

SAIMOS® LIDAR INTEGRATION

GENERAL OVERVIEW

Version 3

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1 INTRODUCTION

ONG-IT GmbH is the vendor of the **SAIMOS® platform** and does have a seamless integration with Milestone XProtect® in respect of its AI-based SAIMOS® Video Analytics modules. The **SAIMOS® Control Center is a GIS** (Geographic Information Systems) based solution **combining SAIMOS® Video Analytics and geo-spatial analytics**. Further, all SAIMOS® modules are seamlessly integrated into Milestone XProtect®.

The SAIMOS® Video Analytics and SAIMOS® Control Center software developments are focused on a seamless integration into Milestone XProtect® integrating with a range of cameras and sensors.

The focus of the SAIMOS® LiDAR integration is to extend its Counting, Perimeter Protection and other modules / algorithms / functionalities by additional sensor technology.

The SAIMOS® LiDAR module enables LiDAR data for further analytics and integrates such data and its meta-data into Milestone XProtect® including alarm- and event communication with the Smart Client.

LiDAR data can be used for the following analytics but is not limited to:

- Object Counting
- Occupancy monitoring
- Proximity detection
- Perimeter protection / Intrusion detection
- Cross-camera object tracking based on LiDAR coordinates

The following industries do benefit from a LiDAR, Video Analytics & VMS integration:

- Security
- Retail
- Smart /Safe Cities
- Critical Infrastructure
 - Airports
 - Railways
 - Roads & Highways
 - Oil & Gas
 - etc.
- Health
- And much more

1.1 SOLUTION APPROACH

The complete LiDAR integration is done via the SAIMOS® platform, which itself is seamlessly integrated into Milestone XProtect®.

For the LiDAR integration, the below listed SAIMOS® components are required:

- SAIMOS® Video Analytics – for basic integration
 - Integration of lidar sensor support
- SAIMOS® Control Center – for advanced integration
 - GIS centric solution

Our solution approach is based on our SAIMOS® Video Analytics as well as geo-spatial analytics and is outlined below:

1. SAIMOS® Control Center plugin for Milestone XProtect® VMS
2. In general, our solution approach is based on geo-spatial analytics and functionalities to support the following:
 - a. Locations of sensors, cameras (including their respective field of view) and alarm zones are stored within the SAIMOS® geo-database model
 - b. Customer floor maps are stored within the SAIMOS® geo-database model
 - c. Base maps (Bing Maps, Google Maps, OSM, Esri, custom)
3. Integrate the LiDAR data stream via its data interface into the SAIMOS® platform
 - a. Objects received from LiDAR sensors are displayed on a map in near real-time
4. Geo-spatial analytics are implemented in order to identify alarms as well as respective cameras
5. Upon selection of an object of interest via a click within the map, such an object is intersected with camera's FOV. By that, the respective camera is identified with its Milestone camera UID to allow the following:
 - a. Geo-spatial intersections are done in order to track the object of interest and to identify the cameras covering the respective FOV
 - b. Creation of dynamic views within Milestone XProtect® to display video stream from relevant cameras observing the object of interest for visual tracking
6. SAIMOS® Control Center handles the communication with Milestone XProtect® to automatically launch a dynamic window showing the concerned camera streams
7. In case there is a PTZ camera, coordinates of a tracked object are used to control the PTZ camera via the Milestone XProtect® VMS PTZ control
 - a. PTZ camera control is a complex subject. It's important to understand that a performing PTZ camera hardware must be in place to ensure sufficient performance
 - b. Filtering all QORTEX DTC™ data streams via our SAIMOS® Control Center, obtaining data routed through a geo-DB, is our approach to reduce and minimize potential issues in respect of data overloads or PTZ camera jittering

2 FEATURES

The below sections provide an overview about the features that come along with a SAIMOS® LiDAR integration. The following provides a quick overview on how LiDAR sensors can be utilized:

[Quanergy MQ-8](#) – SAIMOS® LiDAR Functionality (seamless integration with Milestone XProtect®):

- Perimeter Protection / Intrusion Detection
- People counting / customer frequency
- Occupancy Monitoring / Statistics
- Proximity detection

Can be combined with **SAIMOS® Control Center** (<https://vimeo.com/490786214>) to support advanced functionalities with a map centric user interface integrated into Milestone XProtect®:

- Real-time Object movement display on a map
- Heat mapping & statistics
- Object Tracking within the map control
- PTZ Camera Control & Cross Camera Object Tracking
- Arming/Disarming of alarm zones

2.1 BASIC INTEGRATION

We have integrated the respective data streams from the LiDAR perception software into SAIMOS®. With the basic integration, we utilise the built-in analytics of the LiDAR's perception software.

Such analytics is typically when an object enters a zone, which is pre-defined within the LiDAR's perception software.

SAIMOS® Video Analytics uses that data to further add additional intelligence for:

- Object Counting
- Occupancy monitoring
- Proximity detection
- Perimeter protection / Intrusion detection

Furthermore, it's possible to geo-spatially intersect camera field of views with the LiDAR data stream, thus in the event of an alarm the respective camera stream can be pulled up.

Results (meta-data) generated by SAIMOS® Video Analytics are integrated with Milestone XProtect® and alarms are inserted in the Milestone XProtect® alarm list.

The basic integration of LiDAR data requires the following software licenses:

- SAIMOS® LiDAR
 - Each LiDAR sensor requires one license
- Milestone XProtect®
 - If an integration is required
- LiDAR's perception software

2.2 ADVANCED INTEGRATION

Our advanced LiDAR integration covers everything from the Basic Integration and adds geo-spatial analytics on top of.

All objects received from the LiDAR perception software are visualised on the map of our SAIMOS® Control Center, which is also integrated with the XProtect Smart Client. The live-movement of the objects are displayed at a refresh-rate of 1Hz.

An operator can mark an object of interest on the map and enable our cross-camera tracking functionality. Based on that, we are launching a Milestone XProtect® view, dynamically displaying all camera streams, which do cover the object of interest.

This means further, that each LiDAR object received by SAIMOS is also stored within our geo-database. By that, we keep the complete history track of detected objects. Further, such a history track can be used for later in-deep analytics, for example, to analyse movement patterns of objects.

The collected geo-data is the further basis for enhanced geo-spatial analytics like GIS based heatmaps, analysis of movement patterns, movement tracking of individual objects, etc.

The advantages of our advanced integration with the SAIMOS® Control Center are as follows:

- Seamless integration into Milestone XProtect®
 - Map centric user interface with map interaction
 - Alarms are sent to the Milestone alarm list
- Visualisation of LiDAR objects on a map
 - In real-time with a 1Hz refresh rate
 - Object classification is visualised using different symbols
- Tracking of Objects of Interest
 - By clicking on the map
 - Marked objects can be sent to camera tracking
- Cross camera object tracking (static cameras)
 - Objects of interest can be visually observed via live video streams
 - Milestone view is launched, displaying all relevant video streams “seeing” the object
- PTZ camera tracking
 - When an object of interest enters the FOV of a PTZ camera, that PTZ camera is controlled by the system in respect of following the target automatically based on the LiDAR tracking data
 - The Milestone PTZ control is utilised for this functionality
- Alarm zones can be drawn on the map
 - For intrusion detection
 - Classification of an alarm zone can be defined
- Arming and disarming of alarm zones via the map
 - By clicking on the map
 - Define automatic re-arming after a certain period of time
- Camera positions can be drawn on a map
 - Camera meta-data and rotation is stored
 - Data relation to Milestone XProtect®

- Field of View polygons can be drawn on a map
 - Meta-data is stored
 - Camera relation is established
- Base map data support
 - OGC compatible map services (online/offline)
 - Map services: Bing Maps, Google Maps, OSM or Esri
- Local floor plan support
 - Can be stored within the geo-database
 - Can be locally administrated

The advanced integration of LiDAR data requires the following software licenses:

- SAIMOS® 3D LiDAR
 - Each LiDAR sensor requires one license
- SAIMOS® Control Center
- Milestone XProtect®
- LiDAR's perception software

2.3 PRE-REQUISITES

The following pre-requisites are required:

- SAIMOS® Video Analytics
- SAIMOS® Control Center - optional
- LiDAR sensor(s) and respective perception software
- Milestone XProtect® VMS – optional
- IP camera(s) – optional

Besides the above listed pre-requisites, the relevant server hardware and infrastructure is required as well.

3 CONTACT DETAILS

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