<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>6 June 2016</td>
<td>Initial</td>
</tr>
<tr>
<td>1.1</td>
<td>24 June 2016</td>
<td>SW Pre-requisites slide moved before SW deliverables description</td>
</tr>
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</table>
A color code is used in the document for each component of the eco-system.

**VL53L0X GUI**
User Manual - Embedded

**VL53L0X Eval GUI - STSW-IMG006**
Get ranging live curves on your PC
Change key settings of the device
Data logging capabilities

**STSW-LINK007**

**STSW-LINK009**

**X-CUBE-53L0A1 (STM32Cube) package**
Full integration in STM32 MCU (real-time)
All source code provided
Full access to product settings
Data logging capabilities
Ranging and Gesture detection demo

**VL53L0X C API package – STSW-IMG005**
Discover API Source code

**VL53L0X : Miniature ToF Ranging & Gesture Sensor**

**Documentation**

VL53L0X API User Manual - UM2039

VL53L0X Datasheet – DS11555
VL53L0X Quick Start Guide
Applications Notes

**Hardware**
P-NUCLEO-53L0A1
X-NUCLEO-53L0A1
As for all X-NUCLEO boards, LINK007 and LINK009 STM32 software are accessible from P-NUCLEO-53L0A1 and X-NUCLEO-53L0A1 web pages.
<table>
<thead>
<tr>
<th>Name</th>
<th>Definition</th>
<th>Links</th>
</tr>
</thead>
<tbody>
<tr>
<td>VL53L0X</td>
<td>ST’s FlightSense Time-of-Flight ranging and gesture detection sensor</td>
<td>• Search for vl53l0x on st.com to go to the product main page.</td>
</tr>
<tr>
<td>VL53L0X Quick Start Guide</td>
<td>This document</td>
<td>• Search for VL53L0X Quick Start Guide on st.com</td>
</tr>
<tr>
<td>VL53L0X Datasheet</td>
<td>VL53L0X product datasheet</td>
<td>• Search for DS11555 on st.com</td>
</tr>
<tr>
<td>VL53L0X API</td>
<td>Set of C functions to control VL53L0X and get ranging data</td>
<td>• Search for STSW-IMG005 on st.com</td>
</tr>
<tr>
<td>VL53L0X API User Manual</td>
<td>Document describing VL53L0X API in details</td>
<td>• Search for UM2039 on st.com</td>
</tr>
</tbody>
</table>
# VL53L0X eco-system glossary & links

<table>
<thead>
<tr>
<th>Name</th>
<th>Definition</th>
<th>Links</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUCLEO (F401 or L476)</td>
<td>STM32-based board which can be combined with an expansion board for evaluation purpose</td>
<td>• Search for <strong>nucleo</strong> on st.com</td>
</tr>
<tr>
<td>X-NUCLEO-53L0A1</td>
<td>Nucleo expansion board with VL53L0X sensor plus optional VL53L0X satellites</td>
<td>• Search for <strong>X-NUCLEO-53L0A1</strong> on st.com</td>
</tr>
<tr>
<td>P-NUCLEO-53L0A1</td>
<td>Hardware pack composed of the X-NUCLEO-53L0A1 expansion board plus one STM32 F401Nucleo board, and 2x VL53L0X satellites</td>
<td>• Search for <strong>P-NUCLEO-53L0A1</strong> on st.com</td>
</tr>
<tr>
<td>X-CUBE-53L0A1</td>
<td>Software package containing source code for P-NUCLEO-53L0A1 hardware</td>
<td>• Search for <strong>X-CUBE-53L0A1</strong> on st.com</td>
</tr>
<tr>
<td>X-CUBE-53L0A1 User Manual</td>
<td>X-CUBE package detailed documentation</td>
<td>• Search for UM2046 on st.com</td>
</tr>
<tr>
<td>VL53L0X Eval GUI</td>
<td>PC Graphical User Interface to display ranging data from VL53L0X</td>
<td>• Search for <strong>STSW-IMG006</strong> on st.com</td>
</tr>
<tr>
<td>VL53L0X GUI User Manual</td>
<td>PC GUI detailed documentation</td>
<td>• Install the GUI and open the embedded documentation</td>
</tr>
<tr>
<td>STSW-LINK009</td>
<td>PC driver to enable Virtual Com Port with Nucleo board (used for data logging, GUI)</td>
<td>• Search for <strong>STSW-LINK009</strong> on st.com</td>
</tr>
<tr>
<td>STSW-LINK007</td>
<td>Nucleo STLINK FW upgrade to get best speed performances through Virtual Com Port</td>
<td>• Search for <strong>STSW-LINK007</strong> on st.com</td>
</tr>
</tbody>
</table>
Evaluation tools HW description

• VL53L0X Evaluation tools are based on following hardware elements:
  1. STM32 F401RE Nucleo board
  2. X-NUCLEO-53L0A1 Nucleo Expansion board, which includes:
     • Two VL53L0X satellites
     • One cover glass and 3x spacers with different heights

• Search for **P-NUCLEO-53L0A1** on st.com to order the full pack (1+2)

• or search for **X-NUCLEO-53L0A1** to get only the Nucleo expansion board (2)

• Hardware documentation (schematics) also available on st.com
Hardware Description:

Removing the protective liner on the sensor

- When using the VL53L0X sensor, or the X-NUCLEO expansion board, remove the liner before use!
- Don’t touch too much the sensor with fingers
SW pre-requisites : to be done once

- API examples, X-CUBE data logging and GUI communicate with Nucleo through Serial com over USB (Virtual Com Port). Following SW packages must be installed
  - STSW-LINK009 : PC USB driver
  - STSW-LINK007 : Nucleo ST-LINK FW upgrade

- Connect the Nucleo pack to the PC through USB
  - Wait for the board to be recognized as a mass storage device (some drivers will be installed automatically)

- Install ST-Link Virtual Com port drivers on the PC (STSW-LINK009)
  - Search for STSW-LINK009 on st.com, download, unzip
  - Launch stlink_winusb_install.bat

- Upgrade ST-Link FW on the Nucleo board to get the latest version and benefit from best performances for UART over USB transfers (STSW-LINK007)
  - Search for STSW-LINK007 on st.com, download, unzip
  - Connect Nucleo board to the PC through USB
  - Launch ST-LinkUpgrade.exe, press Device Connect, then Yes
VL53L0X API : Purpose

- Small SW package containing VL53L0X API source code and few basic examples than can be run on the PC connected with Nucleo hardware pack (P-NUCLEO-53L0A1)
- Starting from this software package, user can:
  - Discover VL53L0X API (browse the code, read Doxygen documentation)
  - Run simple .exe programs on the PC to do ranging from VL53L0X
- Related documentation:
  - VL53L0X API User Manual
- Download from st.com searching for STSW-IMG005
X-CUBE-53L0A1 : Purpose

• Give a full example of how VL53L0X device is integrated into a MCU sub-system taking benefit from the STM32 Open Development Environment

• Starting from this software package, user can:
  • Run Ranging and Gesture detection demos with a simple drag & drop
  • Get basic data logging on PC through Virtual Com Port (Teraterm, Putty, etc…) to collect data or build simple PC GUIs
  • Import a project in his favorite IDE (Keil, IAR or STM32 Workbench) to browse the code, (re) compile, (re)flash Nucleo and debug (breakpoints, step into the code, etc…)
  • Understand how VL53L0X API has been ported on Nucleo
  • Get a working and real-time example of interrupt-based ranging mode
  • Modify the project code to change VL53L0X settings for the targeted application

• Related Documentation
  • X-CUBE-53L0A1 User Manual (UM2046)
  • Download from st.com searching for X-CUBE-53L0A1
VL53L0X GUI: Purpose

- PC Graphical User Interface which allows to:
  - Display (in live) key ranging data (distance, signal rate)
  - Change key parameters of VL53L0X
  - Perform calibration phases (offset and xTalk with cover glass)
  - Get data logging (.csv file)
- GUI is running on the PC connected to a P-NUCLEO-53L0A1 pack
  - VL53L0X API running on the PC side
  - Run simple .exe programs on the PC to do ranging from VL53L0X
- Related Documentation
  - User Manual embedded in the tool (See the About tab)
- Download from st.com searching for STSW-IMG006
  - Run the installer with Admin privileges or change default installation directory