LiDAR TECHNOLOGY

Ideal for a broad range of applications requiring a high level of accuracy and a low rate of false alarms, LiDAR offers proactive security and complete situational awareness. Designed to help prevent unauthorized perimeter breaches and enable real-time response to threats, this smart technology uses LiDAR sensors providing effective security protection 24/7 in all light and most atmospheric conditions.

How does LiDAR work?

LiDAR, or Light Detection and Ranging, is a time-of-flight sensing technology that uses low-power, eye-safe lasers to classify humans and vehicles and show their location in real-time. It measures the time it takes for the laser's pulse to complete a round trip between the sensor and a target. The collected data is used to generate a 3D point cloud image displaying both spatial location and depth information. This can be used to identify, classify, and track moving objects. For instance, it can be used to calculate the number of people in a space or to track people or vehicles that have breached a secure area.

What are Point Clouds?

LiDAR produces a 3D point cloud which are large sets of data points that describe an object or surface. These point clouds contain the raw data gathered from the surroundings as the sensors scan moving objects such as vehicles and humans as well as stationary objects such as buildings, trees, and other structures. The data points included in the point clouds are transformed by a software system, such as Qortex DTC™, to create LiDAR-based 3D imagery of the area.

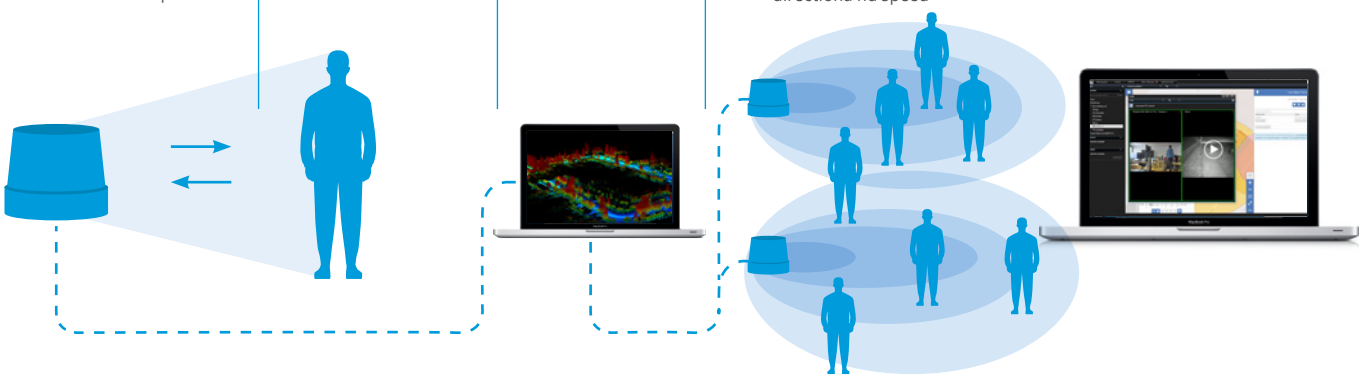
Transmitter/receiver
Transmitter emits pulsed laser light. Time of flight reciver measures the reflected pulses

Object
Object illuminated by lazer

Point coud
Real-time 3D imaging

Classified objects
People and vehicle object list with position, directiona nd speed

Business specific analytics



Reflectivity

LiDAR detects and measures the return of light to the sensor's receiver. The performance and effective range of a LiDAR sensor varies depending on the target's surface reflectivity. For instance, targets with a white surface reflect light well so they return a greater amount of light and are easier to reliably detect and measure at longer distances. On the other hand, targets with a black surface absorb more of the light making them more difficult to detect and measure. Mirror-like targets are also difficult to detect and measure. This is because these objects reflect only a small, focused beam of light that might not reflect directly into the sensor's receiver. Targets with retro-reflective surfaces such as road signs and license plates return a great amount of light to the receiver making them good targets for LiDAR sensors.

How is LiDAR different from radar and camera-based systems?

Both LiDAR and radar are used to determine the velocity, range, and angle of moving objects. While radar uses radio waves, cameras rely on millions of pixels or megabytes to process a 2D image. LiDAR can provide a full, real-time 3D image of the surroundings. It can also provide surface measurements and precise resolutions of objects within a certain range. It's possible to create a 3D image of the target while simultaneously determining the object's distance. Plus, it includes precise calculations of the direction in which an object is moving – a clear advantage over cameras and radar solutions. Furthermore, unlike cameras, LiDAR doesn't include PII (Personally Identifying Information) making it ideal in GDPR sensitive environments.

Features	LiDAR	Radar	Video
Sensing Dimensions	3D	1D	2D
Range	✓	✓	✗
Field of View	✓	✓	✓
Object Detection – Shape / Orientation	✓	✗	✓
Object Detection – Static / Lateral Motion	✓	✗	✓
Resolution with Range	✓	✗	✗
Range Accuracy	✓	✓	✓
Rain, Snow, Smog, Dust, Sand Storm	✓	✓	✗
Fog	✓	✓	✗
Ambient Light – Pitch Darkness / Bright Sunlight	✓	✓	✗
Read Sign / Color	✓	✗	✓
Intensity / Reflectivity	✓	✓	✓

✓ Yes ✗ No ✓ Limited

Complementing camera-based solutions

Traditional camera-based security solutions (and radar solutions) cannot operate in challenging light conditions or may be affected by harsh environmental factors such as heavy rain or snow. This can result in false alarms which can lead to security failures. LiDAR minimizes false alarms, so you don't miss an intrusion event or waste time and money sending security personnel to respond to nonexistent threats. Furthermore, LiDAR devices can be stitched together for seamlessly observing large areas. It's then possible to track objects of interest cross-cameras and use PTZ-cameras to track suspicious objects and visually confirm threats.

Map-centric approach

The SAIMOS Control Center, a full-fledged WebGIS, allows the display of detailed maps, LiDAR detected objects, displaying boundary details of guarded objects, real-time security personnel locations, sensor data, alarms, and much more. It's also possible to merge third-party data streams onto a base map such as weather conditions and traffic information to support even better decision-making. This map-centric approach enables users to manage operations in a more optimized and coordinated way providing enhanced situational awareness.

Want to know more?

LiDAR allows you to reduce the number of cameras and sensors needed while still providing great accuracy and stability. LiDAR sensors offer depth information allowing operators to identify real-world locations of humans and vehicles, which can be accurately tracked using PTZ-cameras. Now, thanks to SAIMOS LiDAR and the SAIMOS Control Center, Milestone customers can enjoy the benefits of this smart technology. Ideal for critical infrastructure organizations, SAIMOS LiDAR combines industry-leading LiDAR sensors with smart near edge-based AI SAIMOS Video Analytics embedded in the SAIMOS Control Center GIS environment.

Get in touch with SAIMOS today to hear more about this reliable and highly accurate technology.