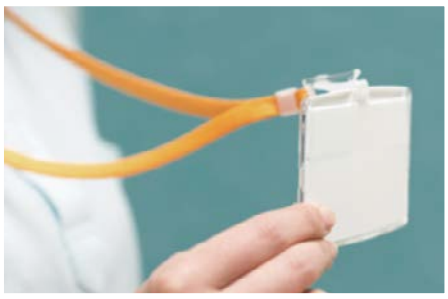
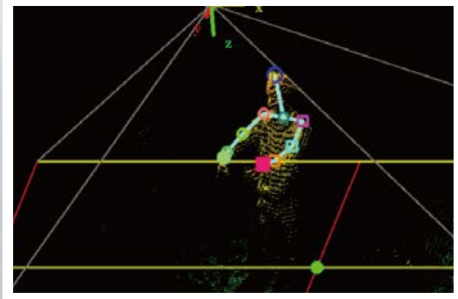
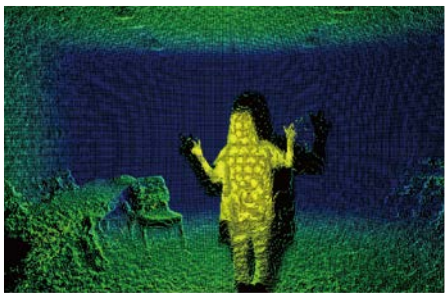
H·L Data Storage

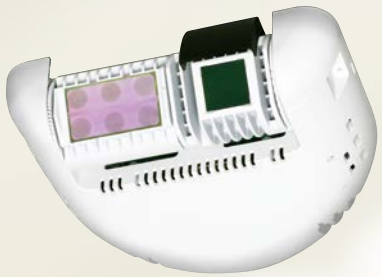
Product Leaflet

3D LiDAR [TOF]









Hitachi-LG Data Storage, Inc.

3D LiDAR (TOF) Sensor from Hitachi-LG Data Storage, Inc.

Next Generation Technology

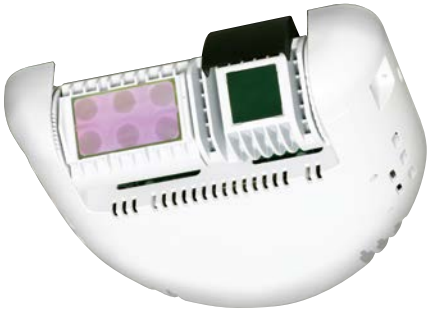
3D LiDAR (TOF) Motion Sensor Series

Object distance measurement with high accuracy in real time

Easy to install with Ethernet (POE +) connection

Multiple use cases can be accommodated with the SDK

HLS-LFOM5
(Ceiling & Wall Installation type)



Ceiling installation

Wall-mounted installation

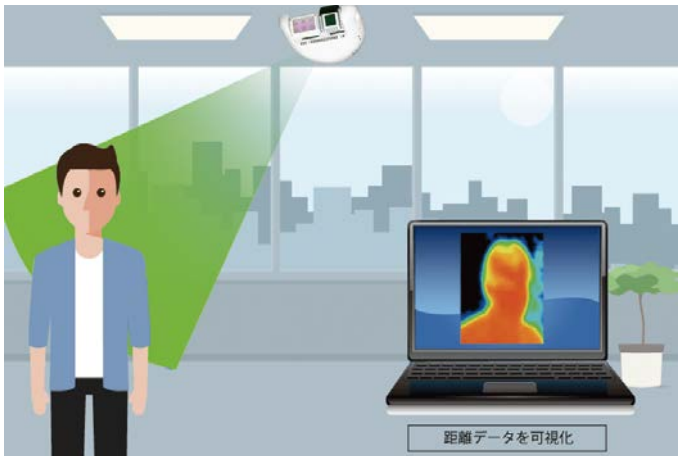
HLS-LFOM3
(Dustproof / waterproof support - IP66 compliant)

HLS-LFOM1
(For Indoor Use)

Features

Privacy Proof

The 3D TOF Sensor can detect humans and objects without identifying individuals. It can be installed in private spaces such as a restroom.



Accurate behavior data

The 3D TOF sensor captures behavior data with higher accuracy and reliability even if people cross or pass each other.
The acquired data can be useful for the marketing and other extensive use-cases.

For Marketing Use

◆ Intelligent Interior Behavior Analysis

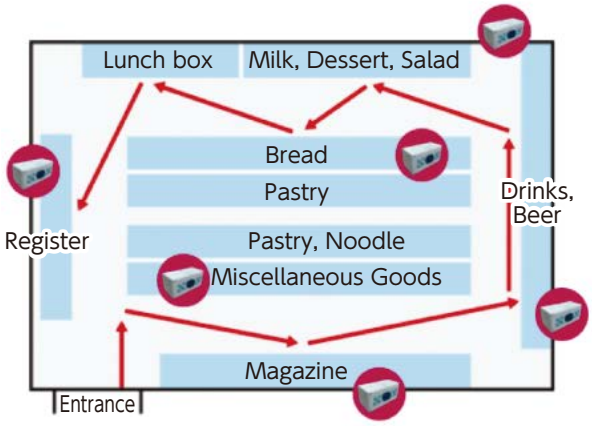
? Challenges and Needs:

・Visualize customer's behavior and customer service data.
・Optimize the product line-up and layout
・Analyze marketing promotions and effectiveness

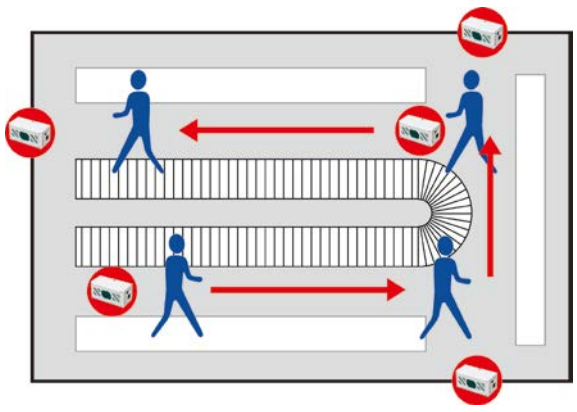
! Benefits:

・Analyze customer's behavior more effectively
・Increase sales
・Improve loss prevention

◉Installation Space: All areas in the store



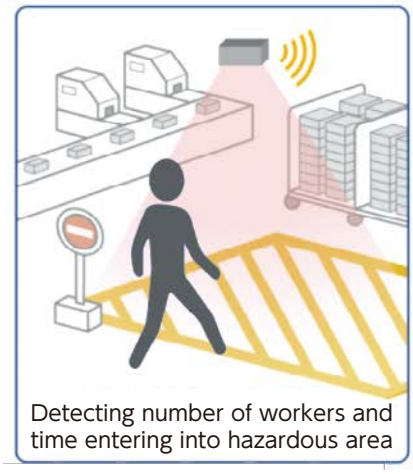
The traffic path is continuous from store entry to exit



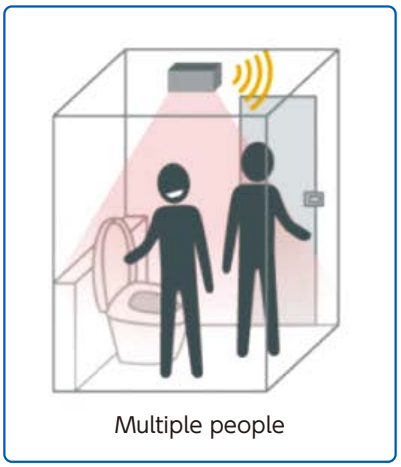
※Visualize worker movements at the factory.

Application Examples

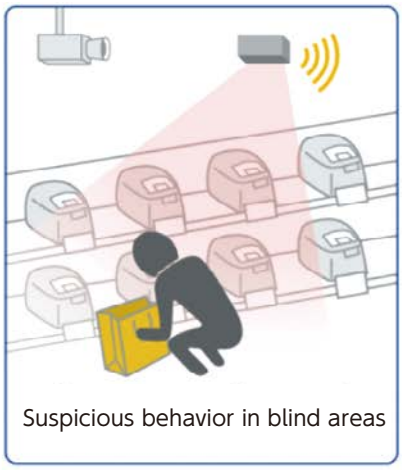
- ◆ Monitor restricted area access
- ◆ Detect suspicious behavior and decrease shrinkage losses
- ◆ Tailgating prevention
- ◆ Monitor suspicious behavior in restrooms



Detecting number of workers and time entering into hazardous area



Multiple people



Suspicious behavior in blind areas

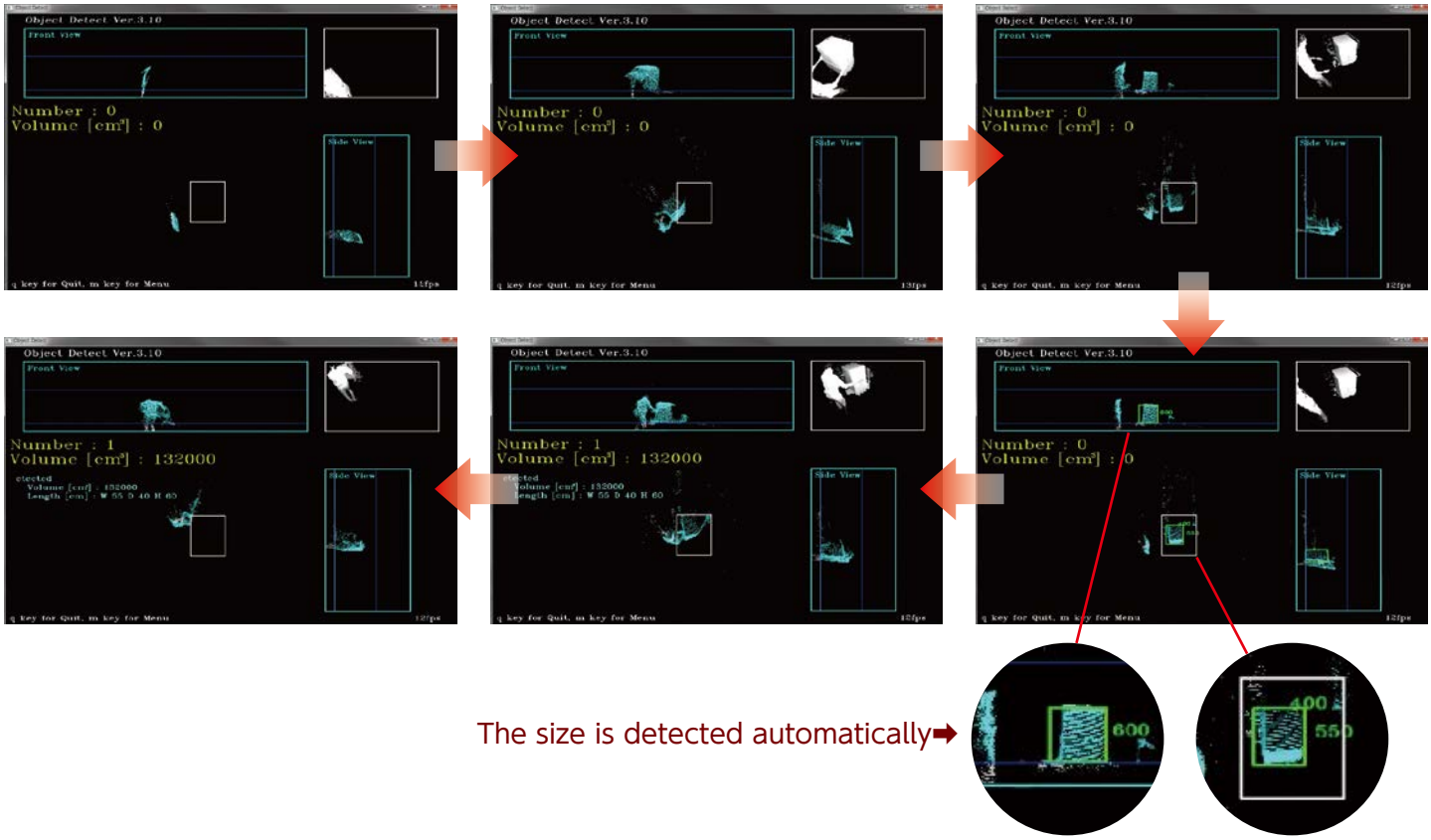
◆ Digital Signage

・Precisely count the people traffic in front of digital signage

・Quantify the effectiveness of advertising by measuring the walking speed of passerby

◆ Volume Sizing

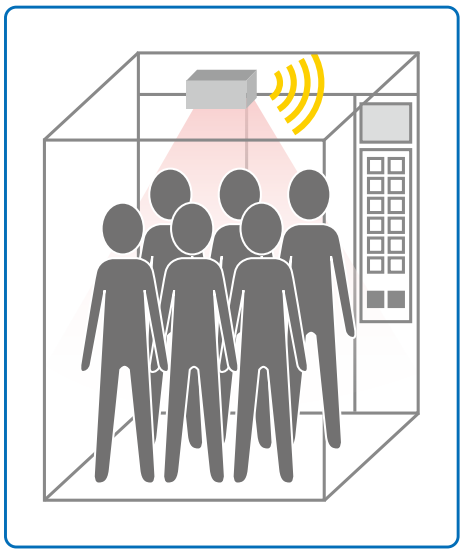
Increase work efficiency by automating dimensional measurement



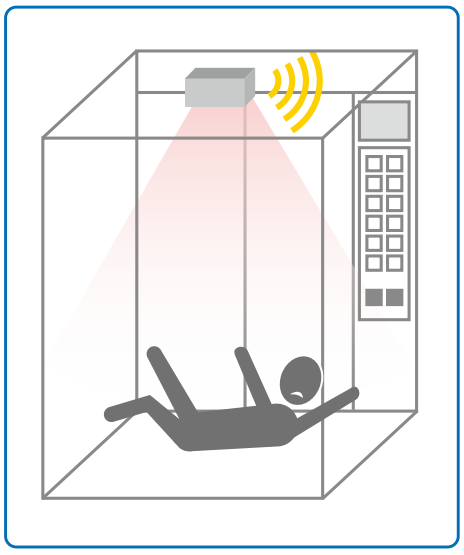
The size is detected automatically➡

◆ Elevator Monitoring

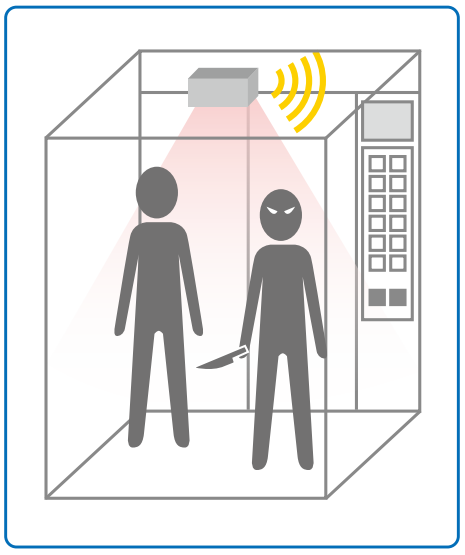
Occupancy Rate Detection



Fall Detection



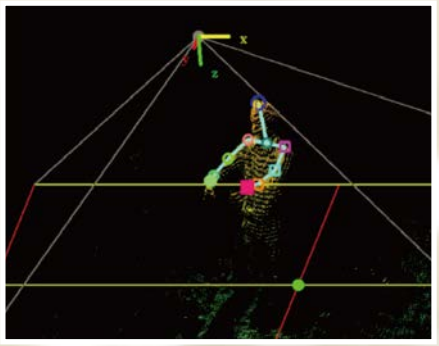
Security Monitoring



3D LiDAR (TOF) Motion Sensor Software Development Kit (SDK)

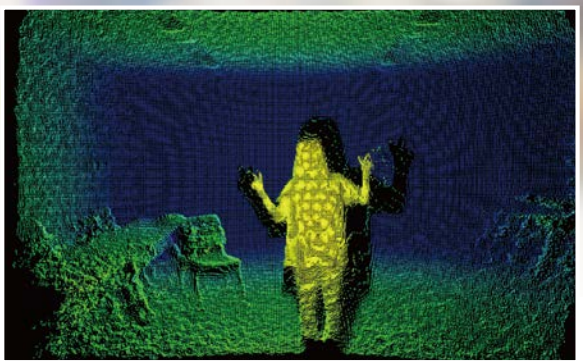
SDK Features

- Standard support of human detection
- API enabling easy use of 3D data
- Ready with sample applications for a variety of use cases
- Supports multiple operating systems

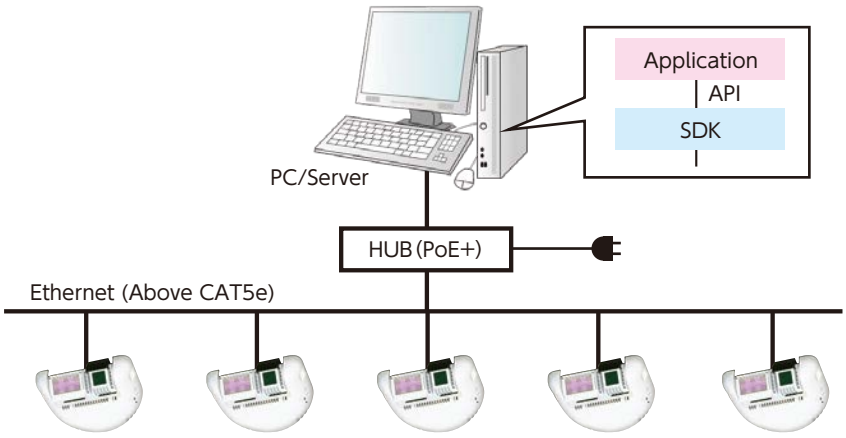


Major Functions

- Multiple sensor management
- Distance data capturing
- Lens distortion correction and 3D point cloud conversion
- Capture/Emulation
- Human detection
- Background subtraction



Sample System Configuration



Development Environment

OS	Windows7/8/8.1/10 (x86/x64) Ubuntu 14.04 LTS/16.04 LTS (x64) Debian 8.0 (x64) CentOS 7.0 (x64)
Environment	Visual Studio 2013/2015 gcc, g++ (-2td=gnu++11 option required) make,cmake,pkg-congig
Programming Language	VC++/C++

Operating Environment

OS	Windows7/8/8.1/10 (x86/x64) Ubuntu 14.04 LTS/16.04 LTS (x64) Debian 8.0 (x64) CentOS 7.0 (x64)
Hardware requirements (Single sensor in use)	Processor 1.6GHz or higher Over 4GB memory NIC port (one or more) (100BASE-TX/1000BASE-T)

Sample Application

◆ Human Detection/Human Counting

Data received from the sensor(s) can be used for traffic flow analysis and human counting. Precise measurement enables height and hand reach position data collection.

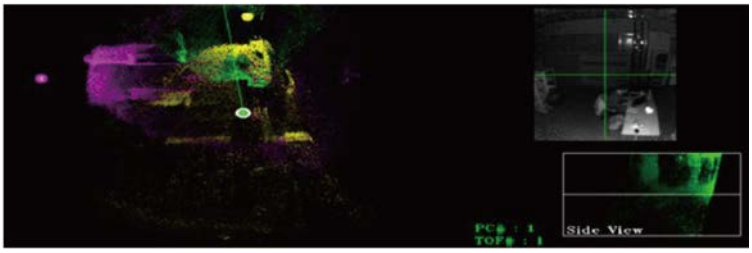
◆ Hand Position Detection (Shelf)

The sensor placed above the shelf precisely detects the hand movements to track where within the shelf the hand has reached.

◆ Hand Position Detection (Table)

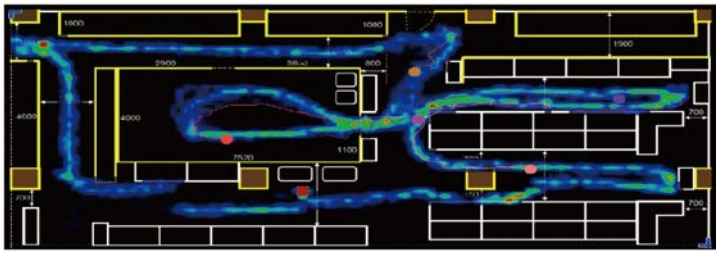
Precise hand movement data collected by the sensor placed over the work table can be used for worker's performance analysis in factories.

◆ Multi-Sensor Coordination Kit



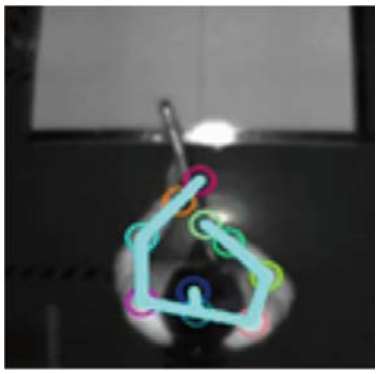
Precise angle and position adjustment becomes possible when using multiple sensors together by using the calibration tool and the dedicated jig, taking approximately 5 min. per sensor.

◆ Traffic Flow Analysis with Multi-Sensor Data Stitching



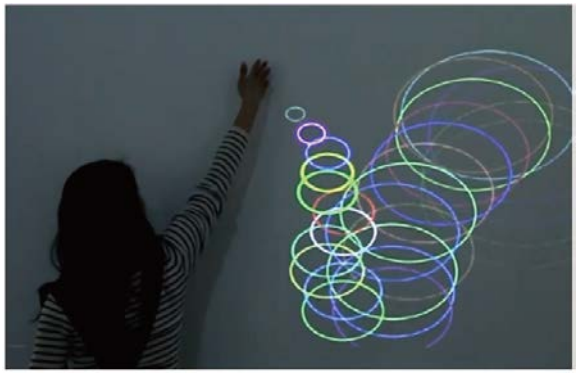
Data from multiple sensors covering a vast area can be stitched to track traffic path. Output data of ID, coordinate, height, hand position and more will be made per frame, enabling use in traffic path analysis and heat map.

◆ Skeleton Detection



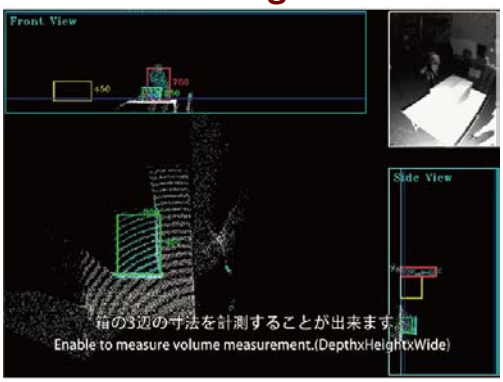
3D coordinates of upper human body parts can be collected for such use as performance analysis, athlete's motion check and rehabilitation.

◆ Touch Detection



With its ability to detect 3D space, the sensor placed above the flat or curved screen can detect touching hands as well as hands near the screen.

◆ Volume Sizing



Sensor placed above the detection space can instantly measure the width, length and height of an object. The sensor can also be installed at an angle, giving flexibility in installation.

※ Many other sample applications are available.
※ Sample applications are not included in the SDK package. Please contact us if you are interested.

Product Specification

HLS-LFOM5

Items	Specification
Sensing Distance	0.7~10m
FOV	H60 °x V80°
Pixcel Resolution	640 x 480pixel(7 fps), 320 x 240pixel(30fps)
Lighting	Infrared IR LD
Size	150x148x44mm (Excluding projecting part)
Weight	500g(Excluding cable)
Interface	Ethernet 100BASE-TX
Power Supply	PoE+
Illumination Condition	Under 10,000 lux (Indoor @daytime)
Temperature Condition	0~45℃
Humidity Condition	0~95%(Non-condensing)
Laser Class	Class 1
Power Consumption	15W
Color	White
IP Standard	—

HLS-LFOM5A

Items	Specification
Sensing Distance	0.7~13m
FOV	H60 °x V80°
Pixcel Resolution	640 x 480pixel(7 fps), 320 x 240pixel(30fps)
Lighting	Infrared IR LD
Size	150x148x44mm (Excluding projecting part)
Weight	520g(Excluding cable)
Interface	Ethernet 100BASE-TX
Power Supply	PoE+
Illumination Condition	Under 10,000 lux (Indoor @daytime)
Temperature Condition	0~45℃
Humidity Condition	0~95%(Non-condensing)
Laser Class	Class 1
Power Consumption	15W
Color	White
IP Standard	—

HLS-LFOM3

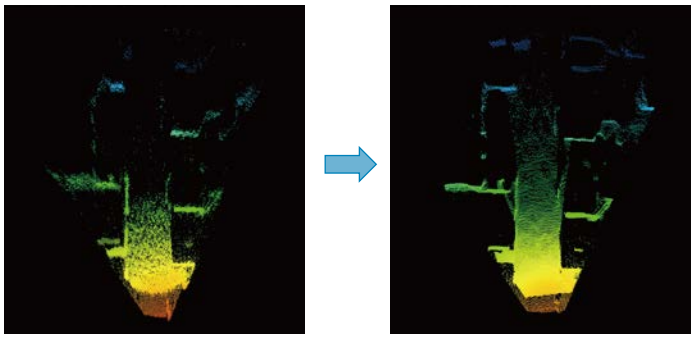
Items	Specification
Sensing Distance	0.7~10m
FOV	H80 °x V60°
Pixcel Resolution	640 x 480pixel(7 fps), 320 x 240pixel(30fps)
Lighting	Infrared IR LD
Size	164x73x83.4mm (Excluding projecting part)
Weight	800g(Excluding cable)
Interface	Ethernet 100BASE-TX
Power Supply	PoE+
Illumination Condition	Under 10,000 lux (Indoor @daytime)
Temperature Condition	0~45℃
Humidity Condition	0~95%(Non-condensing)
Laser Class	Class 1
Power Consumption	15W
Color	Black
IP Standard	IP66

HLS-LFOM1

Items	Specification
Sensing Distance	0.7~10m
FOV	H80 °x V60°
Pixcel Resolution	640 x 480pixel(7 fps), 320 x 240pixel(30fps)
Lighting	Infrared IR LD
Size	138x69x69mm (Excluding projecting part)
Weight	540g(Excluding cable)
Interface	Ethernet 100BASE-TX
Power Supply	PoE+
Illumination Condition	Under 10,000 lux (Indoor @daytime)
Temperature Condition	0~45℃
Humidity Condition	0~95%(Non-condensing)
Laser Class	Class 1
Power Consumption	15W
Color	White/Black
IP Standard	—

◆Accuracy enhancement

- Longer exposure option improves light reception.
- Impulse signal filter reduces noise.
- Upgraded lens improves optical clarity. (HLS-LFOM5A only)



Far view improvements between HLS-LFOM5 and HLS-LFOM5A

For more details, search hlds tof or contact sales@hlds.co.jp via e-mail.

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Data Storage http://hlds.co.jp/product-eng/

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The infrared rays from the TOF sensor are considered safe.

This device is classified as a Class 1 laser device under international standards IEC 60825-1.
Class 1 is defined as eye-safe under all operating conditions.