Flasheye

# Machine Safety 24.01

An award-winning lidar software solution

Become more autonomous, efficient, and safe. Flasheye's industrial solutions provide all tools needed to understand what is happening in the physical environment.

3D laser technology, like lidar, is an active sensing device sending out laser pulses, making it independent of light conditions and more robust.

Flasheye *Machine Safety* makes it easy to create safety zones integrated with machines to ensure the safety and well-being with centimeter accuracy and advanced 3D analytics.
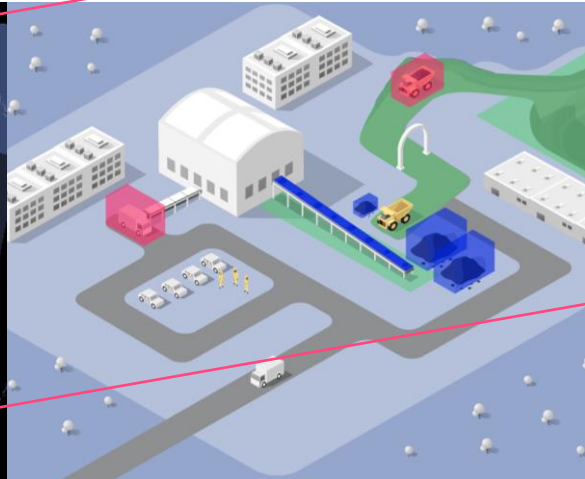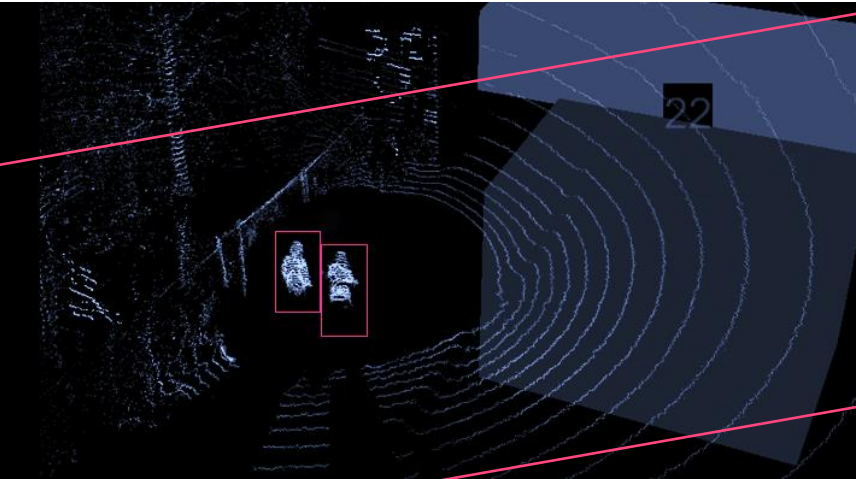
> Save X0 000 EUR of installation costs compared to other smart systems

> No need of specialized hardware and multi-brand support

> Save costs by mitigating the need of personnel and ensure efficient and safe production flows

> Open platform, integrate with industrial control systems and protocols

Features

Create zones of interest

Create 3D zones anywhere in the 3D space with centimeter accuracy. One sensor can replace hundreds of photocells. Each zone can have different functionalities and up to three zones can be linked with logic rules.

Attach functionality to zones:
- Object detection (human, vehicle, etc.)
- Motion detection (occupacy/addition of points, adjust the sensitivity with thresholds)
- Loss detection (loss of points, adjust the sensitivity with thresholds)

This allow you to react on small changes and have control of every moving object in the environment with high-precision.

Filter settings

With several steps of filtering the point cloud in real-time, information about moving objects and activities is gathered. The tracking and filter settings allow you to decide how large objects or how big changes need to be for being detected. This mitigates false alarms effectively and is tunable to each site's unique needs.

Ensure the safety

Start/stop/control machines based on

- Scenarios (e.g. different danger levels)
- Movements
- Positions
- Data from 3rd party platform sources

User interface

The user interface can be accessed from any PC or Android device using a web browser. The interface includes:
- Lidar view for configuring the 3D zones and settings
- Alarm presentation
- Integration to external interfaces

Standards

Flasheye has initiated a risk analysis report how you can use 3D lidar sensors and Flasheye software to fulfill the *European Machine Directive* with:
- Redundancy
- Advanced self diagnostics
- Automated cleaning systems

Hardware requirements

Sensors

Ouster, Blickfeld, Velodyne, Cepton, Hybo, Aeva, Innoviz, Hokyuo and SICK are among sensor brands that have been tested by us. We continuously test and integrate new sensors. Almost any sensor can easily be integrated upon request. Several sensors can be aggregated into one big point cloud model.

LPU (Lidar processing unit)

Recommended system requirements

- Equivalent of ~4000 CPU marks of processor power per 1M points/sec and at least 2 cores per sensor
- ~5GB RAM and ~100GB disk space per sensor
- Linux OS for running Docker containers

This is used in some systems:

- Splitters and injectors for sensors with no PoE connection
- Switches and modules for digital I/O

Performance

The system has built-in self-diagnostics to prevent errors and ensure the best possible performance. The self-diagnostics include dirt detection, anti-tampering, sensor analytics, and system monitoring. This data can activate other systems or be sent as alarms.

Integrations

External integrations:
- OPC UA
- Digital Outputs
- MQTT

Data

	Data type	OPC UA (PLC/DCS e.g. 800xA or S7)	Digital outputs* (only on supported LPU HW)	MQTT
Based on zone	**Event (start+stop)** Zone type Object ID Class Number of points (motion detection)	✓	✓	✓
	Alarm (continuous) Zone type Object ID Class Number of points (motion detection)	✓	✓	✓
	3D trace from event Link to viewer Text			✓
Based on objects	**Tracking** ID Speed Sensor name Class Center of mass coordinate Prev. center of mass coordinate AAB min coordinate AAB max coordinate OOB min coordinate OOB max coordinate OOB transform Prev. OOB transform Gravity bounding box min coordinate Gravity bounding box max coordinate Gravity bounding box transform			✓
	Counting Number of detected objects at the moment for each class	✓		✓
Monitorin	**Self diagnostics** Dirt detection Anti-tampering	✓	✓	✓

* Digitals output does not support variable metadata.