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Latest Time-of-Flight sensor solutions and applications

IMAGING division

October 24th, 2023



FlightSense™ making light work

Time-of-Flight Principle



● ST proprietary FlightSense™ technology

● True distance measurement

● Fast and low power

● Truly invisible 940nm illumination



ST pioneer and leader in Time-of-Flight (ToF)

ST is #1 Worldwide Time-of-Flight sensor supplier

4 Generations

of all-in-one ToF solution deployed since 2014

>500 devices

Over 200 phones with ST's Time of Flight technology
Several hundreds of non wireless end products on the market
Unlimited variety of use-cases beyond smartphones

>80,000

Evaluation kits deployed

>2 Billions

ToF units shipped. Mastering end-to-end supply chain

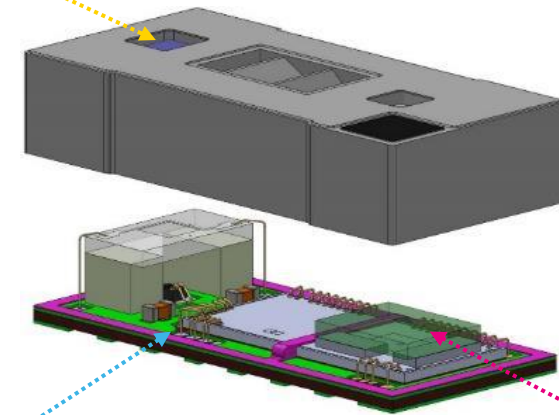


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All-in-One (illumination & sensor) Time-of-Flight system

Advanced optics with integrated IR filters

State-of-art assembly & testing
ST manufacturing line in Shenzhen



Monolithic ToF SoC,
SPAD Array, high safety
Class1 VCSEL driver

Full Class 1 safety
high efficiency
VCSEL



FlightSense industrial & mass market portfolio



Multizone	<p>Up to 64 zones (8x8) Artificial intelligence enabler CNH data</p>				VL53L7CH 90° FoV 64 zones (8x8) 350 cm dark	VL53L8CH 65° FoV 64 zones (8x8) 400 cm dark/285cm amb Low power consumption	<p>Compact normalized histogram</p>
	<p>Up to 64 zones (8x8) Histogram mode Autonomous mode</p>	<p>STGesture™ recognition</p>	VL53L5CX 65° FoV 64 zones (8x8) 400 cm dark/170cm amb	VL53L7CX 90° FoV 64 zones (8x8) 350 cm dark	VL53L8CX 65° FoV 64 zones (8x8) 400 cm dark/285cm amb Low power consumption		
Single zone	<p>Histogram mode Long distance up to 8 m High ambient immunity</p>				VL53L3CX 25° FoV 500 cm dark/140cm amb ULP mode	VL53L4CX 18° FoV 600 cm dark/180cm amb 10 mm linearity	VL53L1CB 27° FoV configurable 800 cm dark/160cm amb Sequential 2x2 zones
	<p>Ranging up to 4 m Autonomous mode</p>	VL53L0CX 25° FoV 200 cm dark			VL53L1CX 27° FoV configurable 400 cm dark/130cm amb ULP mode		
	<p>Proximity up to 1.3 m Short distance linearity Low power consumption</p>				VL53L4CD 18° FoV 130 cm dark 1 mm linearity ULP mode		



Legend:

Legacy product

Recent product

New product



Ultralow power mode

Single-zone sensors



Single-zone family

Single-zone family is pin-to-pin compatible



VL53L4CD

VL53L0CX

VL53L1CX

VL53L3CX

VL53L4CX

VL53L1CB

Max distance measurement	130 cm	200 cm	400 cm	500 cm	600 cm	800 cm
Field-of-view	18°	25°	27° (SW config)	25°	18°	27° (SW config)
Perf. under ambient light	60 cm	80 cm	135 cm	140 cm	180 cm	160 cm
Close distance linearity	+++++ >0.1 cm	++ >2.5 cm	+ >2.5 cm	++ >2.5 cm	+++ >1.0 cm	++ >2.5 cm
Min. distance detection	0 cm	<1.5 cm	1.0 cm	1.0 cm	0 cm	1.0 cm
▶ Histogram				✓	✓	✓
▶ Autonomous mode*	✓ 240µA (10 ms)	✓ 395µA (20 ms)	✓ 320µA (20 ms)			
▶ Ultralow power mode**		✓ 55 µA	✓ 65 µA	✓ 55 µA		
Continuous mode	22 mA	19 mA	16 mA	16 mA	19 mA	16 mA
All-in-one module size	4.4 x 2.4 x 1.0 mm	4.4 x 2.4 x 1.0 mm	4.9 x 2.5 x 1.56 mm	4.4 x 2.4 x 1.0 mm	4.4 x 2.4 x 1.0 mm	4.9 x 2.5 x 1.56 mm
Pinout	Same pinout for all products					

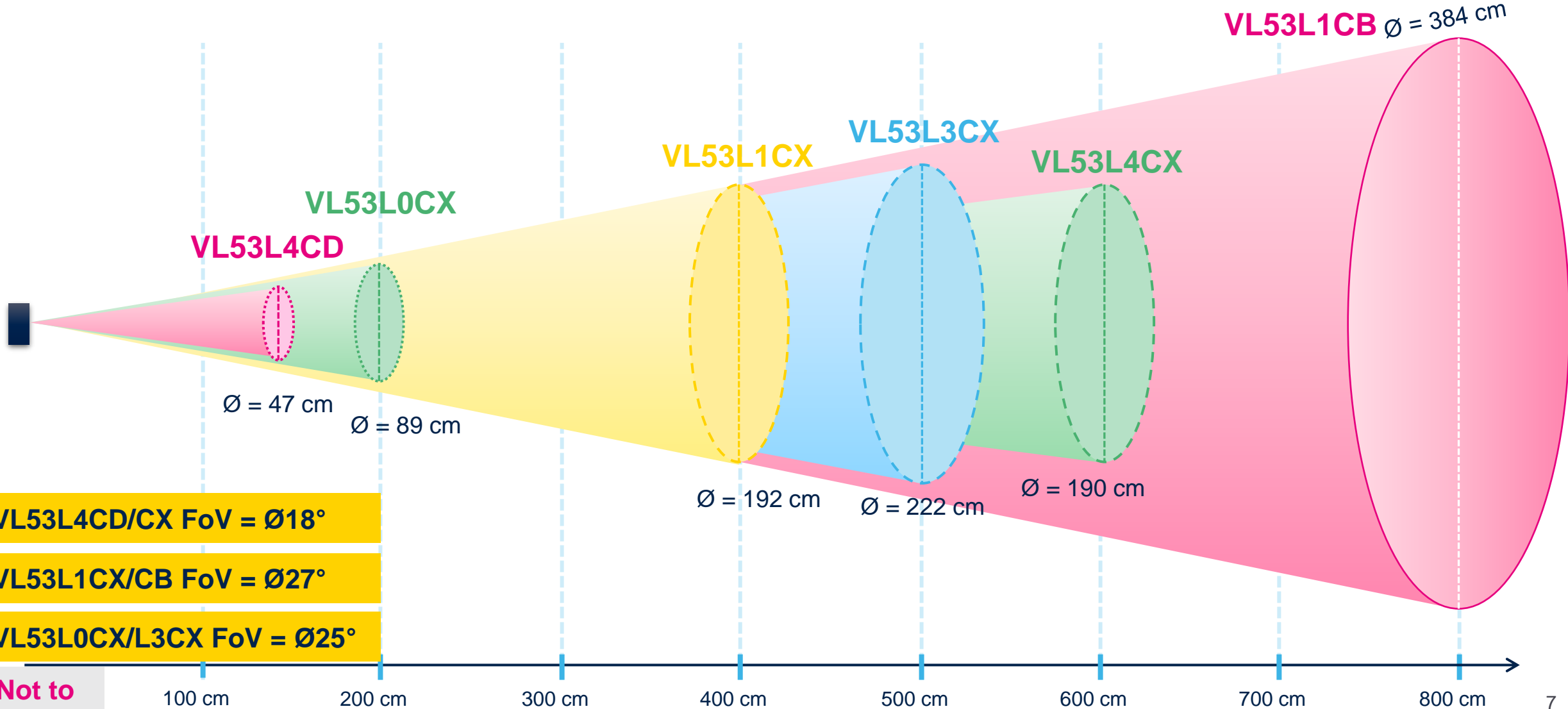


* autonomous mode power consumption is calculated at 1 Hz using the timing budget referenced after the power consumption

** Ultralow power (ULP) mode uses special settings allowing very low power consumption transforming the sensor into a detection sensor



Single-zone max distance and field-of-view (FoV)



VL53L4CD/CX FoV = $\varnothing 18^\circ$

VL53L1CX/CB FoV = $\varnothing 27^\circ$

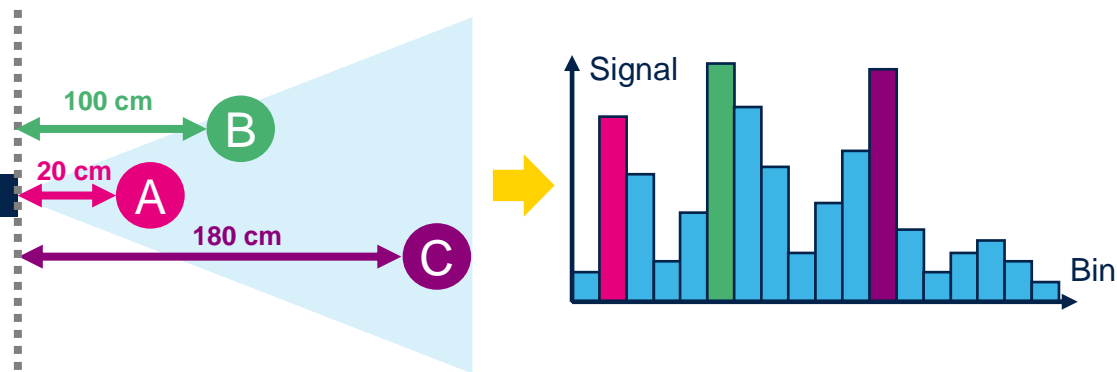
VL53L0CX/L3CX FoV = $\varnothing 25^\circ$

Not to scale

Histogram enable multi-object detection and crosstalk compensation

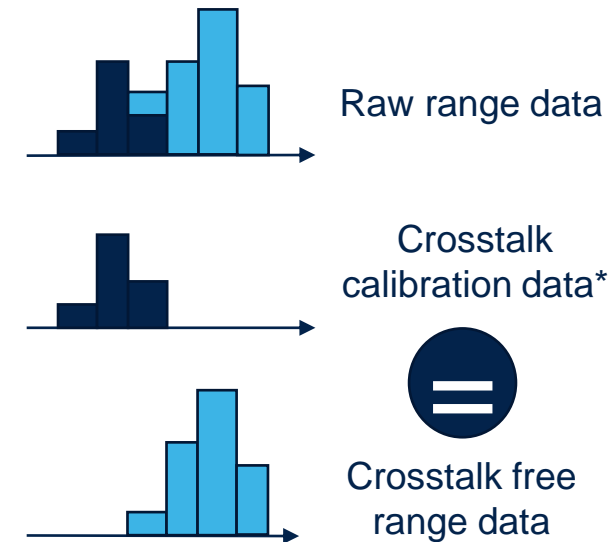
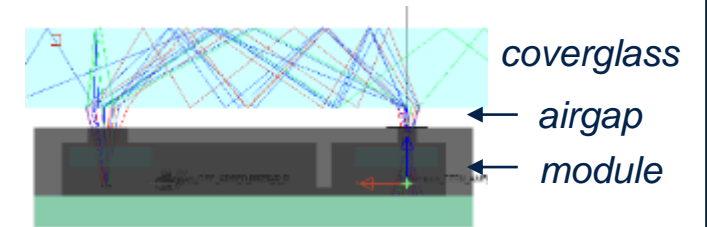
Multi-object detection

- Histogram output ranging distance for each object
- Allows first object detection and background removal
 - Ideal for complex scenes management (foreground / background)
- Allows multi-human detection for privacy (on-looker detection)
 - While respecting user privacy, technology is not a camera



Crosstalk compensation

- Histogram enables accurate distance output whatever the smudge or crosstalk



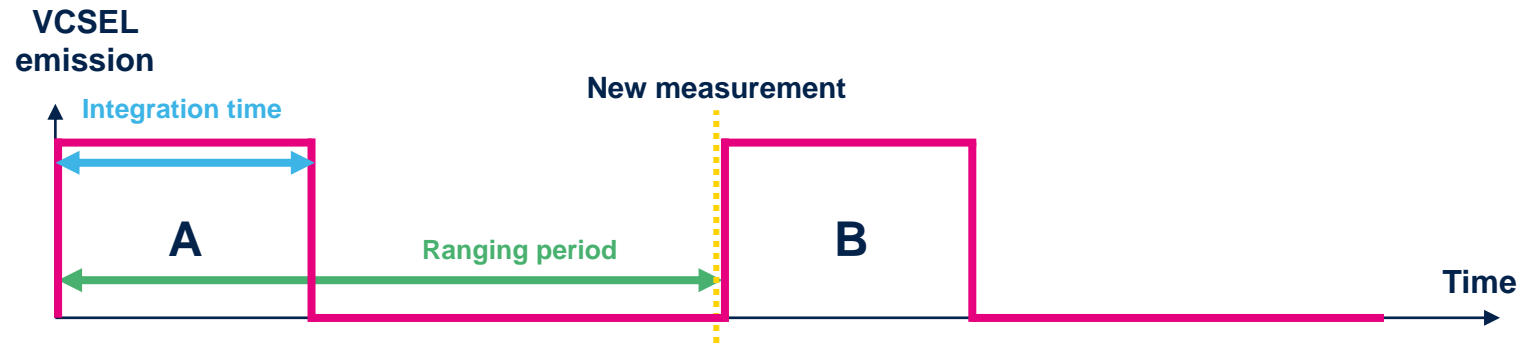


Low power “autonomous ranging mode”

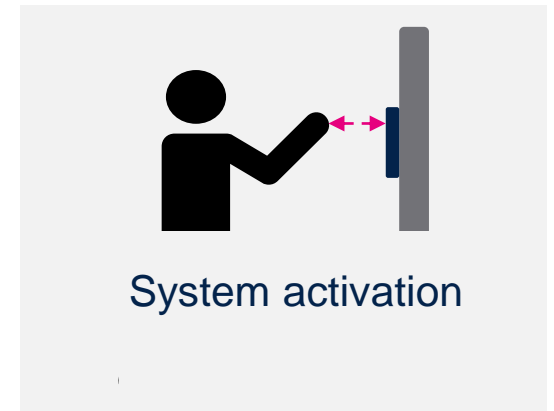
Low power consumption thanks to the autonomous mode

Benefits

- Low power consumption
- The system can sleep until an interrupt is sent by the sensor to the host
- Can be integrated in battery-powered devices



- The sensor is active only during the **integration time**
- During the remaining time of the **ranging period**, the sensor is sleeping and consumes low power, the SW is in standby
- The user can define **integration time** and **ranging period** depending on application
- **Thresholds can be programmed to send an interrupt to the host and wake-up the system only when a target is approaching the sensor**





ST Ultra Low Power ToF sensors

Time-of-Flight ranging sensors used as detector sensors

Three ST solutions



VL53L1CX

- 65µA min power consumption
- 140 cm max distance
- 27° FoV



VL53L3CX

- 55µA min power consumption
- 80 cm max distance
- 25° FoV



VL53L4CD

- 55µA min power consumption
- 110 cm max distance
- 18° FoV

Core Benefits



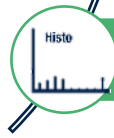
Ultra-low power consumption



Not affected by target color and reflectance



Easy to use: Detection → Interrupt



Compatible with standard modes use (distance ranging)

Visit the landing page

www.st.com/ulp-tof



You will find:

- Products and ULP drivers
- Performance and applications
- Technical resources
- On-demand webinar

Markets & Applications

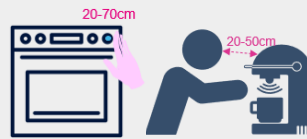
Access control



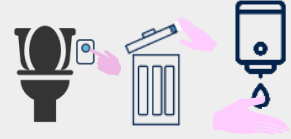
System activation



Home automation



Others



Multizone sensors



8x8 multizone Time-of-Flight sensor products



VL53L5CX



VL53L7CX



VL53L8CX

Field of view	45° x 45° (65° diag.)	60° x 60° (90° diag.)	45° x 45° (65° diag.)
Resolution	8x8 and 4x4		
Processing mode	Histogram		
Common features	Autonomous low power mode → Motion indicator Crosstalk immunity >60 cm		
Additional features			Autostop External synchronization pin
Driver	100% compatible		
Module size	6.4 x 3.0 x 1.5 mm	6.4 x 3.0 x 1.6 mm	6.4 x 3.0 x 1.75 mm
Interface	I ² C	I ² C	I ² C and SPI
Distance ranging	Dark condition*	400 cm	350 cm
	Under ambient light*	170 cm	65 cm
Power consumption**	4.5 mW	8.3 mW	1.6 mW

* Best conditions using white target (88% reflectance)

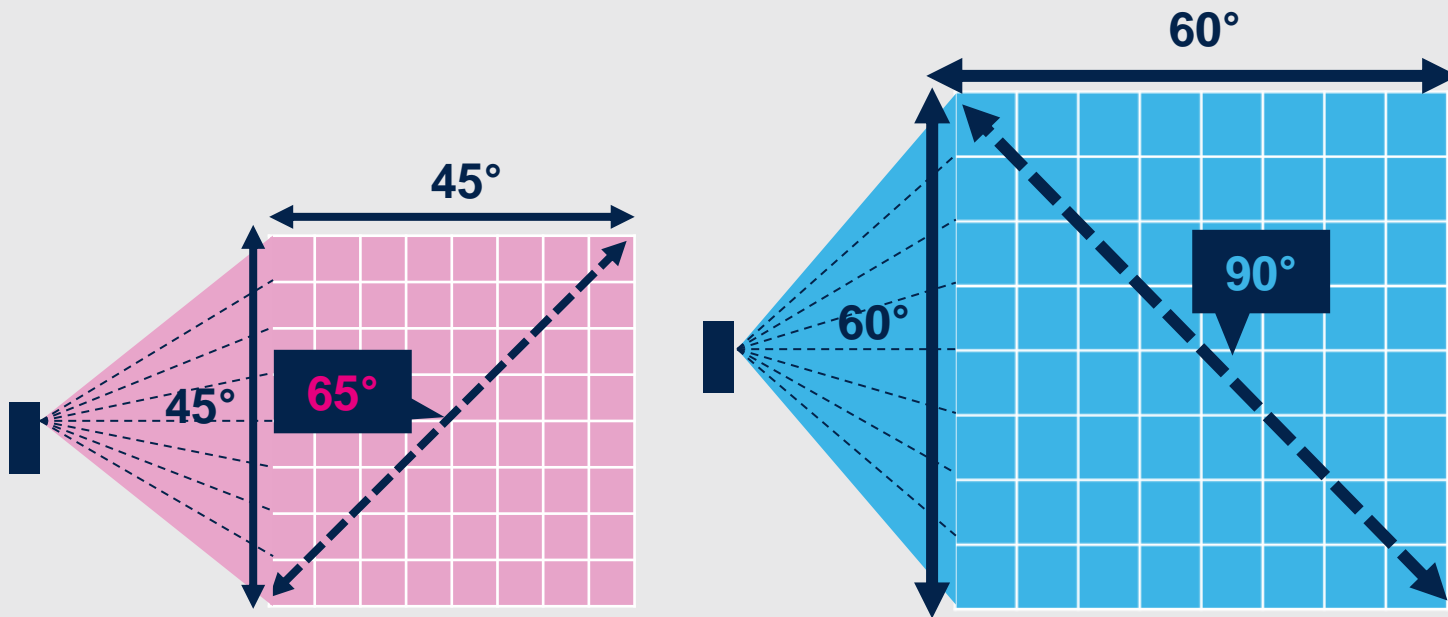
** power consumption measured at 1 Hz frequency and with 3.3 V analog and VCSEL supply



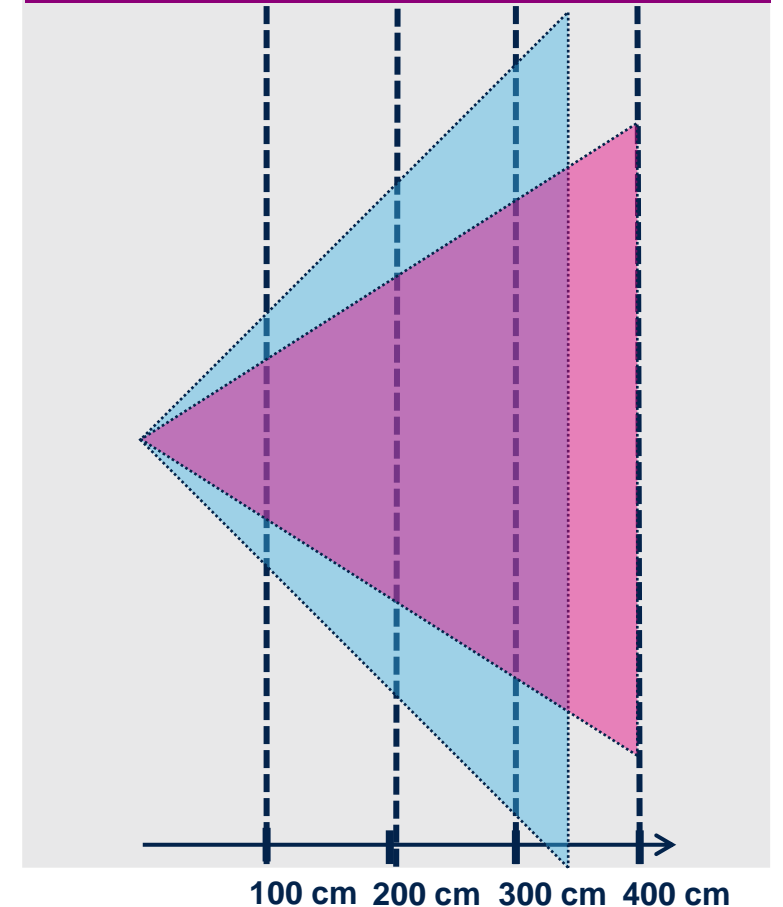
Multizone max distance and field-of-view (FoV)

The **VL53L7CX** has a wider FoV, the **VL53L5CX** and **VL53L8CX** range further

Coverage zone



Maximum distance ranging
Drawing at scale



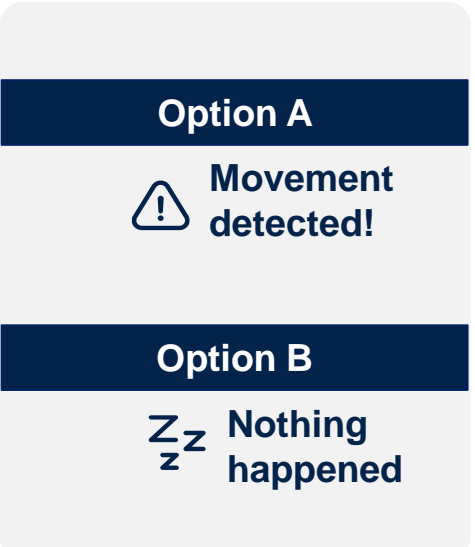
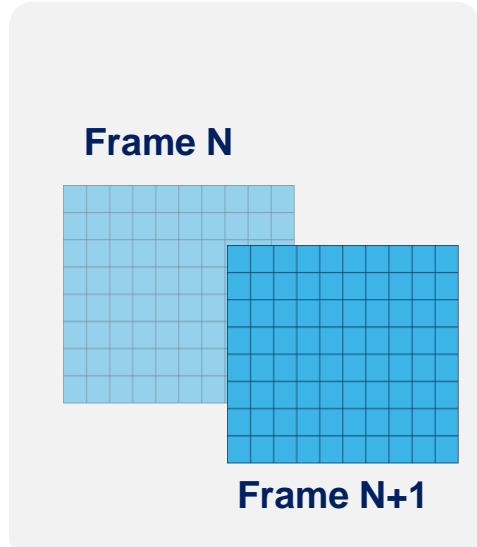
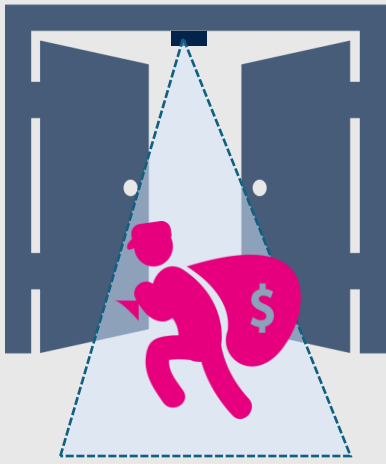


Motion indicator sensor detects motion in each zone



Compatible with detection thresholds

Wake up your devices with anomaly detection



Data collection

Motion indicator algorithms

Results

Features

- Based on histogram algorithms
- Movement variation in each zone
- Motion intensity is the output data
- Runs in Autonomous mode

Market and use-cases



Home Appliance & Home Automation



Smart Home



Industrial



Robotic

For more information



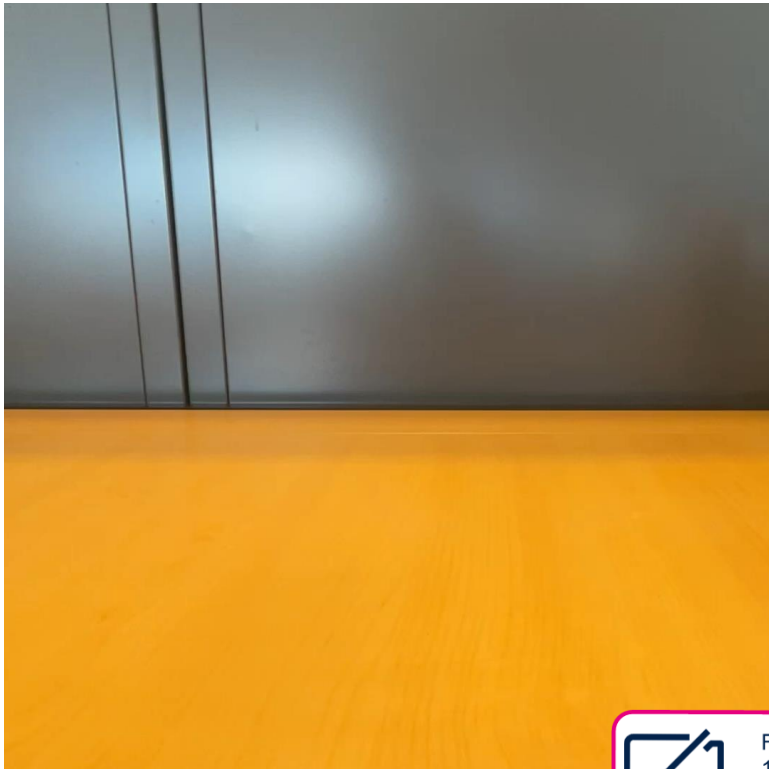
User Manuals
UM3109





What does an 8x8 multizone ToF sensor see?

VL53L8CX live demo



R:567	R:573	R:575	R:580	R:586	R:587	R:598	R:604
R:571	R:573	R:582	R:582	R:597	R:592	R:597	R:601
R:568	R:571	R:588	R:587	R:599	R:607	R:605	R:615
R:577	R:577	R:588	R:592	R:600	R:602	R:610	R:612
R:573	R:588	R:591	R:593	R:607	R:607	R:610	R:606
R:577	R:584	R:590	R:601	R:600	R:607	R:614	R:613
R:545	R:560	R:577	R:582	R:588	R:591	R:595	R:584
		R:455	R:469	R:464	R:474	R:466	R:469



FlightSense™
100% Privacy
(no image)

Visit landing pages



[www.st.com/
VL53L7CX](http://www.st.com/VL53L7CX)



[www.st.com/
VL53L8CX](http://www.st.com/VL53L8CX)



You will find:

- Technical resources
- Ordering codes
- On-demand webinar

On-demand webinar from March 2023 available for viewing on st.com



life.augmented

New CNH sensors



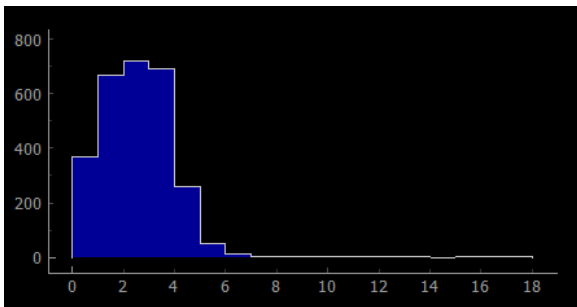


Compact Normalized Histogram

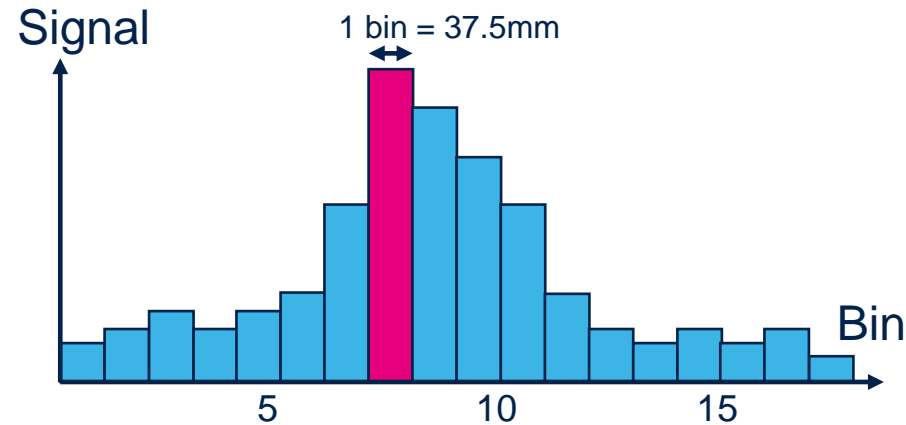
CNH resolution and data-set contains way more information than ranging distances

New data

- For each zone, the sensor provides CNH, with signal count on each bin



- X unit is bin number
- Y unit is signal count
- The measured ambient level is removed from the CNH data



Additional features

- Both standard and CNH data
- Ambient map information
- Autonomous mode available
- Both I²C and SPI* communication modes available

High data quantity

- 1 histogram bin = 1 data
- Up to 18 bins per zone (8x8)
 - Total of 1152 data

What means CNH?

C: Compact → Options are available to reduce the amount of data compared to the native “raw” histogram data

N: Normalized → Raw data are adjusted to compensate variations caused by frame-to-frame adjustments

H: Histogram → Primary data is in the form of histograms recording return-signal-strength vs range

* VL53L8CH only



Two products, one solution

Two products

VL53L7CH



- Up to 350 cm ranging
- 60° x 60° FoV (90° diagonal)
- I²C interface

VL53L8CH



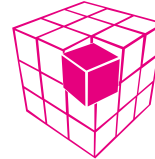
- Up to 400 cm ranging
- 45° x 45° FoV (65° diagonal)
- High ambient light immunity
- Low power consumption
- I²C and SPI interface
- External synchronization pin

Common features

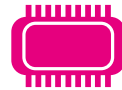
- Autonomous low power mode
- Motion indicator

100% compatible

Single STM32 project



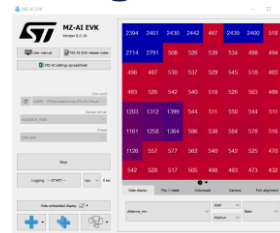
Single driver (ULD)



Single FW

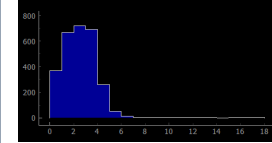


Single GUI



Output data

Compact Normalized Histogram



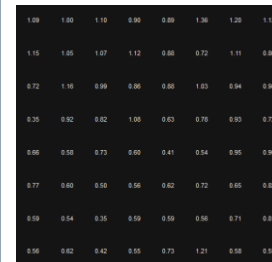
- Up to 18 bins in 8x8 at 15Hz
- Up to 72 bins in 4x4 at 15Hz

Standard data



- 2 for distance (distance, sigma)
- 1 for signal (signal peak)
- 2 additional data (ambient level and reflectance)

Ambient map



- IR ambient light level data generated based on the same zone aggregation as the CNH histogram data

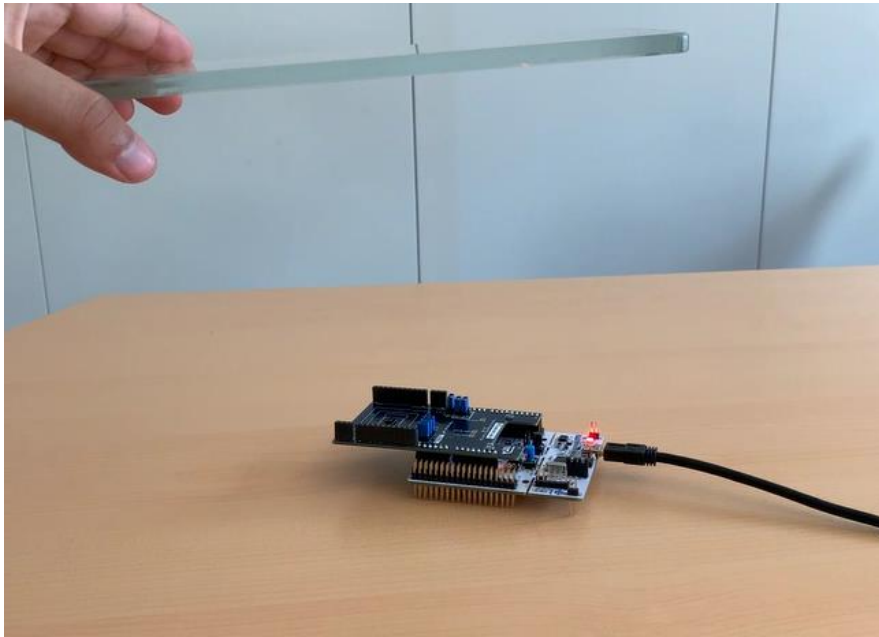




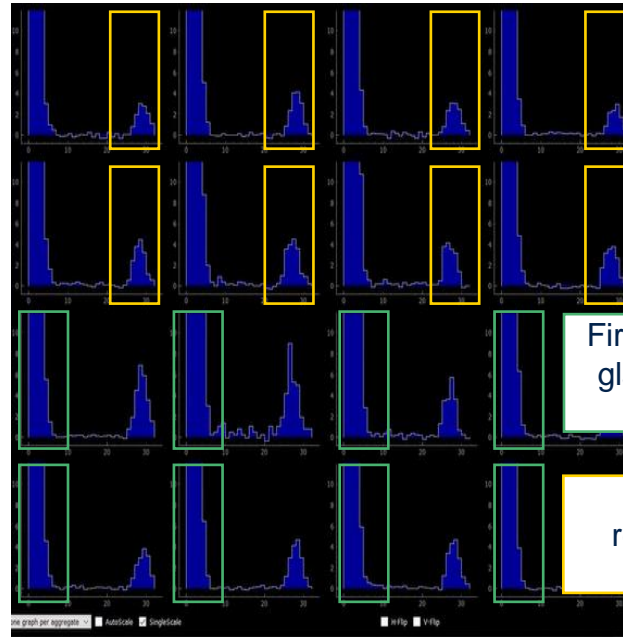
How CNH achieves tenfold data quantities

Example with CNH vs glass

Live scene



CNH



First peak represents glass detected from 10 cm to 20 cm

Second peak represents ceiling around 190 cm

Save the date

October 26th, 2023

www.st.com/content/st_com/en/events/st-time-of-flight-sensor-solutions.html



Agenda:

- What are CNH?
- How it works?
- Where to use?

Applications and solutions



Applications everywhere

PC, Tablets & Peripherals

Home Appliance & Home Automation

Smart Services & Retail Automation

Industrial & Factory Automation

Educational Tablets

Headsets

AR/VR

Smart Home

Home assistants

Air purifiers

Smart storage

Biometric ID Readers

Factory management

Sanitary

Monitors

Laptops

Wearable & IoT

Projectors

Home Automation

Home assistants

Cleaning Robots

ATM

Locks

Conveyor belts

Lighting

Faucets

Tablets

Printers

Instant Cameras

Toys

Home Appliances

Pet Robots

Trucks

Lockers

Tanks

Packing

Dispensers

Keyboards

TVs

Smart Speakers

White Goods

Service Robots

Parking

Vending machines

Industrial robots

Packing

Smart Bins

Conf. systems

Smartphones

Lamps

White Goods

Service Robots

Parking

Vending machines

Industrial robots

Logistics

Smart Mirrors

Personal Electronics & Smartphones

Cleaning Robots & Robots

Access Control & Security

Sanitary Devices & Equipment

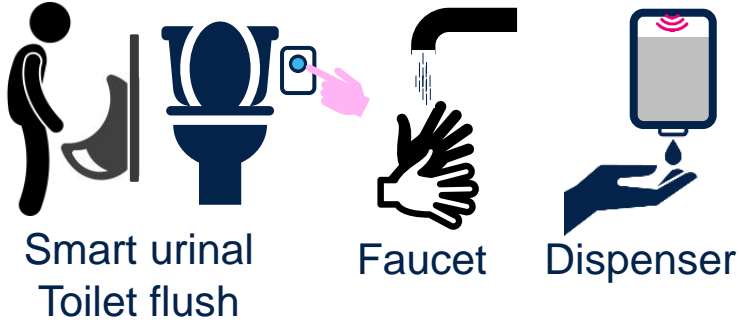




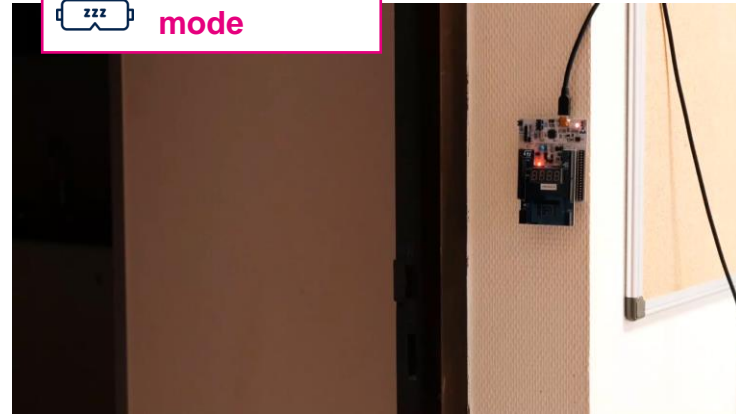
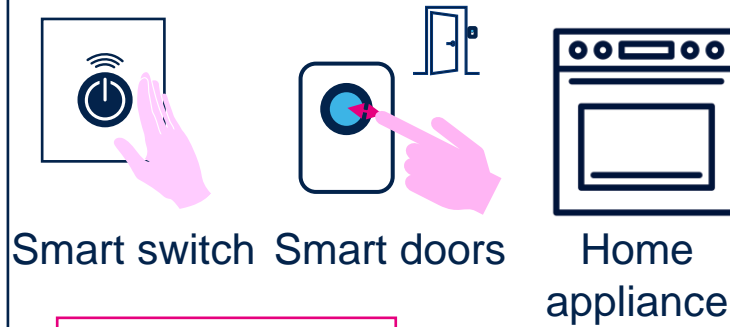
Touchless activation with ToF detection sensors

Avoid any contact with physical buttons thanks to ToF detection sensors

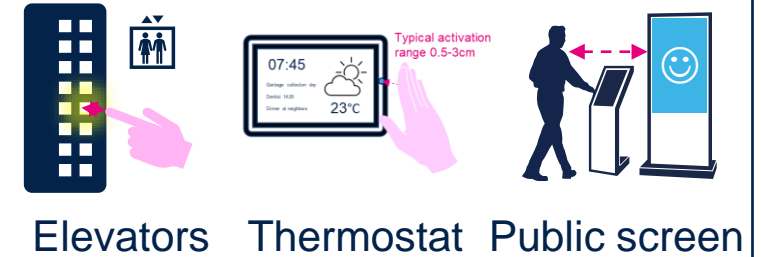
Sanitary



Home automation



Smart building





STGesture™ recognition

Turnkey solution working with VL53L5CX, VL53L7CX and VL53L8CX

Applications

User-friendly



Laptops



Thermostats



Switch

Hygiene



Digital Signage



Sanitary



Elevators

Safety



Kitchen appliances



Industrial robots

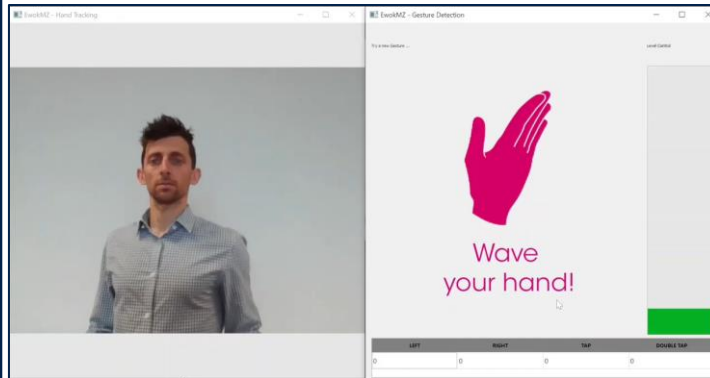


Production lines

Motion gesture recognition

Turnkey STGesture™ libraries:

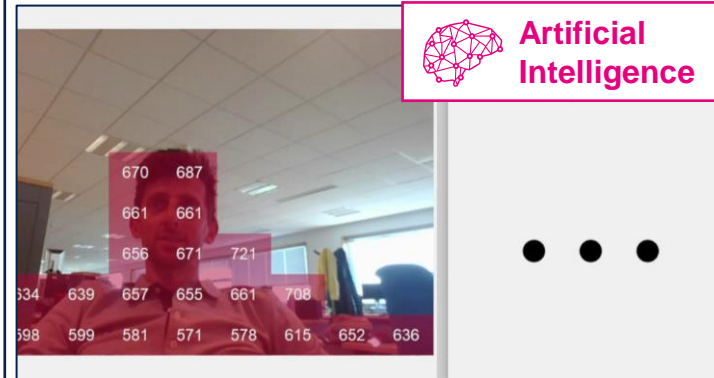
- Hand tracking
- Tap: single and double
- Swipe: left, right, up, and down
- Level control



Download [STSW-IMG035](#) package

Hand posture recognition

Up to 7 hand postures recognized



Discover now our solution on stm32ai.st.com

AI framework available on [GitHub.com/STMicroelectronics](https://github.com/STMicroelectronics)

Visit landing page

www.st.com/gesture-recognition



You will find:

- Real-life examples
- Technical resources
- On-demand webinar

Cost effective

Inexpensive system architecture, and development

Privacy

No image unlike camera. Only ranging distance

BENEFITS

Ready to use

No image unlike camera. Only ranging distance

Low power

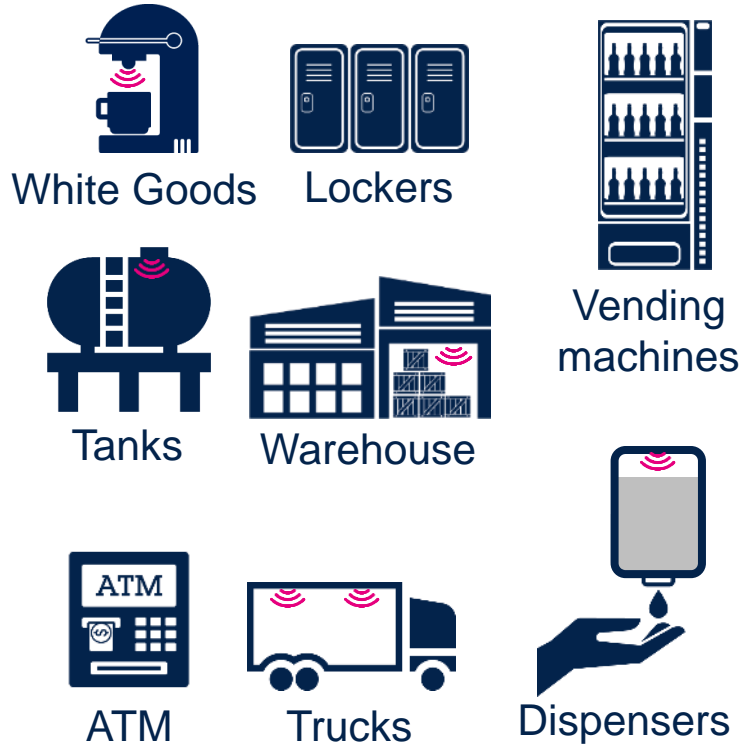
Low power ToF compared to other technology



life.augmented

Inventory management, waste management and liquid level control

Markets and applications



Core Benefits



Smart Shelves demo

- Using **VL53L1CX** and programmable Region of Interest
- www.youtube.com/watch?v=iaayV3r5ALbk





Nonintrusive liquid level monitoring solutions

A dual throng solution portfolio for best end-system integration adequation

Two ST Solutions

• VL53L4CD

- Single-zone sensor
- Narrow 18° FoV
- 120cm max distance

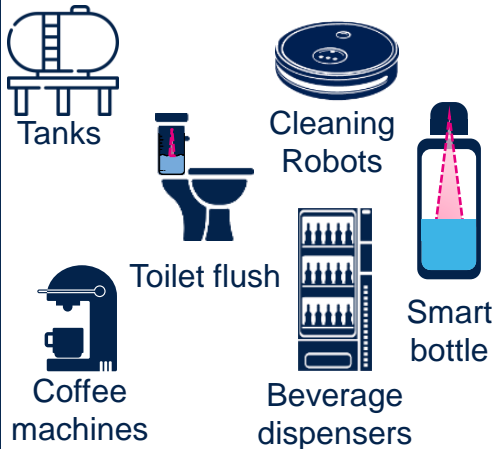


• VL53L5CX

- 8x8 multizone
- 65° wide FoV
- Up to 400 cm ranging



Applications



Core benefits

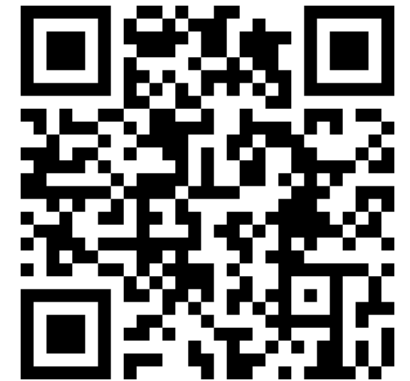
- Not “intrusive”
- Works with all liquids
- Small size

V53L5CX demo



Visit the SW page

www.st.com/en/embedded-software/stsw-img039.html



You will find:

- Source codes
- Technical documentation
- On-demand webinar

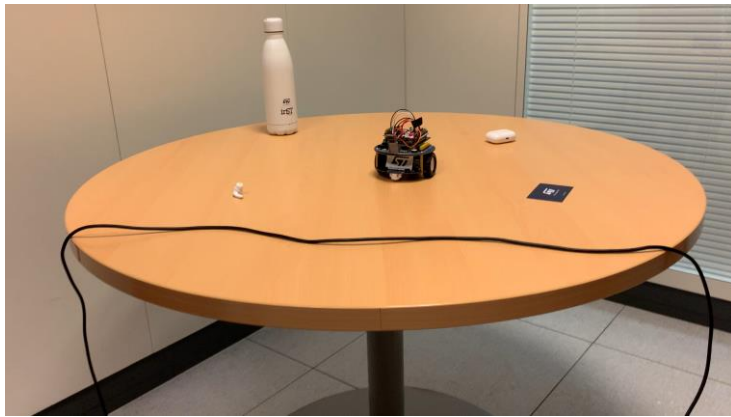


Robotics multi-applications

Only one ST ToF multi-zone sensor supporting up to 6 use-cases

Cliff/edge/slope prediction

- Signature change on lower rows can detect approach to stairs/slope



- Estimate object size (including flat object & cables) and precise distance in order to avoid them

Small object detection

Floor sensing

- Surface recognition (soft or hard) to support mopping or vacuum mode using **8x8 ST ToF**
- <https://stm32ai.st.com/use-case/floor-type-detection-for-vacuum-cleaners/>



Artificial Intelligence

Other use-cases

- Wall tracking



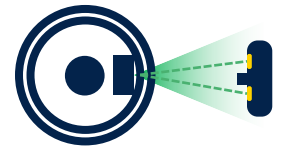
- Collision Avoidance



- Ceiling/Gap Detection



- Safe Docking Assist

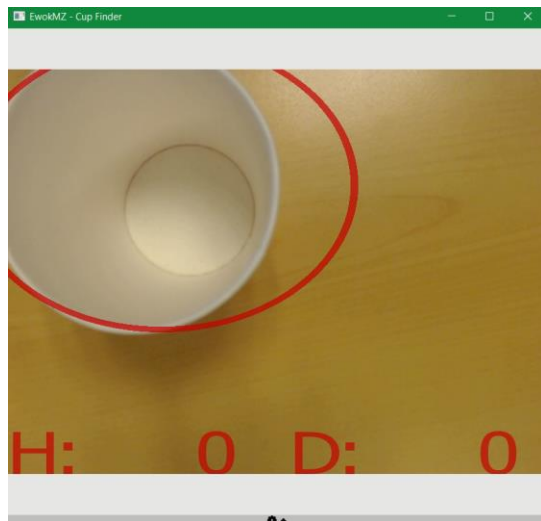




The applications are endless

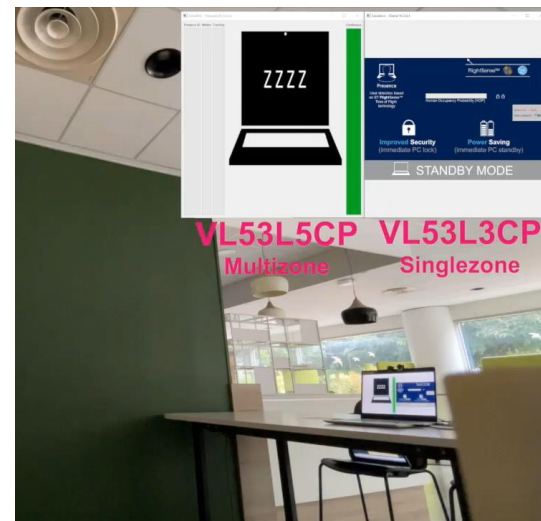
Cup detection

- Diameter estimation
- Height measurement
- Liquid level monitoring
- ...



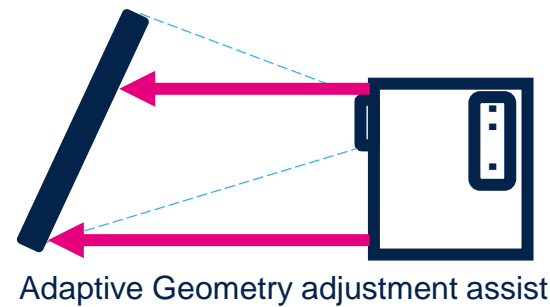
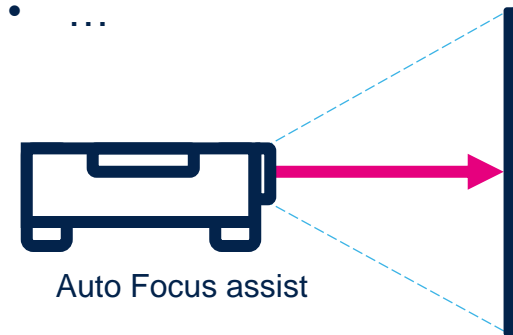
Presence detection

- Wake-on-Approach
- Passing-by filtering
- Walk-away lock
- ...



Projectors

- Autofocus
- Eye protection
- Keystone correction
- ...



Others

- Drones



- Cameras



- Laptops/Tablets



- Industrial



Technical resources



FlightSense ecosystem and tools

Imaging products supported by ST ecosystem & and expanding optical partnership network

Complete package

- X-NUCLEO expansion board



- P-NUCLEO packs with STM32 NUCLEO



- Stand-alone Breakout boards

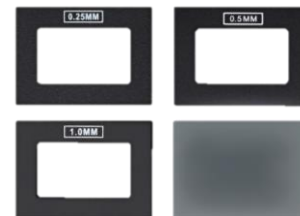


Expansion boards

- Fully integrated in STM32 Ecosystem
- Compatible with all STM32 Nucleo boards

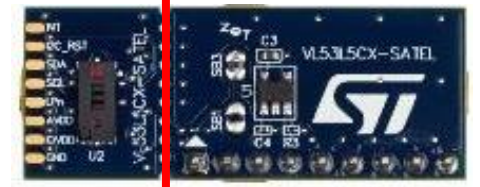


- Cover Glasses:
 - Referenced cover glass proposed in NUCLEO development boards
 - Square Cover Glass
 - 3 spacers 0.25/0.5/1mm to create various air gaps
 - Cover glass holder

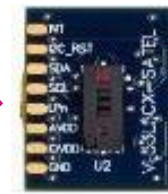


Breakout boards

- Enabling easy & swift integration at customers
- The expansion boards can accept breakout boards via connectors or fly wires



3.3V supply application →



↑
5V to 3.3V supply application



X-CUBE-TOF1

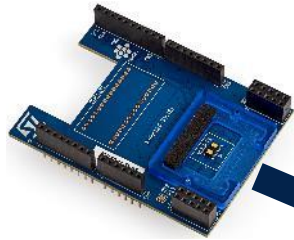
Discover our [STM32Cube expansion software](#) for Time-of-Flight sensors

Sample applications

- Simple ranging
- Multi-sensor ranging

ToF products supported

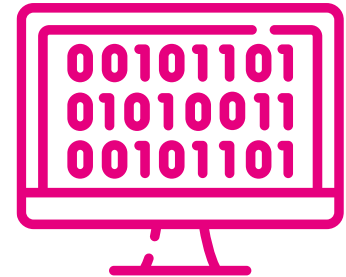
VL53L1CB | VL53L3CX | VL53L4CD
 VL53L4CX | VL53L5CX | VL53L7CX
 VL53L8CX
 (X-NUCLEO & SATEL)



X-CUBE-TOF1



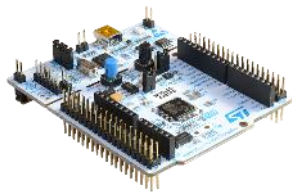
STM32 
 CubeMX 



Code ready to use

STM32 MCUs supported

Any STM32 MCU (any boards)



Keys benefits

- Compatible with **all STM32**
- Compatible with X-NUCLEO & **SATEL**
 (directly plugged on NUCLEO board)
- Many code examples
- Only one tool



FlightSense™ Proximity ToF ordering codes

Go to st.com/FlightSense contact your usual distributor

Item	Picture	Ordering Code	Comments	
VL53L0CX sensor		VL53L0CXV0DH/1	Tape & reel	MOQ= 5ku
			With liner	LT= 16weeks
VL53L0CX Nucleo™ expansion board		X-NUCLEO-53L0A1/	<ul style="list-style-type: none"> Cover-window holder Cover-window sample 3x spacers 2x 2v8 Breakout boards 	
VL53L0CX expansion pack		P-NUCLEO-53L0A1/	X-NUCLEO-53L0A1 + NUCLEO-F401RE	
VL53L0CX Breakout boards		53L0-SATEL-I1/1	2x Breakout boards delivered	

Item	Picture	Ordering Code	Comments	
VL53L4CD sensor		VL53L4CDV0DH/1	Tape & reel	MOQ= 4.5ku
			With liner	LT= 16weeks
VL53L4CD Nucleo™ expansion board		X-NUCLEO-53L4A1-	<ul style="list-style-type: none"> Cover-window holder Cover-window sample 3x spacers 	
VL53L4CD expansion pack		P-NUCLEO-53L4A1-	X-NUCLEO-53L4A1 + NUCLEO-F401RE	
VL53L4CD Breakout boards		SATEL-VL53L4CD	2x Breakout boards delivered	



Long distance single-zone ToF ordering codes

Go to st.com/FlightSense contact your usual distributor

Item	Picture	Ordering Code	Comments	
VL53L1CX sensor		VL53L1CXV0FY/1	Tape & reel	MOQ= 3.6ku
			With liner	LT= 16weeks
VL53L1CX Nucleo™ expansion board		X-NUCLEO-53L1A1/	<ul style="list-style-type: none"> Cover-window holder Cover-window sample 3x spacers 2x 2v8 Breakout boards 	
VL53L1CX expansion pack		P-NUCLEO-53L1A1/	X-NUCLEO-53L1A1 + NUCLEO-F401RE	
VL53L1CX Breakout boards		VL53L1X-SATEL/1	2x Breakout boards delivered	

Item	Picture	Ordering Code	Comments	
VL53L1CB sensor		VL53L1CBV0FY/1	Tape & reel	MOQ= 3.6ku
			With liner	LT= 24weeks
VL53L1CB Nucleo™ expansion board		X-NUCLEO-53L1A2/	<ul style="list-style-type: none"> Cover-window holder Cover-window sample 3x spacers 2x 2v8 Breakout boards 	
VL53L1CB expansion pack		P-NUCLEO-53L1A2/	X-NUCLEO-53L1A2 + NUCLEO-F401RE	
VL53L1CB Breakout boards		VL53L1-SATEL/1	2x Breakout boards delivered	

Item	Picture	Ordering Code	Comments	
VL53L3CX sensor		VL53L3CXV0DH/1	Tape & reel	MOQ= 4.5ku
			With liner	LT= 16weeks
VL53L3CX Nucleo™ expansion board		X-NUCLEO-53L3A2/	<ul style="list-style-type: none"> Cover-window holder Cover-window sample 3x spacers 2x 2v8 Breakout boards 	
VL53L3CX expansion pack		P-NUCLEO-53L3A2/	X-NUCLEO-53L3A2 + NUCLEO-F401RE	
VL53L3CX Breakout boards		VL53L3CX-SATEL/1	2x Breakout boards delivered	

Item	Picture	Ordering Code	Comments	
VL53L4CX sensor		VL53L4CXV0DH/1	Tape & reel	MOQ= 4.5ku
			With liner	LT= 16weeks
VL53L4CX Nucleo™ expansion board		X-NUCLEO-53L4A2-	<ul style="list-style-type: none"> Cover-window holder Cover-window sample 3x spacers 	
VL53L4CX expansion pack		P-NUCLEO-53L4A2-	X-NUCLEO-53L4A2 + NUCLEO-F401RE	
VL53L4CX Breakout boards		SATEL-VL53L4CX	2x Breakout boards delivered	



FlightSense™ Multi-zone ToF ordering codes

Go to st.com/FlightSense contact your usual distributor

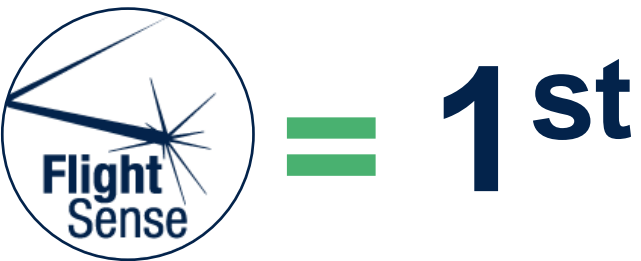
Item	Picture	Ordering Code	Comments		Item	Picture	Ordering Code	Comments	
VL53L5CX sensor		VL53L5CXV0GC/1	Tape & reel	MOQ= 3.6ku	VL53L7CX sensor		VL53L7CXV0GC/1	Tape & reel	MOQ= 3.6ku
			With liner	LT= 22weeks				With liner	LT= 22weeks
VL53L5CX Nucleo™ expansion board		X-NUCLEO-53L5A1/	<ul style="list-style-type: none"> Cover-window holder Cover-window sample 3x spacers 		VL53L7 Nucleo™ expansion board		X-NUCLEO-53L7A1/	<ul style="list-style-type: none"> Cover-window holder Cover-window sample 3x spacers 	
VL53L5CX expansion pack		P-NUCLEO-53L5A1/	X-NUCLEO-53L5A1 + NUCLEO-F401RE		VL53L7 expansion pack		P-NUCLEO-53L7A1/	X-NUCLEO-53L7A1 + NUCLEO-F401RE	
VL53L5CX Breakout boards		VL53L5CX-SATEL	2x Breakout boards delivered		VL53L7 Breakout boards		SATEL-VL53L7CX SATEL-VL53L7 (Q1'24)	2x Breakout boards delivered	

Item	Picture	Ordering Code	Comments	
VL53L8CX sensor		VL53L8CXV0GC/1	Tape & reel	MOQ= 3.6ku
			With liner	LT= 22weeks
VL53L8 Nucleo™ expansion board		X-NUCLEO-53L8A1/	<ul style="list-style-type: none"> Cover-window holder Cover-window sample 3x spacers 	
VL53L8 expansion pack		P-NUCLEO-53L8A1/	X-NUCLEO-53L8A1 + NUCLEO-F401RE	
VL53L8 Breakout boards		SATEL-VL53L8	2x Breakout boards delivered	



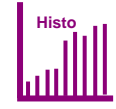
FlightSense™ Summary

Leader on Direct ToF



6 single-zone ToF sensors

- Wide product portfolio
 - Ranging up to 800cm
 - Histogram mode
 - Very short distance linearity
 - Ultra low power mode



5 multizone ToF sensors

- Up to 8x8 zones
- Wide FoV from 65° to 90°
- Ranging up to 400cm
- Strong ambient light immunity
- 2 new sensors for AI applications



Turnkey solutions

- Gesture recognition
- Presence detection
- Liquid level monitoring
- Content management
- Floor sensing prediction
- ...



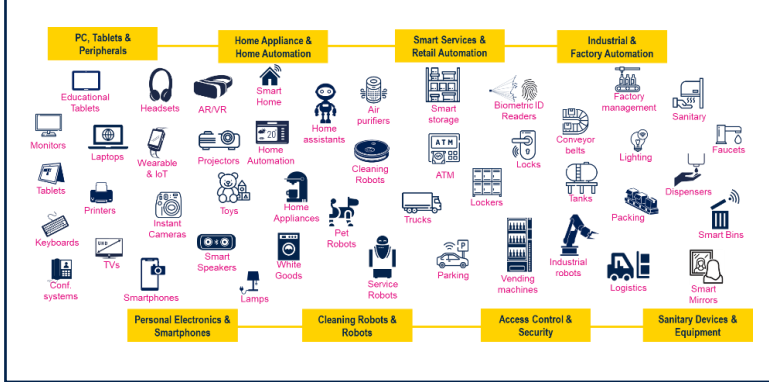
Continuous improvement

FlightSense industrial & mass market portfolio

	VL53L0CX	VL53L0CX	VL53L7CX	VL53L8CX	VL53L7CH	VL53L8CH	VL53L4CX	VL53L1CB	VL53L1CX	VL53L4CD
Multizone	Up to 64 zones (8x8) Artificial intelligence enabled CNI data	Up to 64 zones (8x8) Histogram mode Autonomous mode	Up to 64 zones (8x8) Histogram mode Autonomous mode	Up to 64 zones (8x8) Histogram mode Autonomous mode	Up to 64 zones (8x8) Histogram mode Autonomous mode	Up to 64 zones (8x8) Histogram mode Autonomous mode	Up to 64 zones (8x8) Histogram mode Autonomous mode	Up to 64 zones (8x8) Histogram mode Autonomous mode	Up to 64 zones (8x8) Histogram mode Autonomous mode	Up to 64 zones (8x8) Histogram mode Autonomous mode
Singlezone	Ranging up to 4 m Autonomous mode	Ranging up to 4 m Autonomous mode	Ranging up to 4 m Autonomous mode	Ranging up to 4 m Autonomous mode	Ranging up to 4 m Autonomous mode	Ranging up to 4 m Autonomous mode	Ranging up to 4 m Autonomous mode	Ranging up to 4 m Autonomous mode	Ranging up to 4 m Autonomous mode	Ranging up to 4 m Autonomous mode
	Proximity up to 1.2 m Short distance linearity Low power consumption	Proximity up to 1.2 m Short distance linearity Low power consumption	Proximity up to 1.2 m Short distance linearity Low power consumption	Proximity up to 1.2 m Short distance linearity Low power consumption	Proximity up to 1.2 m Short distance linearity Low power consumption	Proximity up to 1.2 m Short distance linearity Low power consumption	Proximity up to 1.2 m Short distance linearity Low power consumption	Proximity up to 1.2 m Short distance linearity Low power consumption	Proximity up to 1.2 m Short distance linearity Low power consumption	Proximity up to 1.2 m Short distance linearity Low power consumption

Legend: Legacy product, Special product, New product

Unlimited markets & applications



Our technology starts with You



Find out more at www.st.com/FlightSense

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