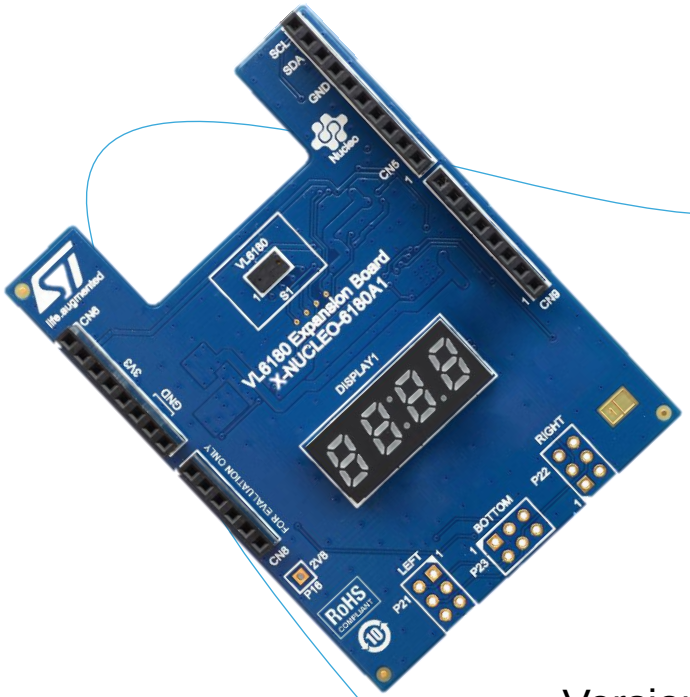
Quick Start Guide

Proximity sensor expansion board based on VL6180 for STM32 Nucleo (X-NUCLEO-6180A1)



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Version 1.0.0 (February 24, 2020)

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X-NUCLEO-6180A1: Proximity sensor expansion board
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Documents & Related Resources

STM32 Open Development Environment: Overview

Proximity sensor expansion board
Hardware Overview (1/2)

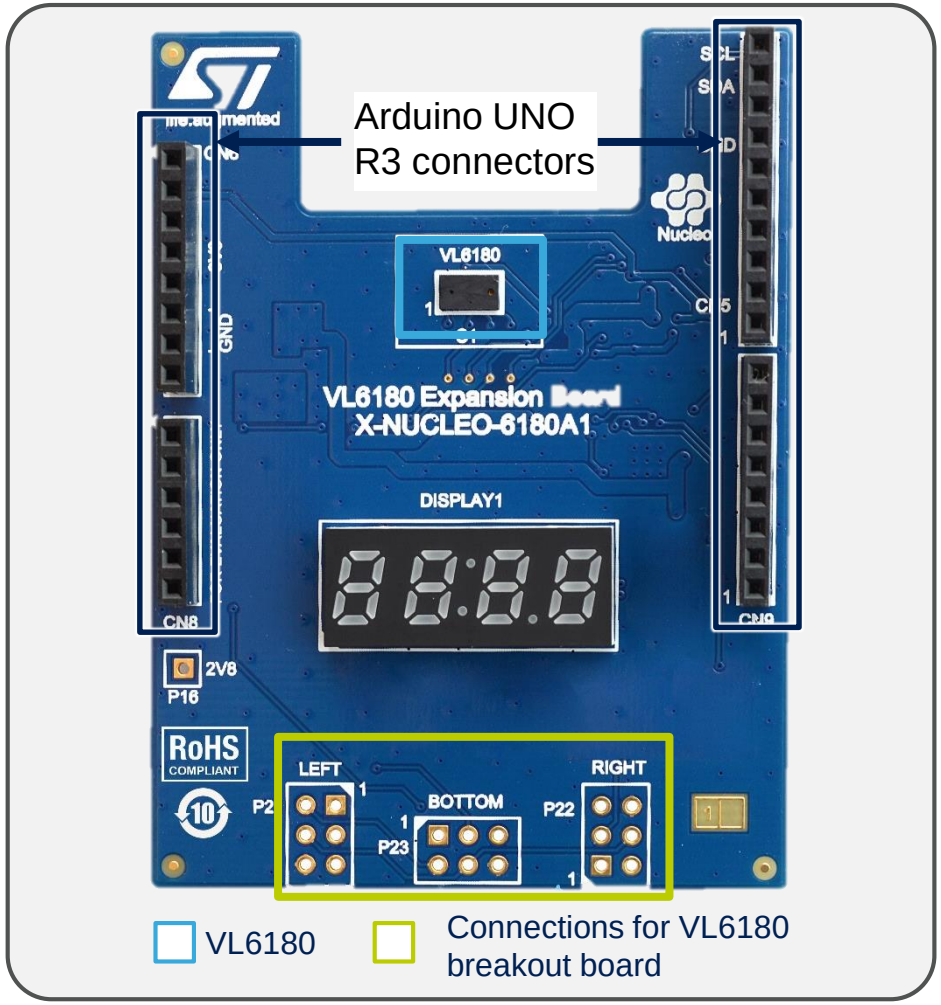
X-NUCLEO-6180A1 Hardware Description

- The X-NUCLEO-6180A1 is proximity sensor evaluation and development board system, designed around VL6180, a device based on ST's FlightSense™, Time-of-Flight technology.
- The VL6180 communicates with STM32 Nucleo developer board host microcontroller through an I2C link available on the Arduino UNO R3 connector.

Key Products on board

VL6180
Proximity sensor

Possibility to add 3x VL6180 external breakout boards (order code: VL6180-SATEL – 2 breakout boards)



Latest info available at www.st.com
X-NUCLEO-6180A1

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Proximity sensor expansion board
Hardware Overview (2/2)

- X-NUCLEO-6180A1 with VL6180-SATEL plug-in
  - In order to easily integrate multiple VL6180's into customer devices, up to 3 external breakout boards VL6180 boards can be connected to the expansion board.

- X-NUCLEO-6180A1 also available as a Nucleo pack (P-NUCLEO)
  - The X-NUCLEO-6180XA1 expansion board can also be ordered on st.com combining the expansion board and the STM32 Nucleo board:
    - Order code: **P-NUCLEO-6180A1**
      - X-NUCLEO-6180A1 expansion board and NUCLEO-F401RE full features board

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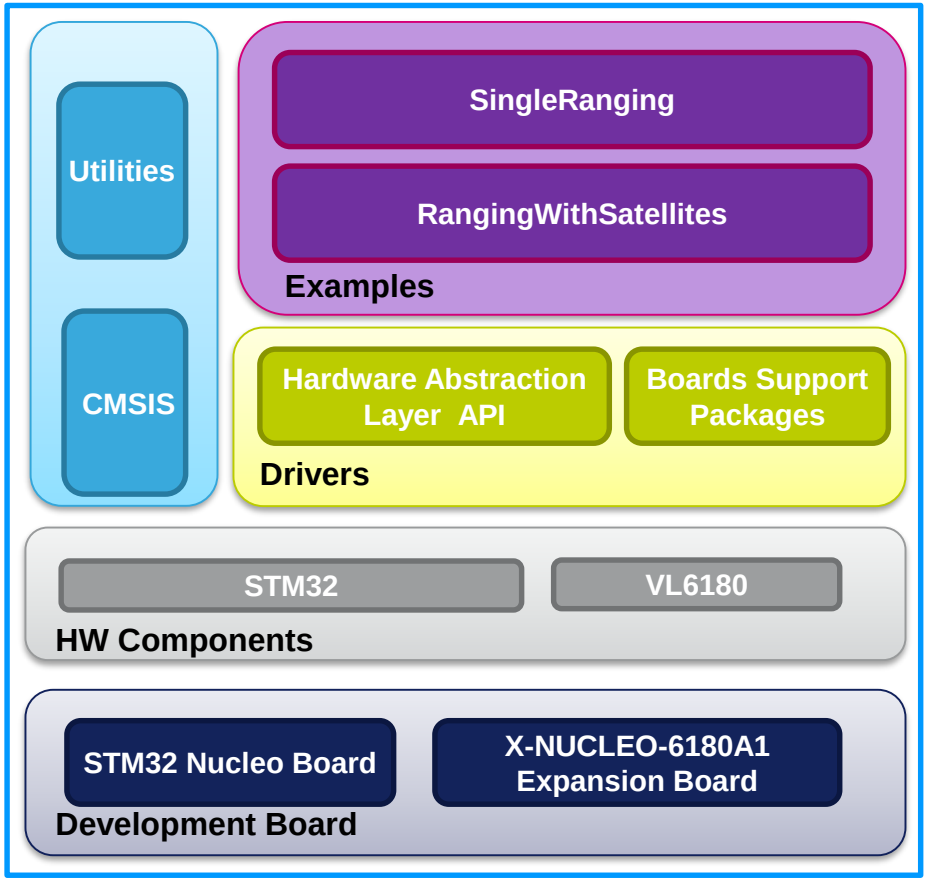
X-CUBE-6180A1 Software Description

- The X-CUBE-6180A1 software package is an expansion for STM32Cube, associated with the X-NUCLEO-6180A1 expansion board for STM32. The source code of this package is based on STM32Cube to ease portability and code sharing across different STM32 MCU families. Implementation examples are available for the STM32 Nucleo Proximity, gesture and ambient light sensor expansion board (X-NUCLEO-6180A1) plugged on top of an STM32 Nucleo development board (NUCLEO-F401RE).



Key features

- Driver layer (VL6180 API) for complete management of the VL6180 proximity integrated in the X-NUCLEO-6180A1 expansion board.
- Easy portability across different MCU families, thanks to STM32Cube.
- Free, user-friendly license terms.
- Example code for ranging measurement with single VL6180 sensor.
- Example code for ranging with multiple VL6180 sensors. Up to 4x VL6180 devices can be controlled using the X-NUCLEO-6180A1 expansion board equipped with 3x breakout boards (VL6180-SATEL).

Latest info available at www.st.com
X-CUBE-6180A1

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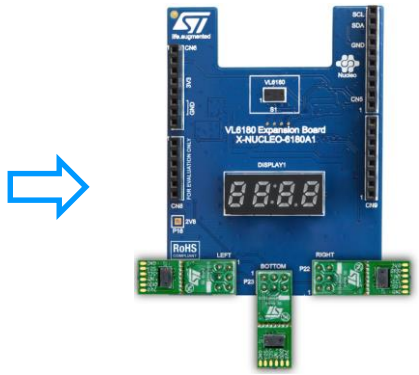
HW prerequisites

- 1x STM32 Nucleo proximity expansion board (**X-NUCLEO-6180A1**).

- 1x STM32 Nucleo development board (**NUCLEO-F401RE**)

- If user has no STM32 Nucleo development board, it is possible to order a Nucleo pack.
  - **P-NUCLEO-6180A1**
    - X-NUCLEO-6180A1 expansion board and NUCLEO-F401RE full features board

- If user has to develop a VL6180 multi-sensor application, VL6180-SATEL boards can be ordered



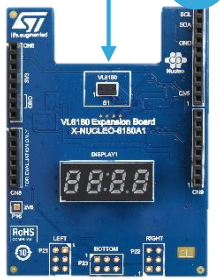
SW prerequisites

- **X-CUBE-6180A1**: P-NUCLEO-6180A1 software expansion for STM32Cube
- **STSW-IMG012**: P-NUCLEO-6180A1 graphical interface on Windows 7 and 10

Start coding in just a few minutes with X-CUBE-6180A1

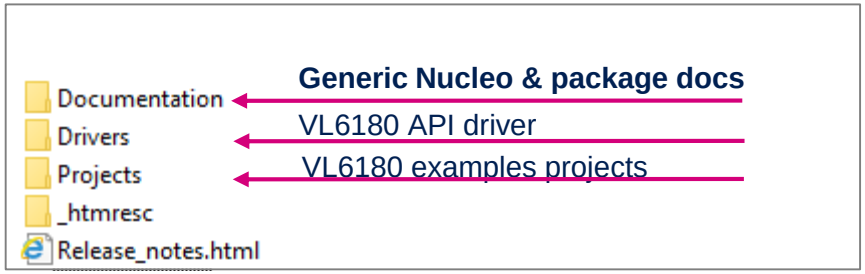
1 Go to www.st.com/x-nucleo

2 Select X-NUCLEO-6180A1



3 Download & unpack X-CUBE-6180A1

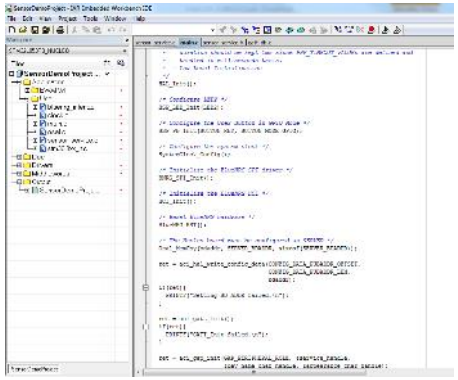
X-CUBE-6180A1 package



4 Download & install STM32 Nucleo ST-LINK/V2-1 USB driver

5 Open project example SimpleRanging or RangingWithSatellites

6 Modify, build application



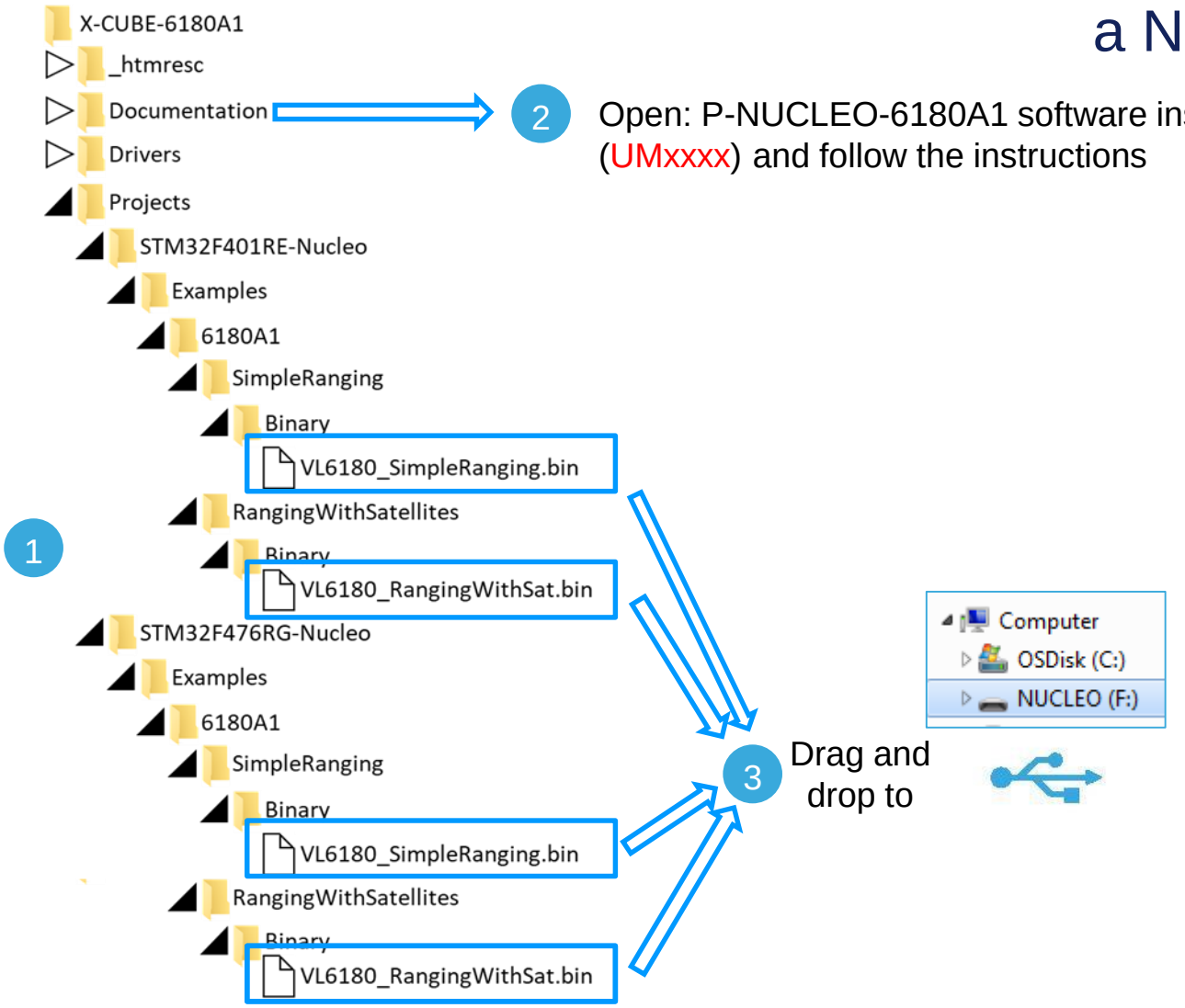
KEIL Tools by ARM

IAR SYSTEMS

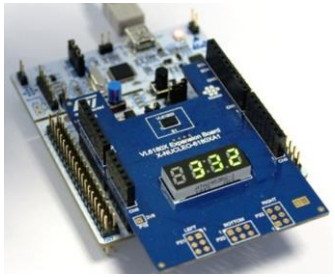
STM32 CubeIDE

Open STM32 Tools

Proximity sensor expansion board
Evaluate using X-CUBE-6180A1 and a NUCLEO board



Open: P-NUCLEO-6180A1 software installation guide.pdf (UMxxxx) and follow the instructions



Or

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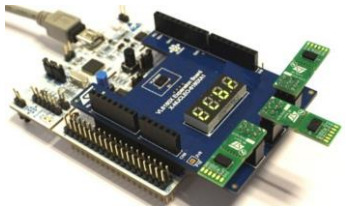

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Documents & Related Resources

All documents are available in the DESIGN tab of the related products webpage

X-NUCLEO-6180A1:

- **DB4063:** proximity sensor expansion board on VL6180 for STM32 Nucleo – **data brief**
- **UM2657:** proximity sensor expansion board based on VL6180 for STM32 Nucleo – **user manual**

X-CUBE-6180A1:

- **DB4163:** proximity sensor expansion for STM32Cube – **data brief**
- **Software setup file**

STSW-IMG012:

- **DB4158:** P-NUCLEO-6180A1 pack PC graphical user interface (GUI) – **data brief**
- **Software setup file**

Consult www.st.com for the complete list

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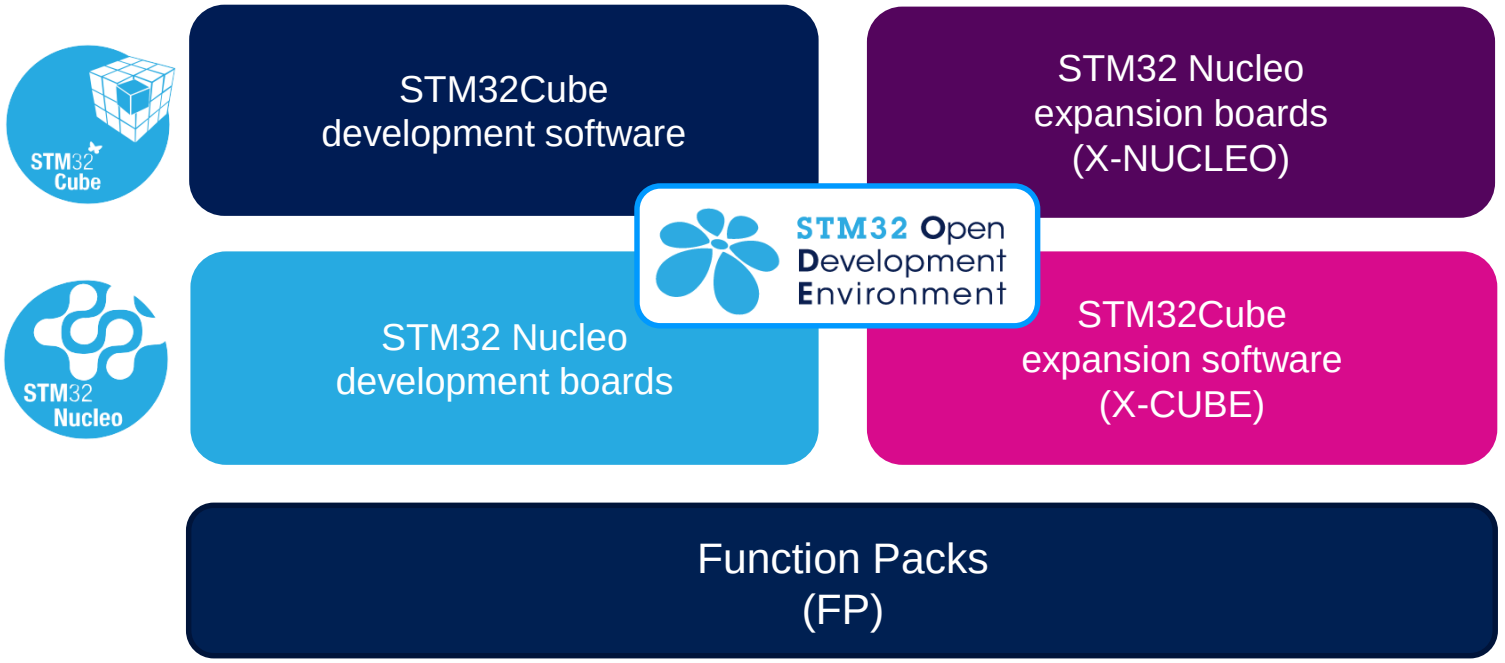
STM32 Open Development Environment: Overview

STM32 Open Development Environment
Fast, affordable Prototyping and Development

- The STM32 Open Development Environment (ODE) consists of a set of stackable boards and a modular open SW environment designed around the STM32 microcontroller family.



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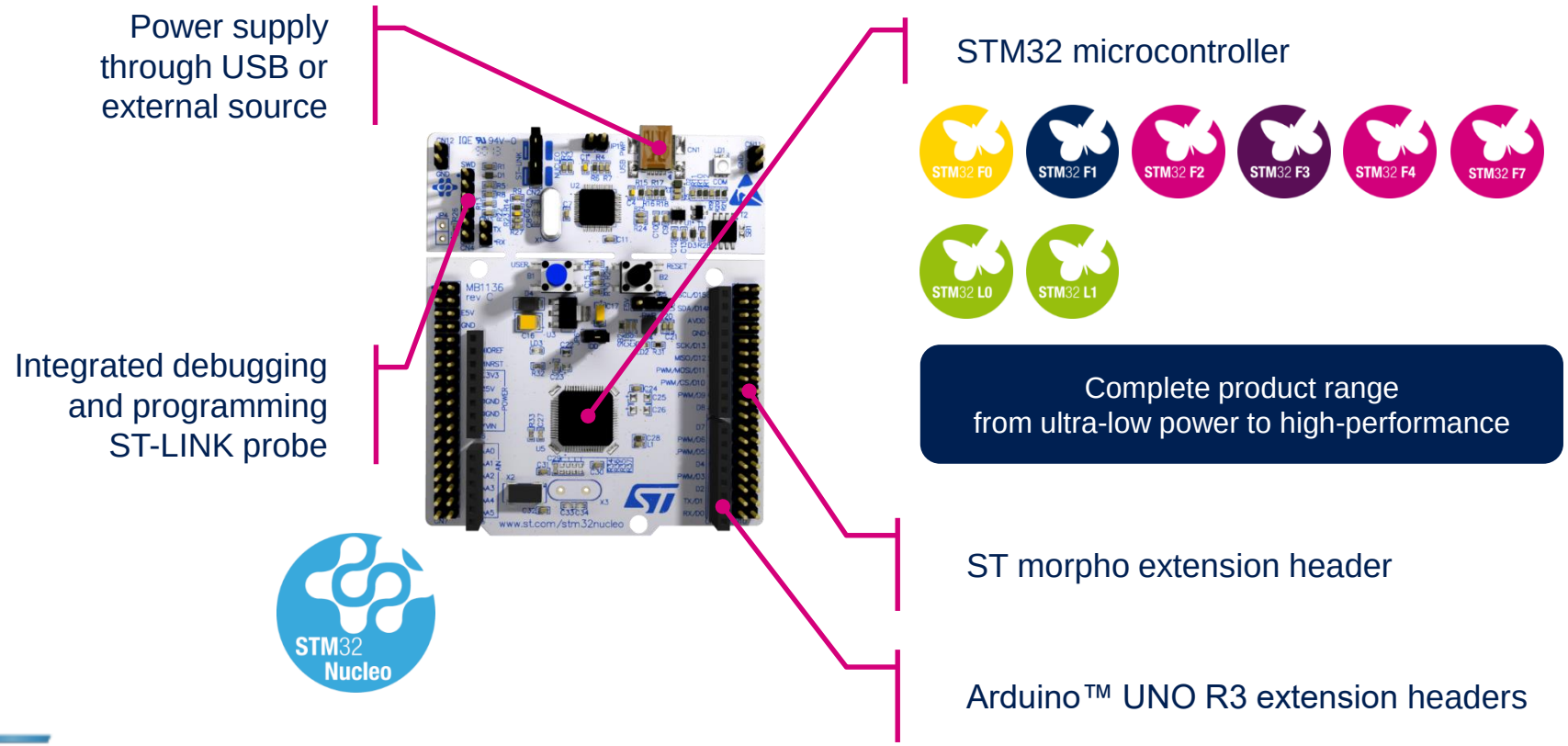
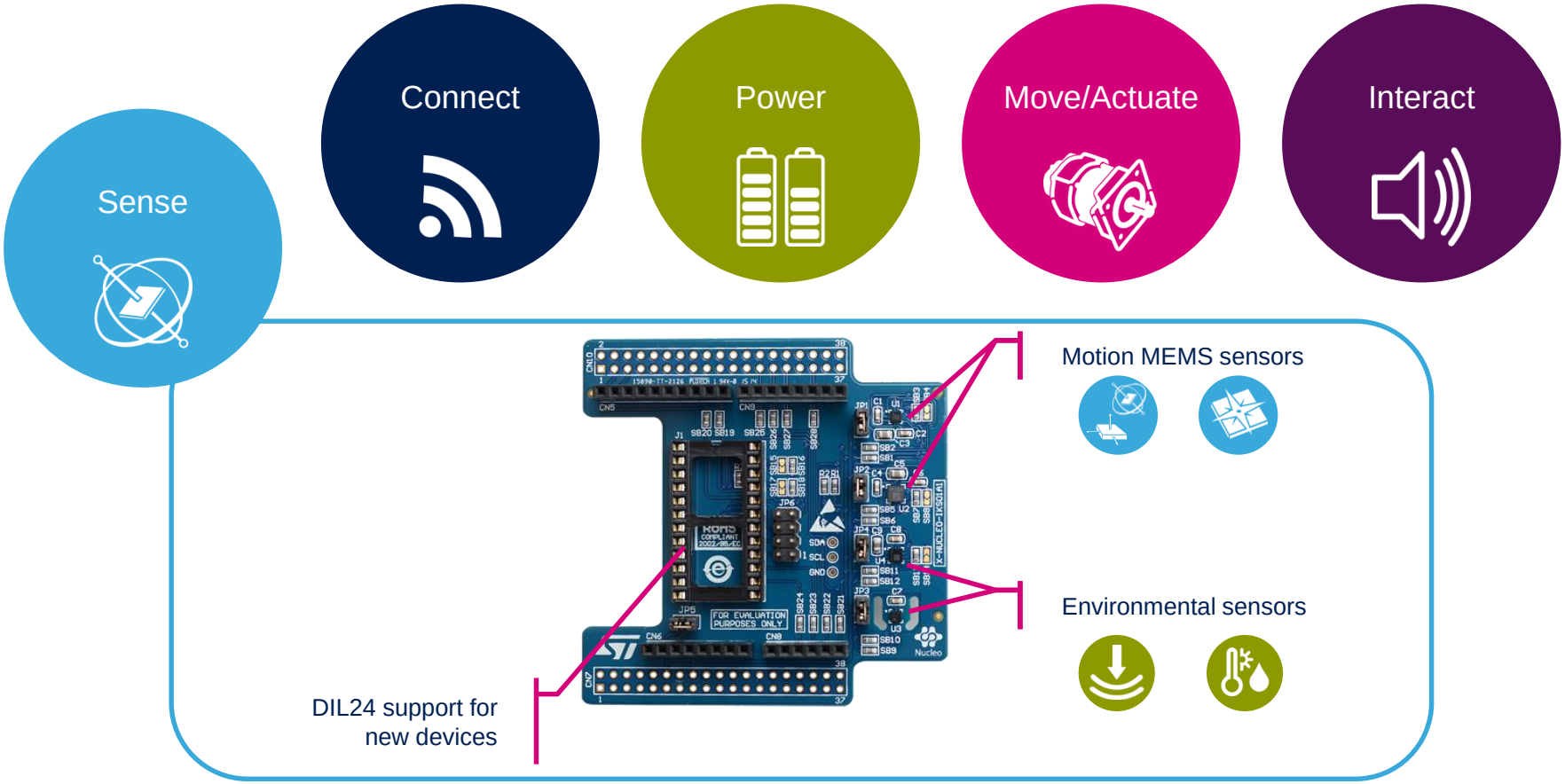
Development Boards (NUCLEO)

- A comprehensive range of affordable development boards for all the STM32 microcontroller series, with unlimited unified expansion capabilities and integrated debugger/programmer functionality.



Expansion Boards (X-NUCLEO)

- Boards with additional functionality that can be plugged directly on top of the STM32 Nucleo development board directly or stacked on another expansion board.



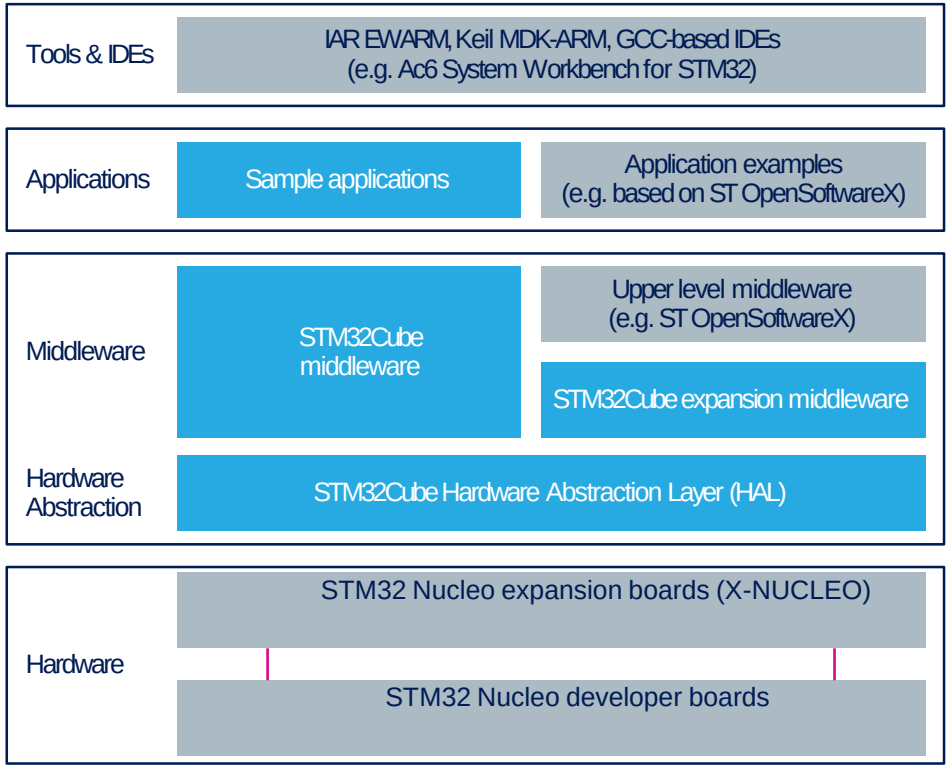
Example of STM32 expansion board (X-NUCLEO-IKS01A1)

STM32 Open Development Environment

Software components

- **STM32Cube software (CUBE)** - A set of free tools and embedded software bricks to enable fast and easy development on the STM32, including a Hardware Abstraction Layer and middleware bricks.

- **STM32Cube expansion software (X-CUBE)** - Expansion software provided free for use with the STM32 Nucleo expansion board and fully compatible with the STM32Cube software framework. It provides abstracted access to expansion board functionality through high-level APIs and sample applications.



- **Compatibility with multiple Development Environments -** The STM32 Open Development Environment is compatible with a number of IDEs including IAR EWARM, Keil MDK, and GCC-based environments. Users can choose from three IDEs from leading vendors, which are free of charge and deployed in close cooperation with ST. These include Eclipse-based IDEs such as STM32CubeIDE for STM32 and the MDK-ARM environment.

www.st.com/stm32cube

www.st.com/x-cube

STM32 Open Development Environment

Building block approach

The building blocks	Your need	Our answer

Accelerometer, gyroscope
Inertial modules, magnetometer
Pressure, temperature, humidity
Proximity, microphone

Sense — COLLECT

Bluetooth LE, Sub-GHz radio
NFC, Wi-Fi, GNSS

Connect — TRANSMIT

Audio amplifier
Touch controller
Operation Amplifier

Translate — ACCESS

Stepper motor driver
DC & BLDC motor driver
Industrial input / output

Move / Actuate — CREATE

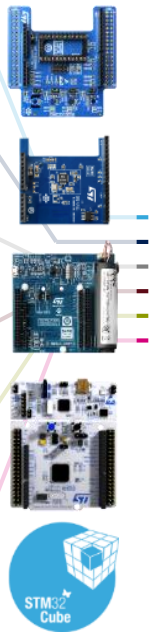
Energy management & battery

Power — POWER

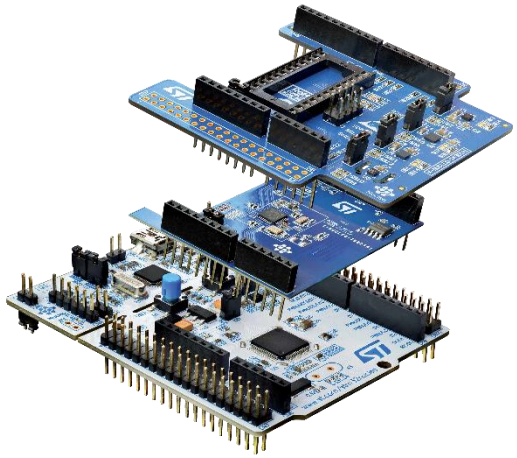
General-purpose microcontrollers
Secure microcontrollers

Process — PROCESS

Software



STM32 Open Development Environment



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