed and stored formation determining who and when the information can be accessed.



# Software Architecture Overview



## Legend:

-  A3IU Core Software Module
-  A3IU Optional Software Module

**A3IU software application is a modular solution that consists of the following modules:**

### **Video Camera Recording.**

This module provides the video camera streaming recording (VMS function). This module pricing is based on a one-license fee per camera.

Key functions:

- Unlimited number of connected video cameras.
- Smart camera integration.
- Low Resolution, Full-Frame, Multi Megapixel cameras are supported.
- RTSP-H264 and ONVIF protocols support.
- Up to 30 Fps over analog channel.
- Digital control of PTZ cameras as well as dome cameras.
- Frame rate control.
- Video compression functions to save bandwidth.
- Full-Frame Shot.
- Unlimited number of streams even from the same camera (streaming multi-tenant server).
- All data are accessible by the user through research time-based, sensor-based or event-based.
- Wide variety of recording options: continuous and scheduled recording. Upon alarm and motion detection recording.
- Tracked data is geo-located and mapped in the 3D world.

### **Video Camera Tracking (3D video analytics)**

This module provides the 3D video analytics and object tracking in the 3D virtual model of the protected area. This module pricing is based on a one-license fee per camera.

Key functions:

- Specialized algorithms for removing various noises (water, grass, trees).
- Simultaneous noise analysis on the same video stream.
- Adaptive shadows recognition.
- Objects classification (people, animals, vehicles, aircraft, ships).
- Object tracking with direction and speed using one or more cameras.
- Multi-tracking (potentially unlimited number of traceable objects at the same time).
- Objects tracking in water.
- Recognized license plates tracking.
- Matched faces tracking.
- Detect objects within, entering, or leaving an area.
- Detect line crossing with/without direction.
- Crowd detection.
- Loitering.

### **Marketing Analysis module**

This module is a data warehouse tool able to register, analyze and present the data coming from the object tracking in the surveilled areas.

This data can be used for analysis and statistics purposes in the marketing domain as the POS systems.

This module pricing is based on a one-time license fee.

Key functions:

- Presentation in a dashboard of the object counters and relative statistics.
- Time based chart of the object counters.
- Data exporting as spreadsheet.

## License plate Recognition module

This module enables the detection and the recognition of the license plates. This module pricing is based on a one-time license fee for a maximum of three video cameras.

Every camera thereafter requires a relative license.

Key functions:

- License Plate matching notification/alarm.
- Possibility to provide a list of license plates that are authorized or not authorized on a certain area.

## Faces Recognition module

This module enables the detection and the recognition of faces. This module pricing is based on a one-time license fee for a maximum of three video cameras.

Every camera thereafter requires a relative license.

Key functions:

- Faces matching notification/alarm.
- Possibility to provide a list of faces that are authorized or not authorized on a certain area.
- Facial image quality assessment compliance the ISO/IEC 19794-5 ICAO standard.

## Object Removed/Abandoned module

This module allows detecting when an object is removed or abandoned in a specific area.

This module, in addition to the object presence detection, implements the behavior analysis of all the objects tracked in the area where the abandoned/removed object is detected.

This module pricing is based on a one-time license fee for a maximum of three video cameras.

Every camera thereafter requires a relative license.

Key functions:

- Alarm generation upon event detection.
- Report generation of the objects trajectories leading to the Removal/Abandoning of the object.
- Events recording.

## Access Control module

This module correlates data coming from the access control system with the other data sources (standard 2D video cameras and sensors used in anti-intrusion, home and industrial automation systems) and maps it into a 3D space.

It implements the association between of all the access control events (access authorization, enter, exit, presence) with the geo-referenced objects tracking. This module pricing is based on a one-time license fee for a maximum of three video cameras.

Every camera thereafter requires a relative license.

Key functions:

- Access Control integration with the Video Analytics.
- 3D geo-referencing of the sensors data.
- Access Control events recording.
- Access Control events participate to the creation of rules that defines behaviors leading to a security threat.

## Anti-Intrusion module

This module correlates data coming from the anti-intrusion system with the other data sources (standard 2D video cameras and sensors used in access control, home and industrial automation systems) and maps it into a 3D space.

It implements the association between of all the anti-intrusion events with the geo-referenced objects tracking. This module pricing is based on a one-time license fee.

Key functions:

- Anti-Intrusion integration with the Video Analytics.
- Anti-Intrusion events recording.
- Anti-Intrusion events participate to the creation of rules that defines behaviors leading to a security threat.

## **RFID module**

This module correlates data coming from the RFID system (RFID tags) with the other data sources (standard 2D video cameras and sensors used in anti-intrusion, access control, home and industrial automation systems) to identify the 3D geo-referenced objects.

This module pricing is based on a one-time license fee for a maximum of five video cameras.

Every camera thereafter requires a relative license.

Key functions:

- RFID integration with the Video Analytics.
- RFID events recording.
- RFID identification data participates to the creation of rules that defines behaviors leading to a security threat.

## **Home and Industrial Automation modules**

These modules implement the interface between A3IU and Industrial/Home automation systems for the control of the reaction to detected alarm condition.

These modules pricing is based on a one-time license fee.

Key functions:

- Automatic and manual control of digital and analog outputs.
- SCADA systems interface support (Modbus, CAN bus, Web Services).
- SCS Biticino communication protocol support.
- KNX communication protocol support.

## **Remote Assistance module**

This module enables the remote assistance from the Hyperion's central server.

This module pricing is based on a one-time license fee.

Key functions:

- Notification of system errors.
- System status monitoring and recording.
- Automatic intervention request for local assistance.

## **Push Notification Service module**

This module enables the notification of the alarms status to mobile devices through the Push Notification service. This module pricing is based on a one-time license fee.

## **Manual Alarms Generation module**

This module enables the creation of manual alarms to be associated to access control events or software buttons implemented in the User Interface.

This module pricing is based on a one-time license fee.

## **Wall vandalism Detection module**

This module implements the video analytics algorithm for the detection of vandalized wall. This module pricing is based on a one-time license fee for a maximum of three video cameras.

Every camera there after requires a relative license.

## **Media Server (DLNA) module**

This module transforms A3IU into media server to make sharable the recorded videos.

This module pricing is based on a one-time license fee.





A PROACTIVE AND AUTONOMOUS CONTROL  
SYSTEM FOR THE SECURITY LEADING TO A MAXIMUM  
LEVEL OF SECURITY ENSURING AT A MINIMUM COST.

## Contacts

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