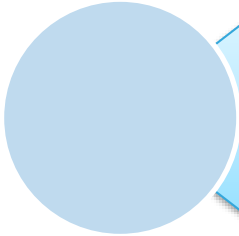# Quick Start Guide

STM32Cube function pack for asset tracking using BLE connectivity
for SensorTile.box wireless multi sensor development kit
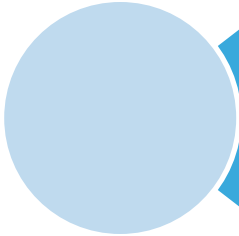
(FP-ATR-BLE1)

life.augmented

Version 1.0 (February 19, 2020)

Quick Start Guide Contents

FP-ATR-BLE1: STM32Cube function pack for asset tracking using BLE connectivity for SensorTile.box wireless multi sensor development kit

Hardware and Software overview

Setup & Demo Examples

Documents & Related Resources

STM32 Open Development Environment: Overview

Hardware Overview

Sample implementations available for:
STEVAL-MKSBOX1V1 evaluation board

Blister Content:
- STEVAL-MKSBOX1V1 with 2 different cases, SD-Card and rechargeable battery
- JTAG20 to STDC14 adapter
- STDC14 cable

STEVAL-MKSBOX1V1

Multi sensor kit with portable sensor box and smart sensor app
Hardware Description

The STEVAL-MKSBOX1V1 (SensorTile.box) is a ready-to-use box kit with wireless IoT and wearable sensor platform to help you use and develop apps based on remote motion and environmental sensor data, regardless of your level of expertise.

The SensorTile.box board fits into a small plastic shroud with a long-life rechargeable battery, and the ST BLE Sensor app on your smartphone connects via Bluetooth to the board and allows you to immediately begin using the wide range of default IoT and wearable sensor applications.

SensorTile.box includes a firmware programming and debugging interface that allows professional developers to engage in more complex firmware code development using the STM32 Open Development Environment (STM32 ODE), which includes a sensing AI function pack with neural network libraries

Key Product on board

- Ultra-low-power STM32L4 Series MCUs based on ARM® Cortex® -M4 MCU 120 MHz with 2048 kbytes Flash (STM32L4R9ZI)
- Accurate temperature : STTS751
- Low power precise 6x IMU: LSM6DSOX
- Stand-alone XLs: LIS3DHH, LIS2DW12
- Magnetometer: LIS2MDL
- Altimeter / pressure sensor : LPS22HH
- Wide-band microphone: MP23ABS1
- Humidity sensor: HTS221

Latest info available at www.st.com
STEVAL-MKSBOX1V1

Software Overview

Software Description

The FP-ATR-BLE1 is STM32Cube Function Pack for low power asset tracking using BLE connectivity for the SensorTile.box wireless multi sensor development kit (STEVAL-MKS1BOX1).
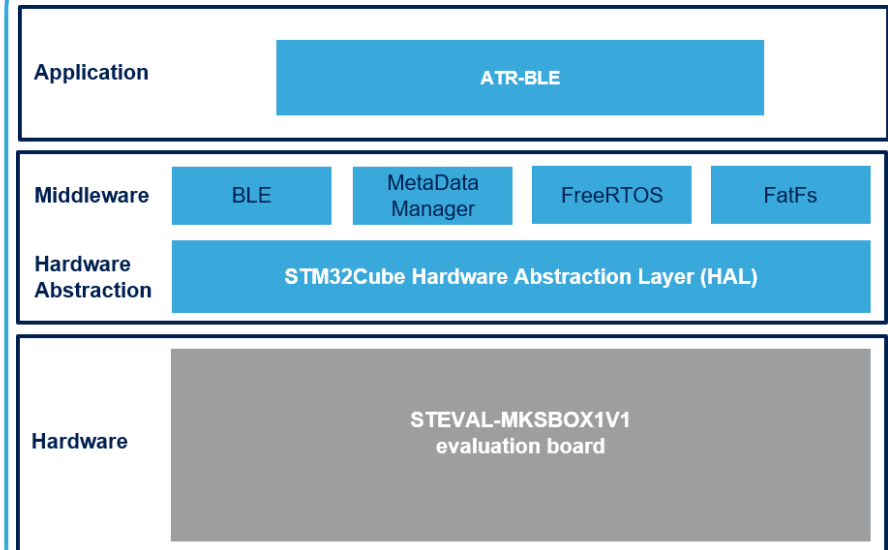
The purpose of this functional pack is to provide one example application that show how to build a custom low power asset tracking using BLE connectivity for STEVAL-MKS1BOX1.

The expansion is built on STM32Cube software technology to ease portability across different STM32 microcontrollers.

Key features

- Complete sample application on how to create one asset tracking application controlled by BLE connectivity

- Ultra low power implementation based on RTOS

- Wake-up, tilt and orientation detection by the on-board accelerometer

- Environmental sensor data and Intertial data saved on SD card usinf FatFs middleware

- Middleware Bluetooth connectivity from the X-CUBE-BLE2 software package

- Compatible Compatible with ST Asset Tracking client application for Android/iOS for supporting firmware setting via Bluetooth connectivity and for reading the Data log created

- Easy portability across different MCU families, thanks to STM32Cube

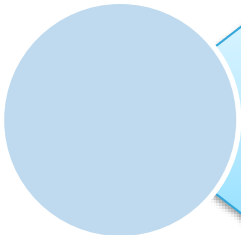- Free, user-friendly license terms.

Overall Software Architecture

Application	ATR-BLE

Middleware	BLE	MetaData Manager	FreeRTOS	FatFs
Hardware Abstraction	STM32Cube Hardware Abstraction Layer (HAL)			

Hardware	STEVAL-MKSBOX1V1 evaluation board

Latest info available at www.st.com
FP-ATR-BLE1

Quick Start Guide Contents

FP-ATR-BLE1: STM32Cube function pack for asset tracking using BLE connectivity for SensorTile.box wireless multi sensor development kit

Hardware and Software overview

Setup & Demo Examples

Documents & Related Resources

STM32 Open Development Environment: Overview

Setup & Application Examples
HW prerequisites

- 1x STEVAL-MKSBOX1V1 evaluation board

- Laptop/PC with Windows 7, 8 or 10

- 1 x micro USB cable

- 1x USB type A to Mini-B USB cable

- ST-Link/V2 in-circuit debugger/programmer for STM8 and STM32

Micro USB Cable

Mini USB

ST-Link/V2

STEVAL-MKSBOX1V1

SensorTile.Box

STLINK-V2   JTAG Adapter   Flat Cable
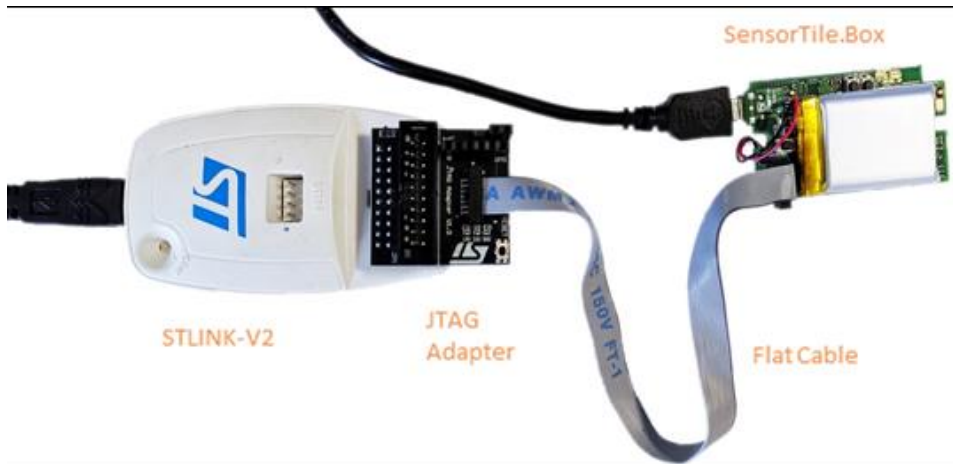
- **STSW-LINK004**
  - STM32 ST-LINK Utility (STSW-LINK004) is a full-featured software interface for programming STM32 microcontrollers

- **FP-ATR-BLE1**
  - Copy the .zip file content into a folder on your PC. The package will contain source code example (Keil, IAR, STM32Cube IDE) based on **STEVAL-MKSBOX1V1**

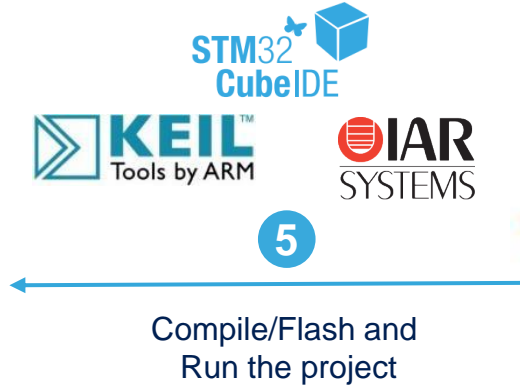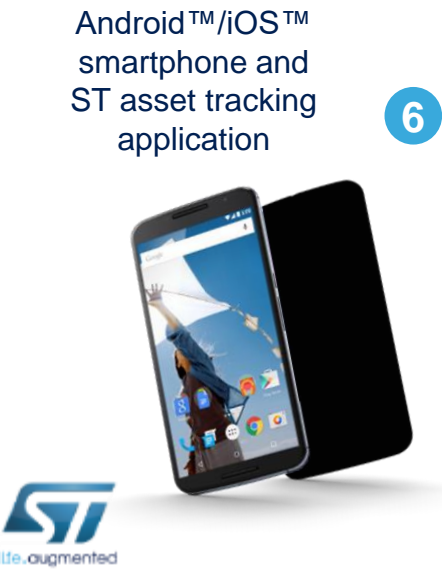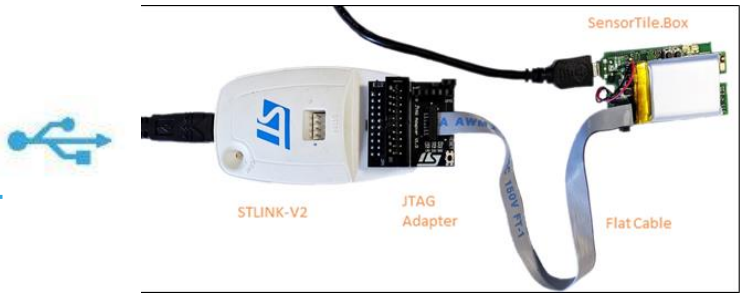- **ST Asset Tracking** Application for **iOS** to download from iTunes (V2.0.0 or above)

1 www.st.com/stm32ode-fp

www.st.com
life.augmented

2 Select FP-ATR-BLE1

3 Download & unpack
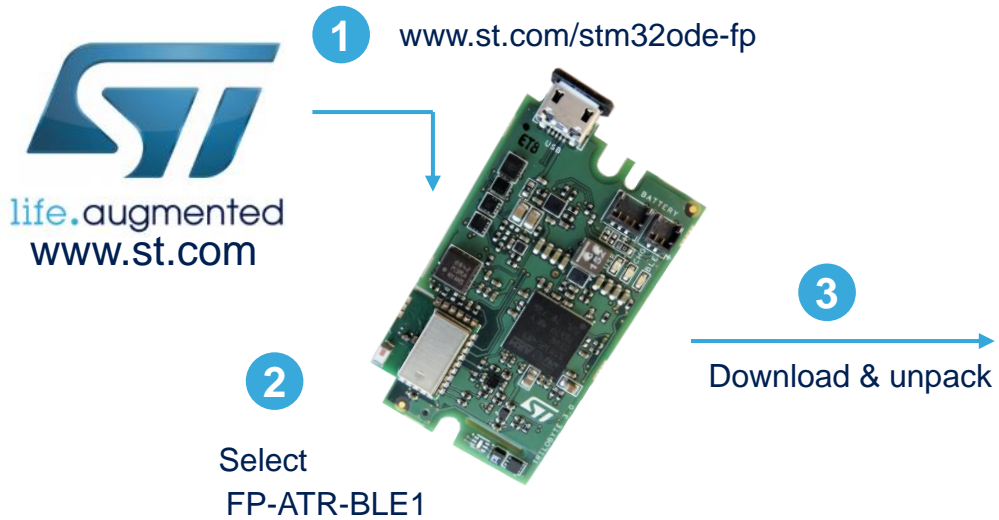
FP-ATR-BLE1 package structure

- _htmresc
- Documentation ← Docs
- Drivers ← BSP, HAL and drivers
- Middlewares ← BlueNRG-2, FatFs, FreeRTOS
- Projects ← Application
- package.xml
- Release_Notes.html
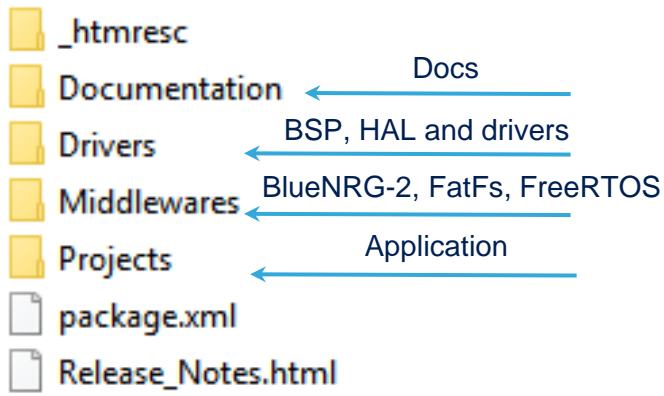
4

Projects\STM32L4R9ZI-SensorTile.box\Applications\ ATR_BLE\

6 Android™/iOS™ smartphone and ST asset tracking application

STM32 CubeIDE

KEIL Tools by ARM

IAR SYSTEMS

SensorTile.Box

STLINK-V2   JTAG Adapter   Flat Cable

5 Compile/Flash and Run the project

life.augmented

How to Switch on/off the and how to enable the Bluetooth

Power Button   **User Button**

- **Switch on the SensorTile.box**

  Keep pressing the **Power Button** until you will see
  a couple of blue & green LED blinking.

- **Switch off the board**

 Press again the **Power Button** for switching off the board

- **Enable the Bluetooth advertise**

  For reducing the power consumption the Bluetooth it's not enabled
  when the ST asset tracking application is not connected to it.
  Each time we want to enable it for controlling the asset tracking log
  using the ST asset tracking application, press the **User Button**.
  The blue LED will start blinking

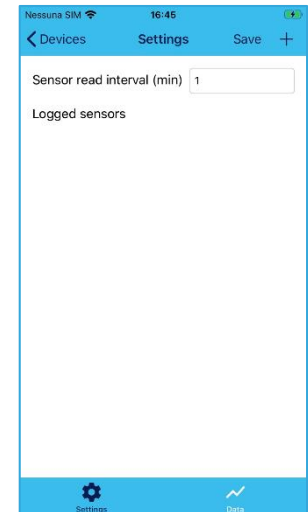- **Use the ST asset tracking application for connecting to the SensorTile.box**
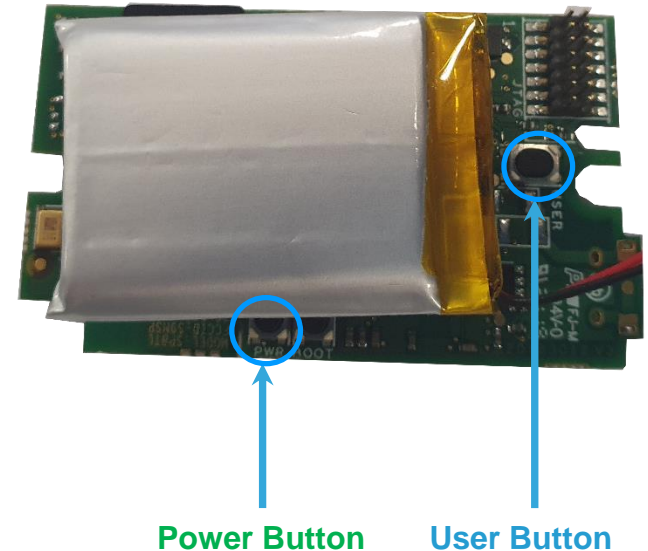
- **Switch on the SensorTile.box and enable Bluetooth connectivity**

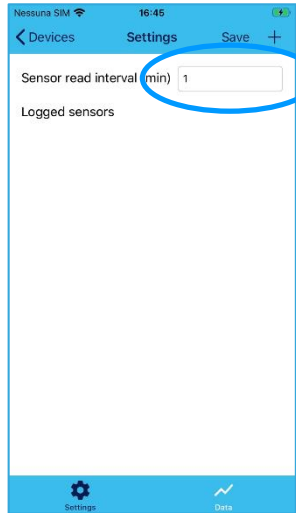- **Start the ST asset tracking application and select FP-ATR-BLE1**
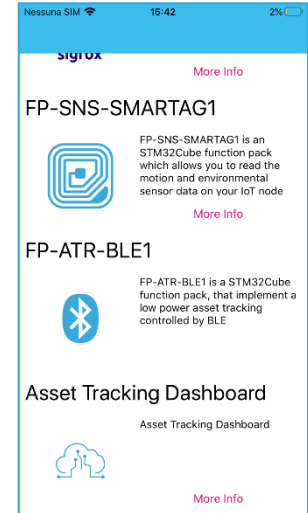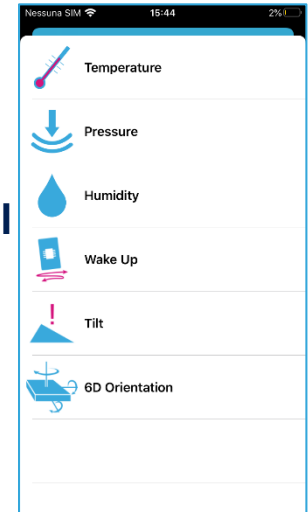
- **Search the board (ATB_100 default name)**
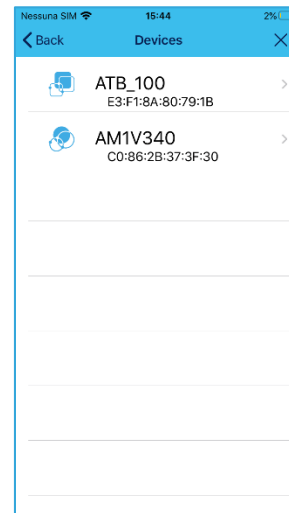
- **Connect to the board and make the pairing (default PIN 123456)**
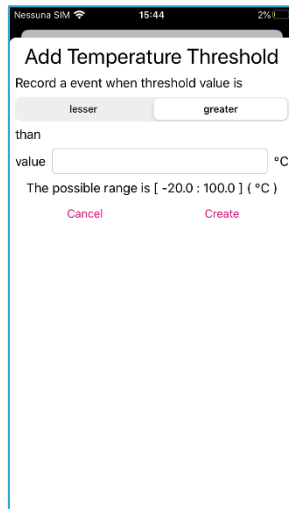
ST asset tracking Mobile App

- **Select the Interval for reading Environmental Sensors (Pressure/Temperature/Humidity)**
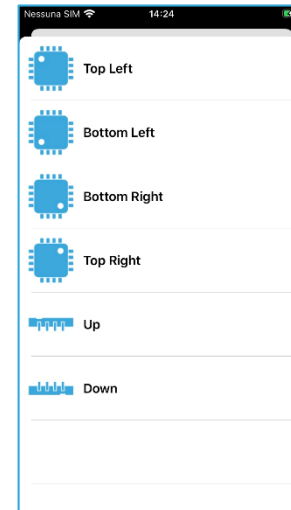
  - **Pressing the "+" Button add all the Environmental and Inertial Events that we want to track**

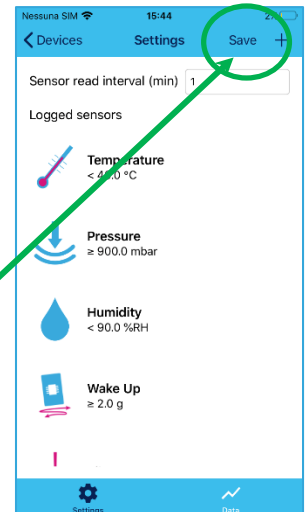- **Environmental Event**

- **6D Orientation Event**

- **After having decided all the Events to log Press "Save" For starting the Asset Tracking Log**
  The application may be closed

FP-ATR-BLE1
ST asset tracking Mobile App

• **For reading the Events Log on the board, enable again the Bluetooth pressing the "User Button"**

• **Use the ST asset tracking application and connect to SensorTile.box (Secure PIN no more requested) and select "Data" page**
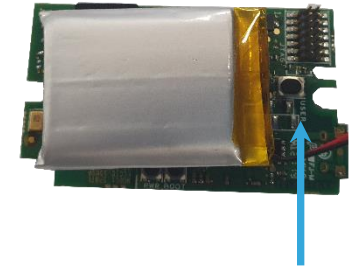
User Button
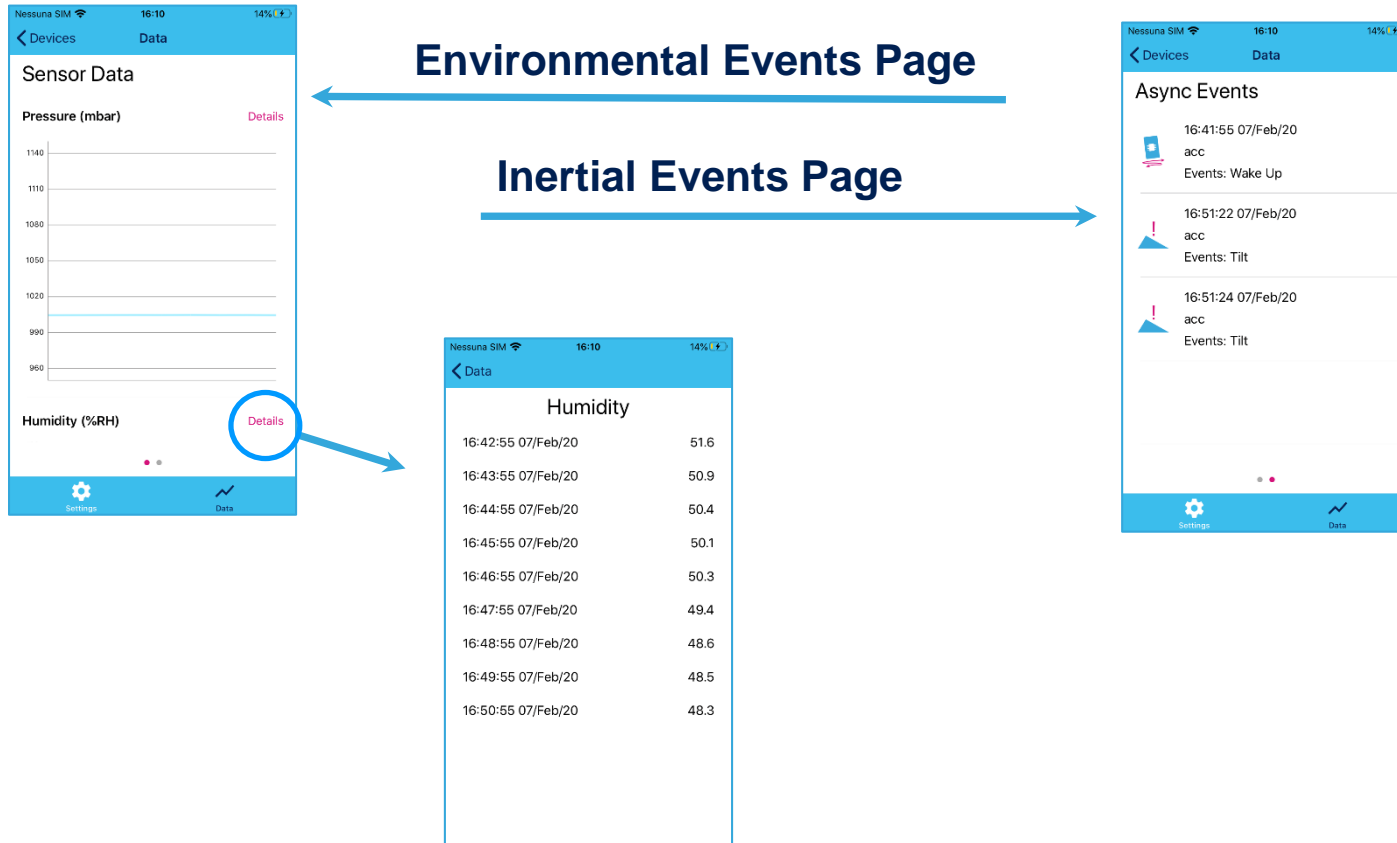
Environmental Events Page
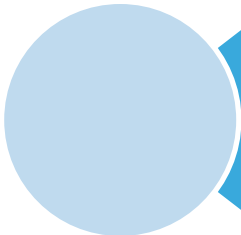
Inertial Events Page
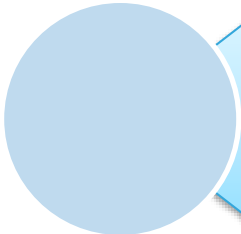
Quick Start Guide Contents

FP-ATR-BLE1: STM32Cube function pack for asset tracking using BLE connectivity for SensorTile.box wireless multi sensor development kit

Hardware and Software overview

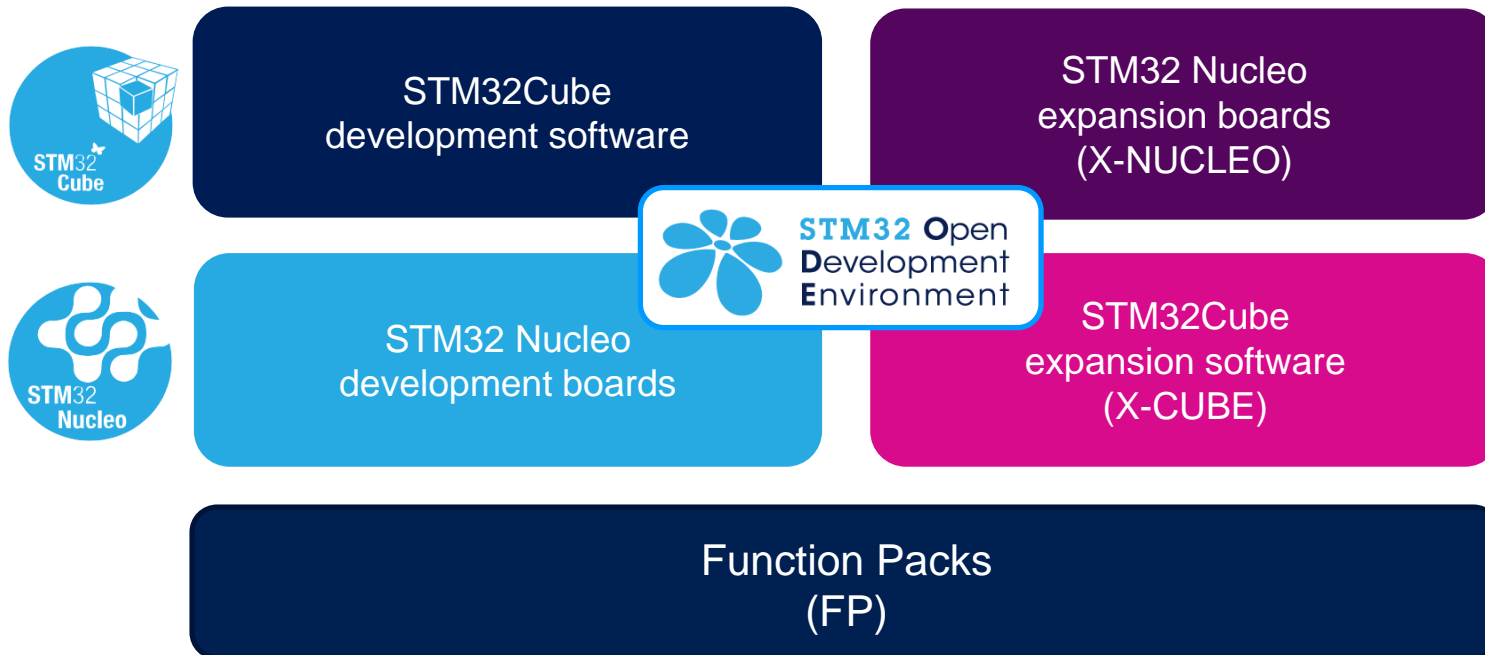Setup & Demo Examples

Documents & Related Resources

STM32 Open Development Environment: Overview

STM32 Open Development Environment
Fast, affordable Prototyping and Development

- The STM32 Open Development Environment (STM32 ODE) is an open, flexible, easy and affordable way to develop innovative devices and applications based on the STM32 32-bit microcontroller family combined with other state-of-the-art ST components connected via expansion boards. It enables fast prototyping with leading-edge components that can quickly be transformed into final designs

STM32Cube development software

STM32 Nucleo expansion boards (X-NUCLEO)

STM32 Nucleo development boards

STM32Cube expansion software (X-CUBE)

Function Packs (FP)

For further information, please visit www.st.com/stm32ode