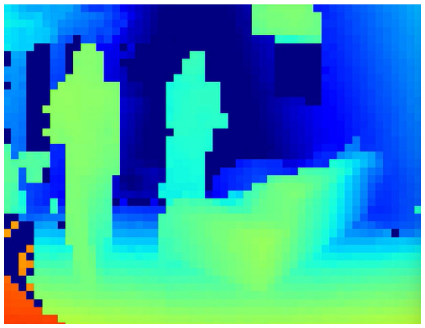
STSW-IMG055

Data brief

Smart 3D tracking software solution based on VL53L9CX direct Time-of-Flight (dToF) 3D lidar module



Features

- **Advanced 3D sensing solution supporting:**
  - VL53L9CX, all-in-one direct Time-of-Flight (dToF) 3D lidar sensor module
- **Comprehensive 3D tracking and spatial intelligence:**
  - Real-time 3D tracking and spatial coordinates in the cartesian coordinate system (X,Y,Z)
  - Target segmentation and geometric feature extraction to enable presence detection and advanced spatial analysis
- **Ready-to-use software and development ecosystem:**
  - Turnkey smart 3D tracking library for quick deployment of application-specific features
  - Complete application examples showing library integration
  - Compatible with Arm® Cortex®-based microcontrollers, including low-end generic microcontrollers such as the STM32H563ZI Nucleo board
- **Key benefits of FlightSense 3D dToF technology:**
  - 100% privacy-preserving: Operates on direct distance/depth data without camera modules or image sensors
  - Robust performance: Independent of ambient light conditions or target surface reflectance
  - Seamless design integration: Compact "all-in-one" module easily hidden behind a cover glass
  - Low power and high efficiency: Optimized processing complexity for embedded microcontrollers

Application

- Smart home and building automation:
  - Smart thermostats, control panels, and wall interfaces
  - Privacy-conscious home automation and occupancy tracking
  - Smart lighting systems
- Office and healthcare sensing:
  - Room occupancy management and space utilization solutions
  - Patient tracking and fall detection in sensitive healthcare environments
- Personal and commercial electronics:
  - Laptops, tablets, and smart displays
  - AR/VR headsets and smart speakers
- Industrial and service robotics:
  - Service and educational robots
  - Vending machines, sanitary devices, and touchless control interfaces

Description

Accelerate the deployment of intelligent, privacy-preserving spatial sensing with our all-in-one direct Time-of-Flight (dToF) 3D lidar module: the **VL53L9CX**.

The ready-to-use smart 3D tracking software library provides developers with a complete development ecosystem designed to drastically shorten time-to-market. By turning raw depth maps into actionable spatial insights, the library enables application-specific features such as presence detection, real-time tracking, and object classification—deployable with or without AI-processing algorithms.

To support large spaces and complex environments, the solution supports scalable architectures where multiple VL53L9CX sensors can be interconnected to low-end generic microcontrollers, such as the STM32H563ZI Nucleo board.

A major advantage of this 3D dToF sensing solution is that it provides **full privacy** by processing direct multizone depth information without capturing images or requiring camera modules. Unlike traditional vision-based solutions, performance remains independent of target reflectance and lighting conditions. Its compact form factor makes it easy to integrate behind a cover glass, making it ideal for privacy-sensitive environments across smart homes, corporate offices, and healthcare facilities.

Revision history

Table 1. **Document revision history**

Date	Version	Changes
29-Oct-2026	1	Initial release

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