

hyperION

INNOVATION OVER THE NETWORK

A3.iu

ADVANCED
AUTONOMOUS
ARTIFICIAL
INTELLIGENT
UNIT

A3IU is:

- a VMS with embedded video analytics for the classification and the tracking of the objects (people, vehicles, ships and more).
- an advanced PSIM with sensors fusion to create an optimal situation awareness.

Imagine being able to recreate a real world space subjected to security ensuring as a virtual 3D model (holistic view), where all the contained objects are classified, geo-referenced, tracked and their behavior is analyzed.

Now, imagine a surveillance system that benefits from the **3D geo-referenced perspective** and the **behavior analysis**.

It would be able to reduce to the absolute minimum the false alarms with a high degree of reliability, which is the essential condition to proactively and autonomously react to security threats.



A3IU (Advanced Autonomous Artificial Intelligent Unit) implements the **3D geo-referenced perspective** using 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.

This geo-referenced sensors data fusion makes the information of the objects classification and tracking more accurate. A3IU feeds a self-learning Artificial Intelligence based-engine with 3D geo-referenced information to implement the **behavior analysis**.



Example of sensors combination

Several video cameras filming the same scene:

The system combines all information recognizing one single object which is virtualized and positioned in a 3D environment.

Key Features

A3IU succeeds where conventional 2D and 3D video analytics fail



Motion detection in 2D video analytics

Motion detection in 2D video analytics analyzes how many pixels have changed between frames. Very often false alarms are generated upon detection of a change in pixel patterns caused by unpredictable scene variations.



A3IU, analyzing the volume of the object, provides more accurate information.



3D video analytics

3D Video analytics needs markers to calibrate the scene. It needs to know the relation between the object volume and its occupied pixels (bounding box). All objects must move on a single, flat ground plane. Multiple floors, staircases and vertical object motion can lead to wrong results. False alarms can be easily generated because of large variation of shapes from the ground-truth in the real world.



A3IU does not use markers, but calibrates the scene on the virtual 3D model where all the dimensions are known and the resulting system is more insensitive to shapes variation.



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.

A3IU outperforms conventional VMSs and PSIMs



PSIMs correlate the sensors data to extrapolate a behavioral pattern that can lead to a security threat.

PSIMs map the sensors on a 3D plant of the protected area. The tracked objects are geo-referenced on a 2D plant of the protected area.



- A3IU is more effective thanks to the 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 and fed into the AI engine. It reduces possible blind spots and improves the behavior consistency analysis, which is fundamental for the behavior classification.
- A3IU geo-reference the sensors and the tracked objects on a 3D plant of the protected area.



- VMSs provide a user interface consisting on different camera views (wall of monitors), which could result in dispersive and overwhelming information.

- 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.

Key Functions



Video Acquisition and Management

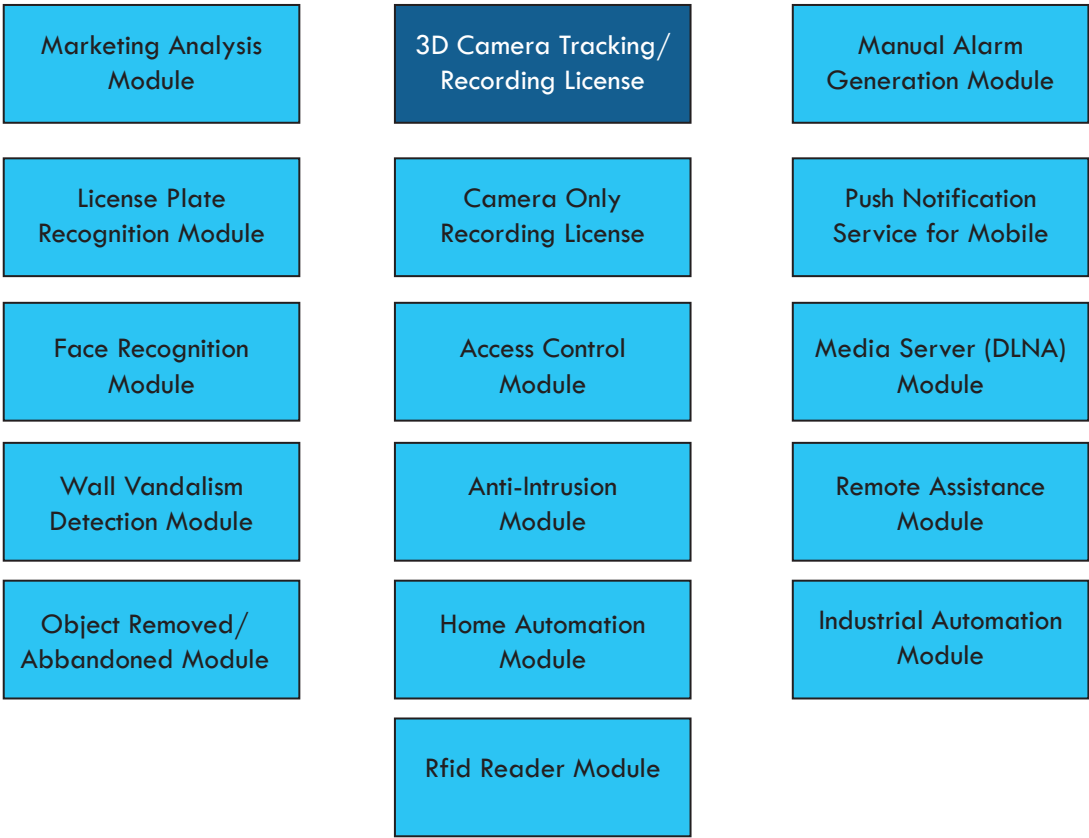
- Unlimited number of connected video cameras.
- Smart camera integration.
- Low Resolution, Full Frame, Multi Megapixel cameras are supported.
- RTSP-H264 and ONVIF protocols support.
- Up to 30 Fps over analog channel.
- Digital control of PTZ cameras as well as dome cameras.
- Frame rate control.
- 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 Analytics

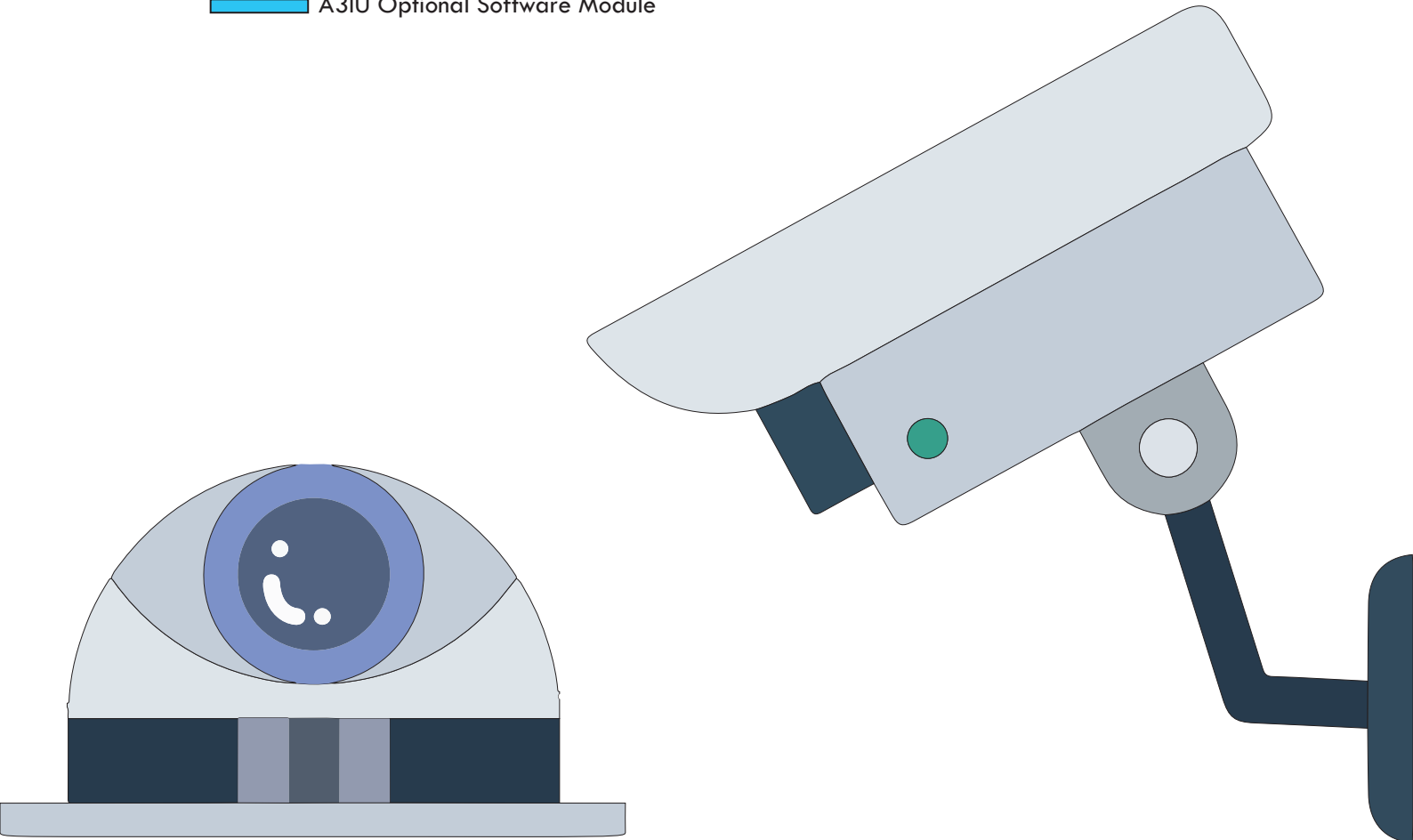
- Specialized algorithms for removing various noises (water, grass, trees).
- Simultaneous noise analysis on the same video stream.
- Adaptive shadows recognition.
- Objects classification (people, animals, vehicles, aircraft, ships).
- Object tracking with direction and speed using one or more cameras.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

Software Architecture Overview



Legend:

- A3IU Core Software Module
- A3IU Optional Software Module





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

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