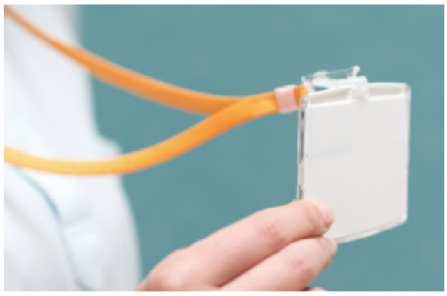
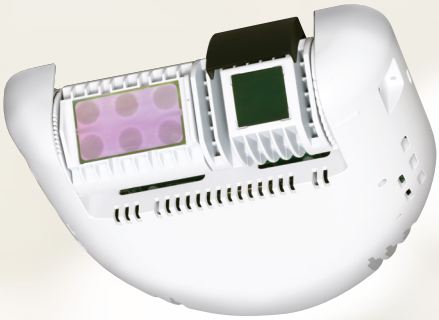
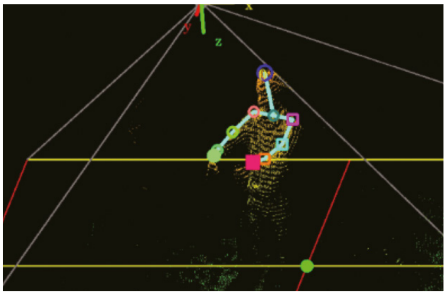
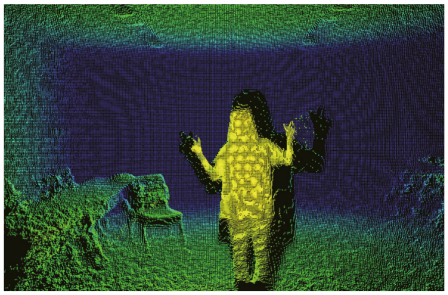
Data Storage

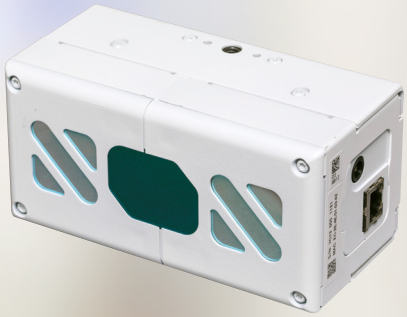
3D LiDAR [TOF]











Hitachi-LG Data Storage, Inc.

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

Next Generation Technology

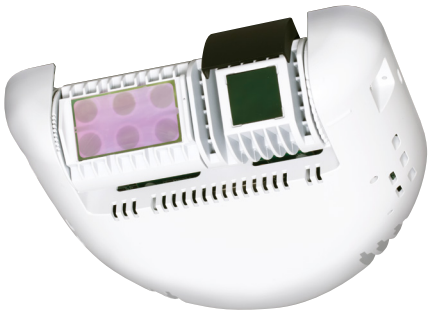
3D LiDAR (TOF) Motion Sensor Series

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

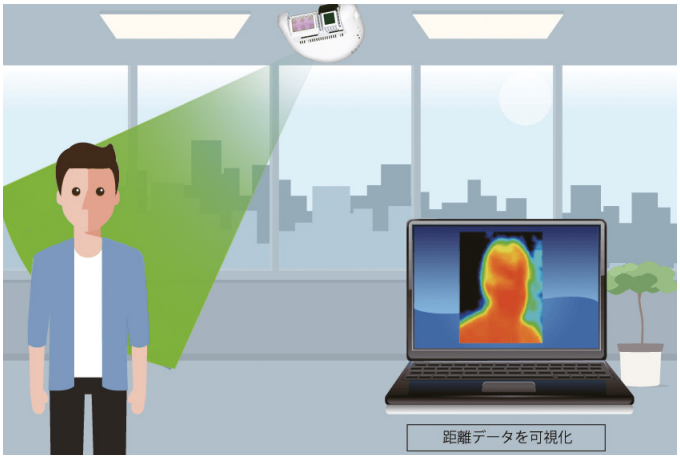
HLS-LFOM3
(Dustproof / waterproof support - IP66 compliant)

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 behaviour data

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

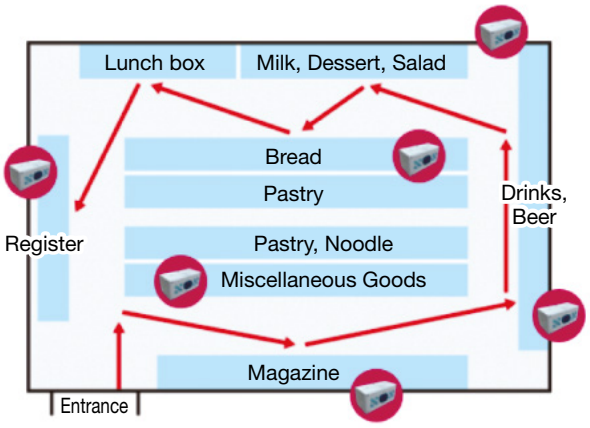
For Marketing Use

◆ Intelligent Interior Behaviour Analysis

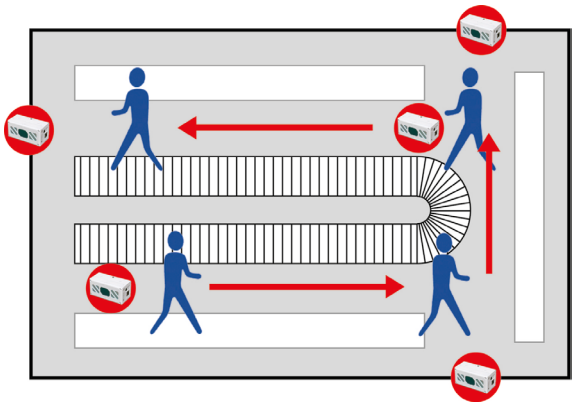
? Challenges and Needs:
- Visualise customer's behaviour and customer service data.
- Optimise the product line-up and layout
- Analyse marketing promotions and effectiveness

! Benefits:
- Analyse customer's behaviour more effectively
- Increase sales
- Improve loss prevention

◉Installation Space: All areas in the store



The traffic path is continuous from store entry to exit



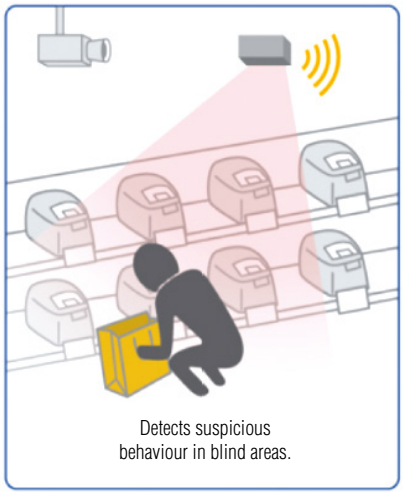
※Visualise employee movements in a factory.

Application Examples

- **Monitor areas of restricted access**
- **Detect suspicious behaviour and decrease shrinkage loss**
- **Tailgating prevention**
- **Monitor behaviour in restrooms**

Detects the precise time and frequency employees enter/exit into hazardous zones.

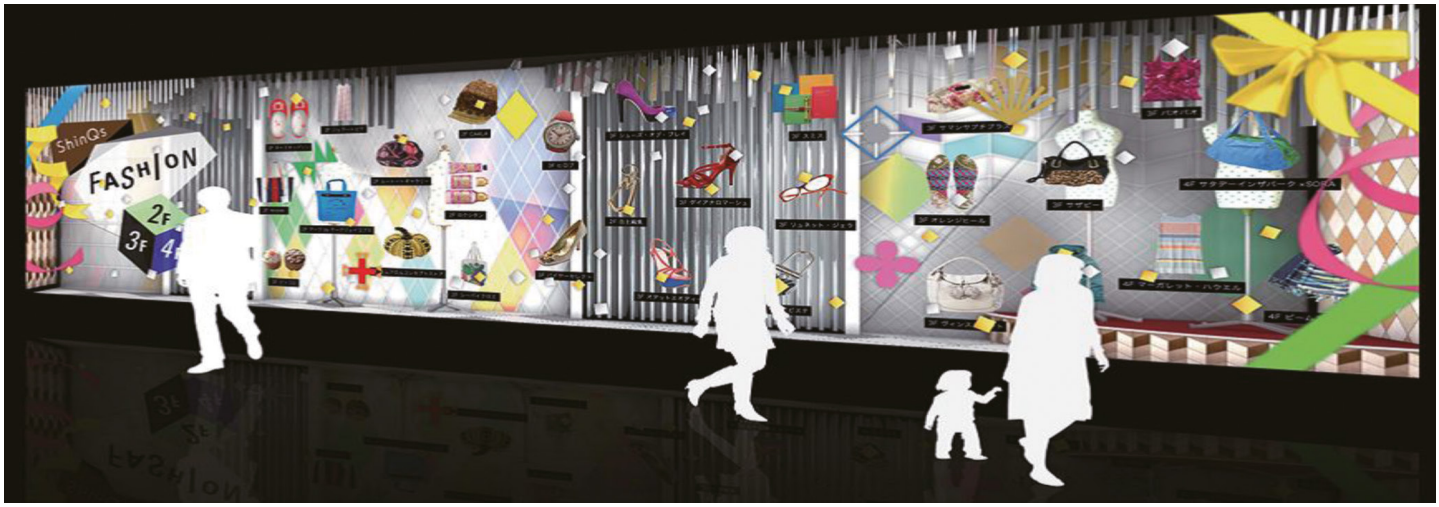
The alarm is activated when multiple people are detected in one cubicle.The alarm will not activate if young children are noted. The system can also identify disabled users and can trigger an alert if required.



Detects suspicious behaviour in blind areas.

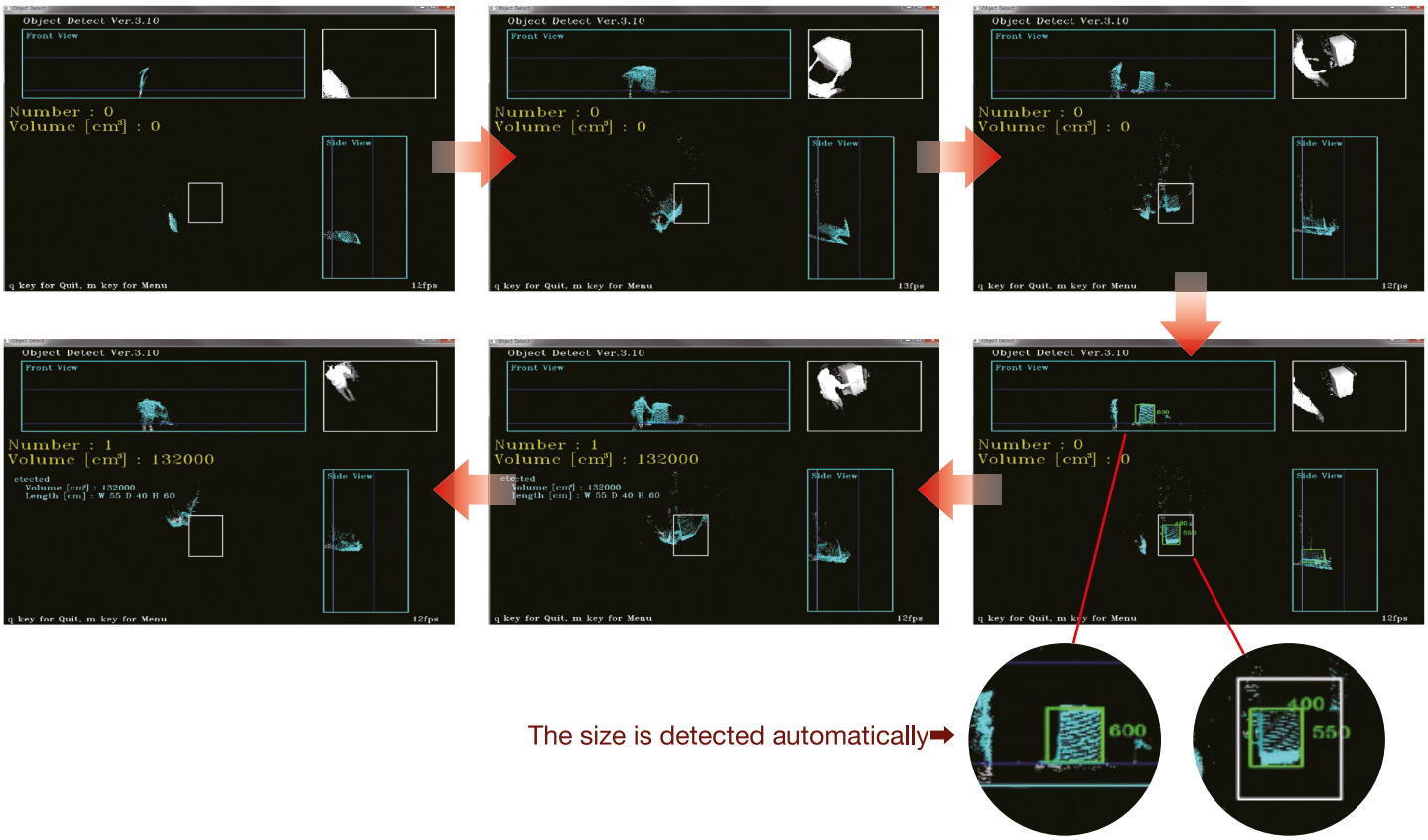
Digital Signage

- Precisely count the people traffic in front of digital signage
- Quantify the effectiveness of advertising by measuring the walking speed of passerby



◆ Volume Sizing

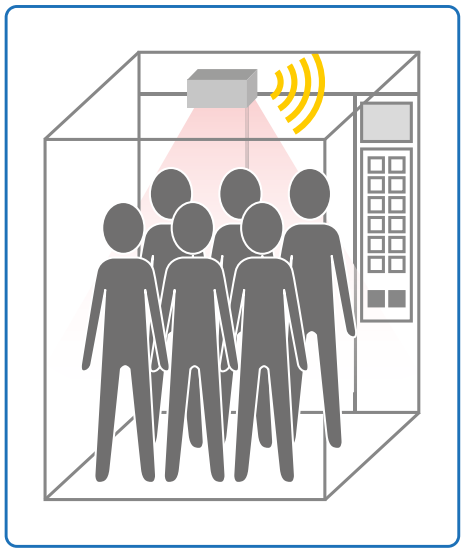
Increase work efficiency by automating dimensional measurement



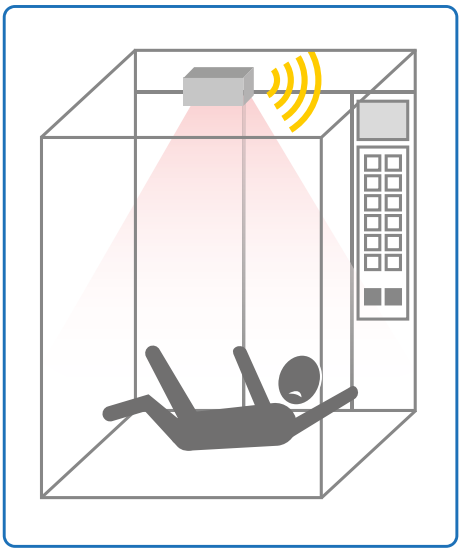
The size is detected automatically➡

◆ Elevator Monitoring

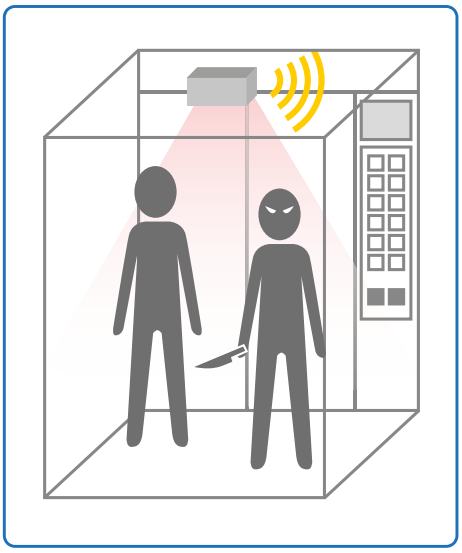
Occupancy Rate Detection



Fall Detection

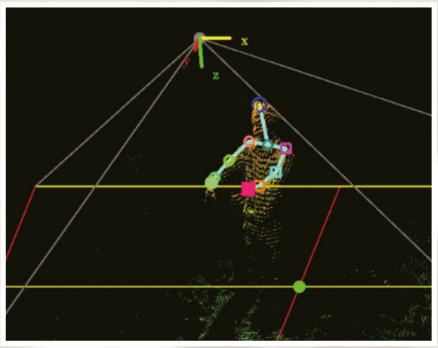


Security Monitoring



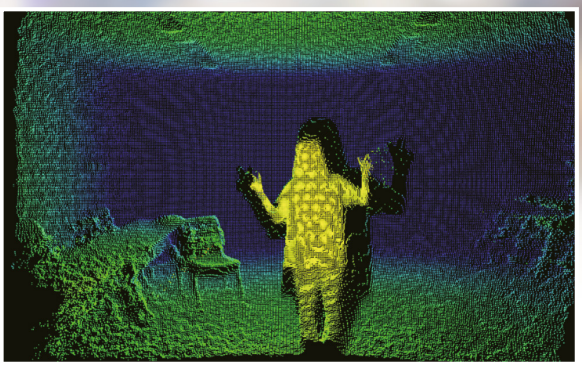
SDK Features

- 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

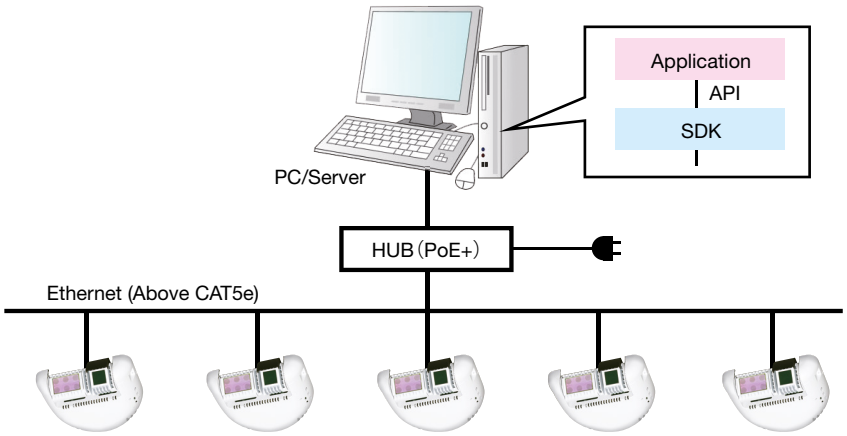


Major Functions

- Multiple sensor management
- Distance data capturing
- Lens distortion correction and 3D point cloud conversion
- Capture/Emulation
- Person measurement
- 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

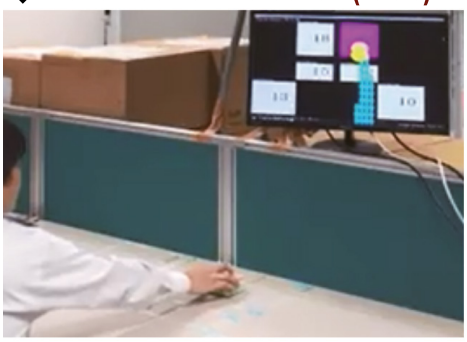
◆ Human Detection/Human Counting

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

◆ Hand Position Detection (Shelf)

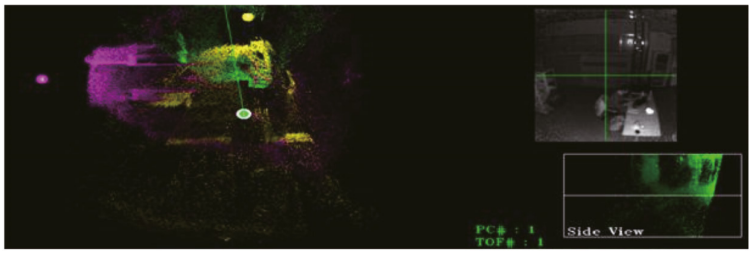
The sensor located above the shelf precisely detects hand movements which tracks where within the shelf the hand moves.

◆ Hand Position Detection (Table)



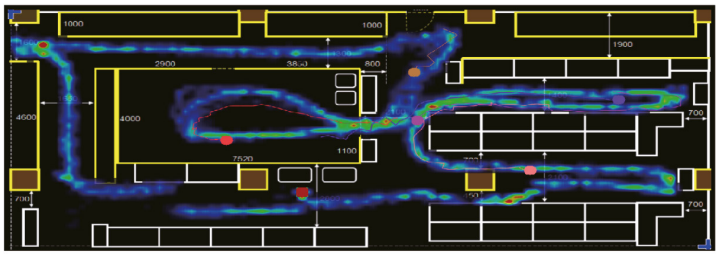
Precise hand movement data is collected by the sensor which is placed over the work table; this can be used for warehouse operatives performance analysis in factories.

◆ Multi-Sensor Coordination Kit



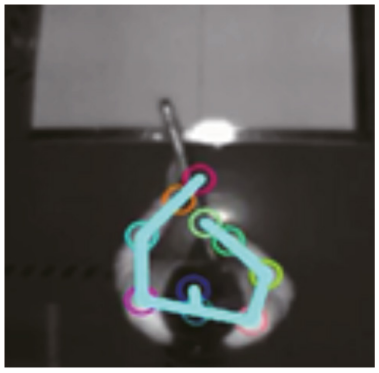
Precise angle and positioning adjustment becomes possible when using multiple sensors together by using the calibration tool and the dedicated jig, taking approximately 5 min. per sensor.

◆ Traffic Path Analysis with Multi-Sensor Data Stitching



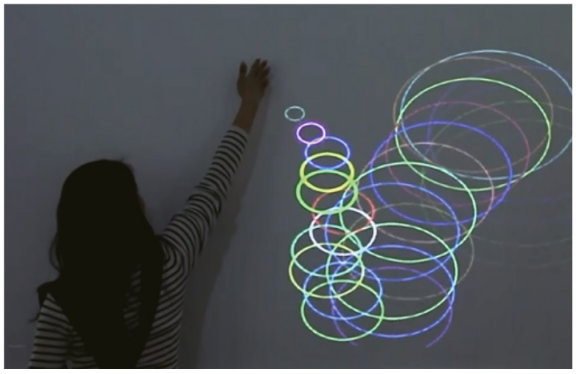
Data from multiple sensors covering a large area can be stitched together to track the movement of visitors. Output data of ID coordinates, height and hand positions will be generated per frame, ensuring an accurate traffic path analysis and heat map data is created.

◆ Skeleton Detection



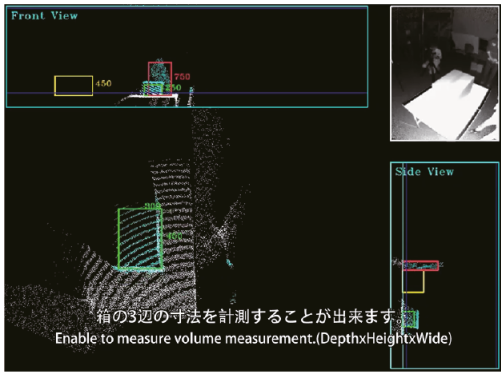
3D coordinates of upper human body parts can be collected for such use as performance analysis, athlete's motion check and rehabilitation.

◆ Touch Detection



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

◆ Volume Sizing



A sensor which is 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, providing flexibility in installation.

※ Many other sample applications are available upon request.
※ Sample applications are not included in the SDK package. Please contact us if you would like further information.

Product Specification

HLS-LFOM5

Safety standards: under preparation

Items	Spec
Sensing Distance	0.7～10m
FOV	H60 °x V76°
Pixel Resolution	640 x 480(7 fps), 320 x 240(30fps)
Distance Resolution	X,Y:6mm, Z:8mm @2m
Lightning	Infrared IR LD
Size	150x148x44mm (Excluding projecting part)
Weight	500g(Excluding cable)
Interface	Ethernet 100BASE-TX (Power is supplied by POE+)
Illumination Condition	Under 10,000 lux (Indoor @ daytime)
Temperature Condition	0～45°C
Humidity Condition	0～95%(Non-condensing)
Laser Class	Laser Class 1
Power Consumption	15W
Colour	White

HLS-LFOM3

Items	Spec
Sensing Distance	0.7～10m
FOV	H76 °x V60°
Pixel Resolution	640 x 480(7 fps), 320 x 240(30fps)
Distance Resolution	X,Y:6mm ,Z:8mm @2m
Lightning	Infrared IR LD
Size	164x73x83.4mm(Excluding projecting part)
Weight	800g(Excluding cable)
Interface	Ethernet 100BASE-TX (Power is supplied by POE+)
Illumination Condition	Under 10,000 lux (Indoor @ daytime)
Temperature Condition	0～45°C
Humidity Condition	0～95%(Non-condensing)
Laser Class	Laser Class 1
Power Consumption	15W
Colour	Black

HLS-LFOM1

Items	Spec
Sensing Distance	0.7～10m
FOV	H76 °x V60°
Pixel Resolution	640 x 480(7 fps), 320 x 240(30fps)
Distance Resolution	X,Y:6mm ,Z:8mm @2m
Lightning	Infrared IR LD
Size	138x69x69mm(Excluding projecting part)
Weight	540g(Excluding cable)
Interface	Ethernet 100BASE-TX (Power is supplied by POE+)
Illumination Condition	Under 10,000 lux (Indoor @ daytime)
Temperature Condition	0～45°C
Humidity Condition	0～95%(Non-condensing)
Laser Class	Laser Class 1
Power Consumption	15W
Colour	White/Black

For more details, search:

hlds tof

Or contact:

sales@hlds.co.jp via e-mail.

https://www.facebook.com/hitachi.lg.tof.LiDAR/

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

https://www.youtube.com/channel/UCzQ0FtPOoTMJ60_mUNgjo8Q

<Japan / Korea / APAC>
Hitachi-LG Data Storage, Inc.
Tel: 108-0022 4F MSC Center Bldg., 22-23, Kaigan 3-chome, Minatoku, Tokyo, Japan
Email: sales@hlds.co.jp
Web: http://hlds.co.jp/product-eng/

<US / Canada>
Hitachi America, Ltd.
Digital Solution Division, Security Solutions Group (SSG)
2420 Fenton St., Suite 200, Chula Vista, California 91914
Email: ssgsales@hal.hitachi.com
Web: http://hitachi-america.us/IoT

<EMEA>
Hitachi Europe Ltd.
Whitebrook Park, Lower Cookham Road, Maidenhead
Berkshire SL6 8YA, United Kingdom
Email: dmgspg.sales@hitachi-eu.com
Web: http://www.hitachidigitalmedia.com

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.