Introducing the **SensorTile**

IoT design lab on the tip of a pencil

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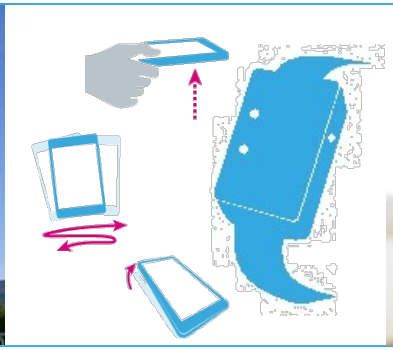
SensorTile

The connectable multi-sensor node

Sensing, **Tracking** and **Monitoring** Embedded **Processing** Unit

Motion	Algorithms	Audio	Gaming	Augmented living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SensorTile

Sensing, processing and BLE connectivity

Sensors

- Motion MEMS — LSM6DSM, LSM303AGR
- Environmental sensors — LPS22HB
- MEMS microphone — MP34DT04

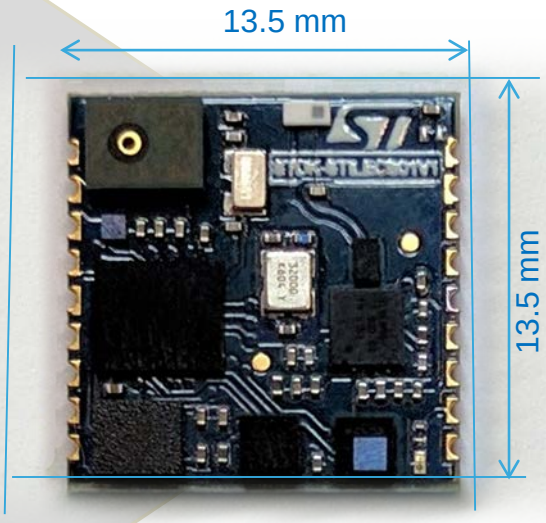
Low-Power MCU

- Low-power brain
- Sensor fusion

STM32L4

Ultra Low Power Connectivity

- Bluetooth Smart — BlueNRG-MS



Miniaturized Tile that can be **soldered** or **plugged** on a host board

open.AUDIO

open.MEMS

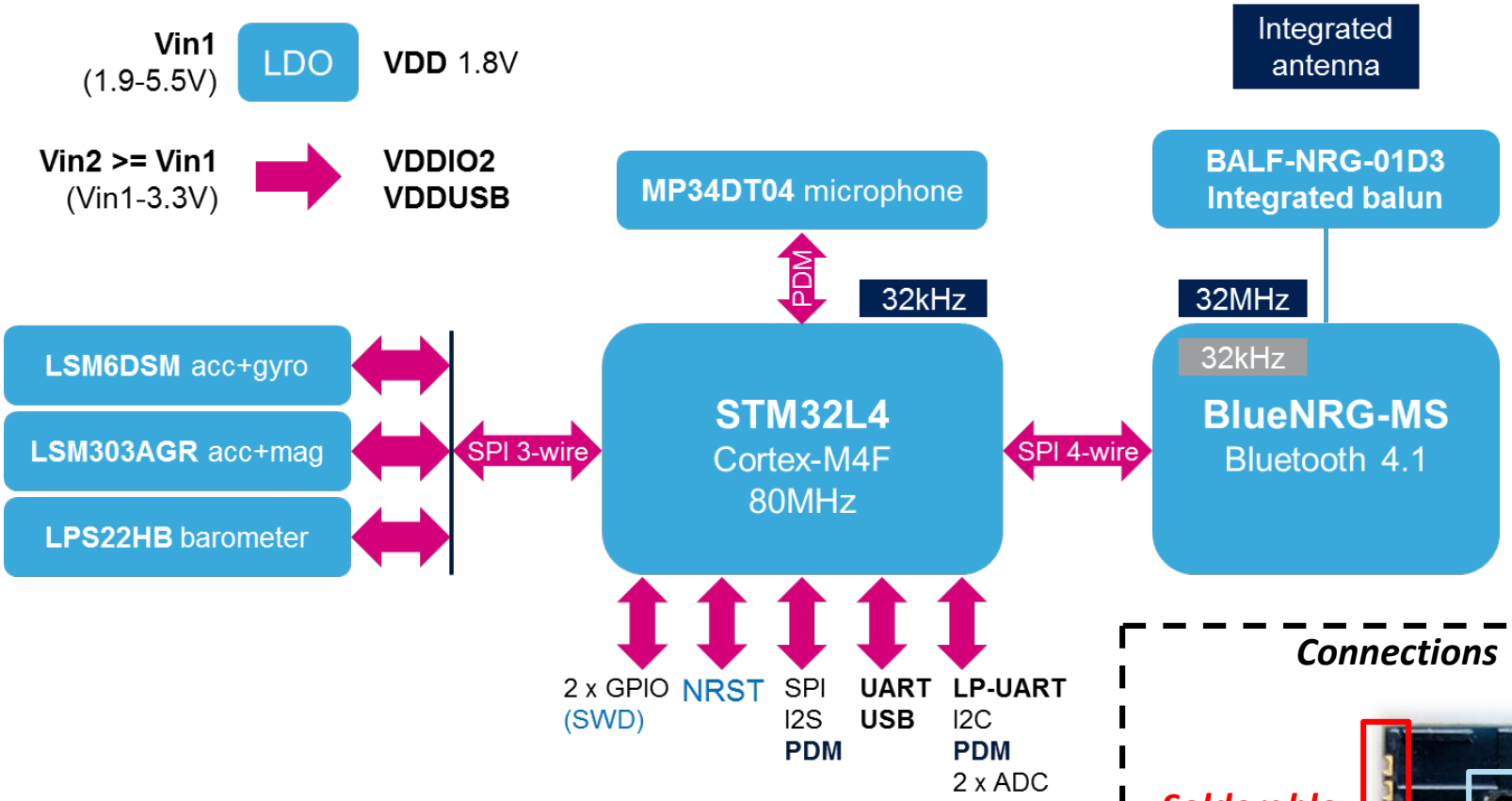
open.RF

STM32

SensorTile is a Bluetooth Smart sensorized development kit.

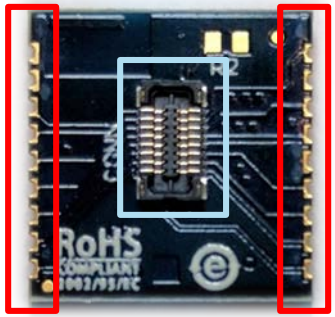
The miniaturized tile-shaped design includes all that is needed to remotely sense and measure motion, environmental and acoustical parameters.

SensorTile Architecture



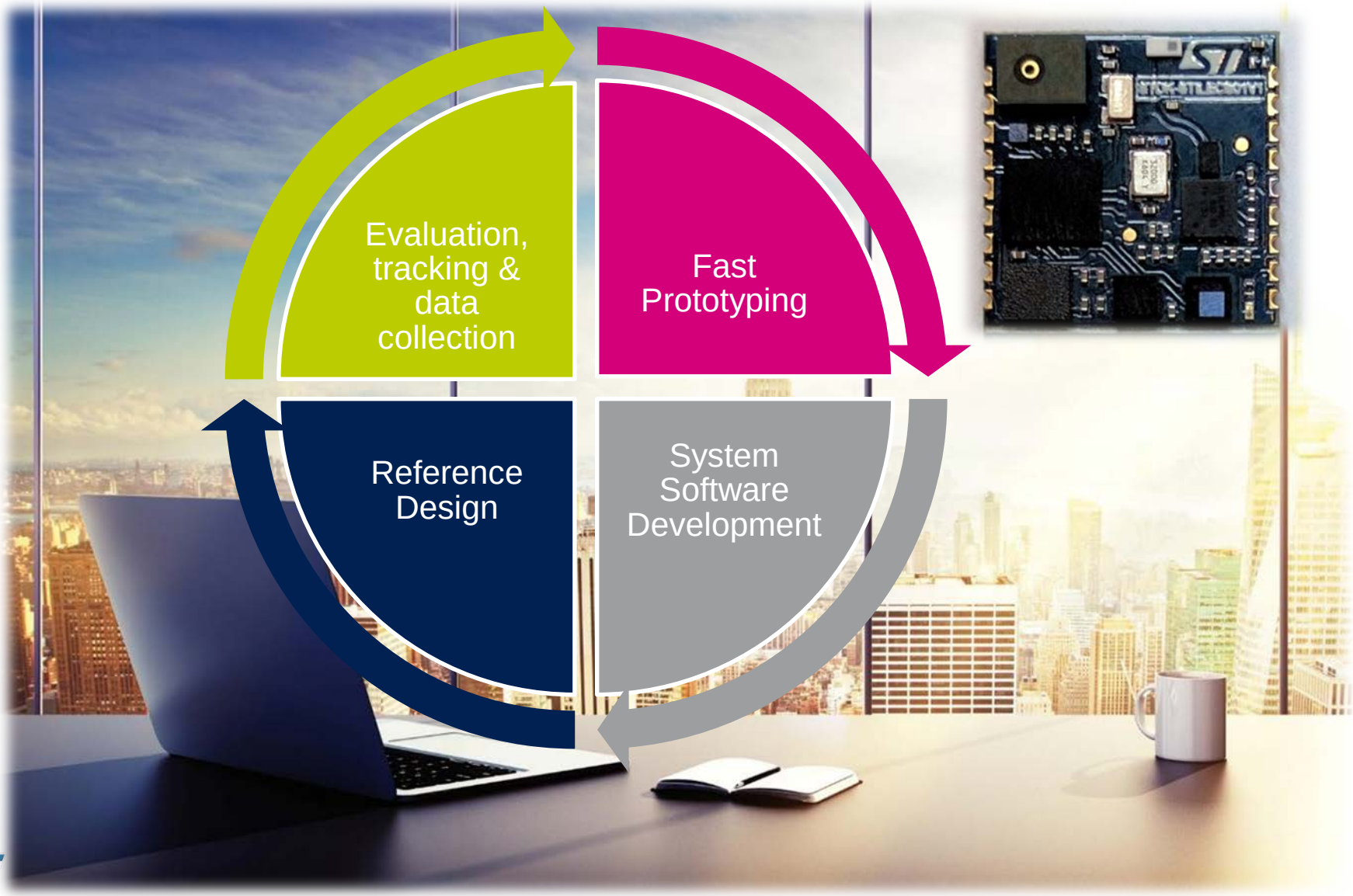
Connections

Solderable Plugin



Bottom View

System Design with the SensorTile



SensorTile

Simple, powerful, extendible

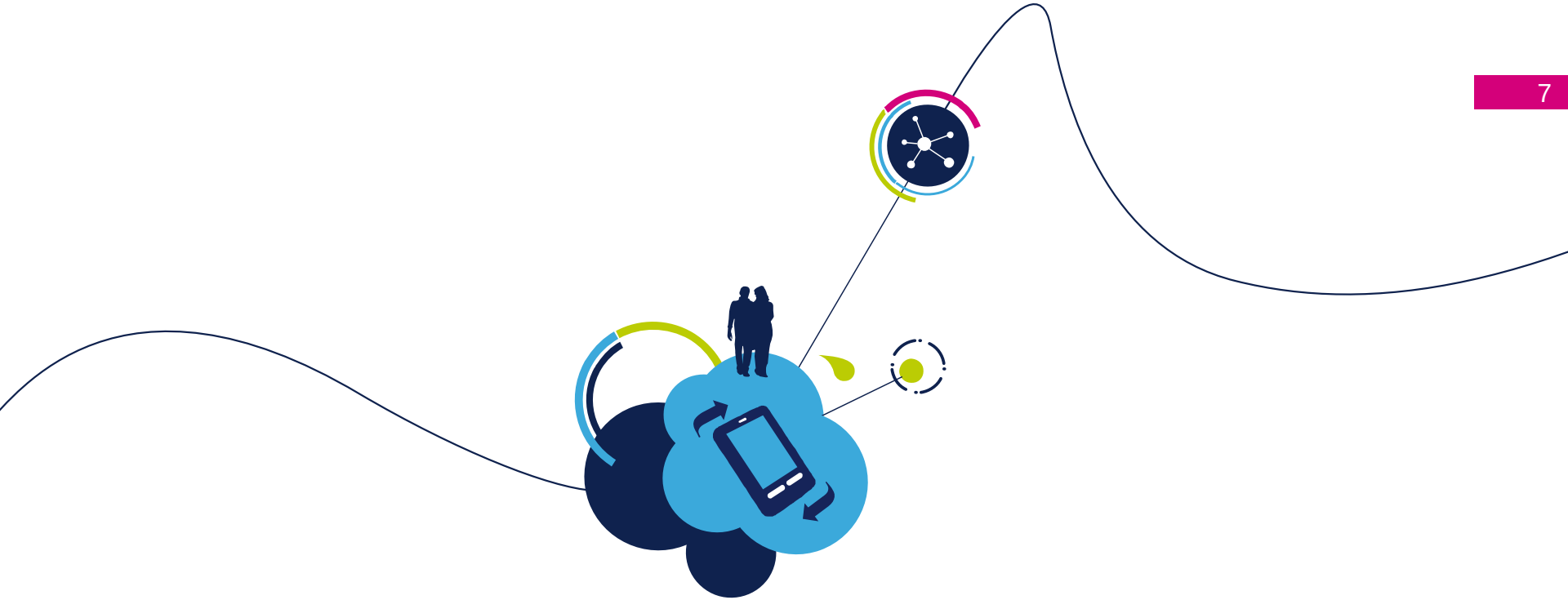
An all-ST Reference Design

Designed to fit your needs:

- Used as a **standalone sensor** node to MONITOR, TRACK and REMOTELY CONNECT to an iOS/Android Smartphone App
- Easily **plug into new designs** to add SENSING and CONNECTIVITY capabilities through a SMART HUB solution

Engineered for makers and developers:

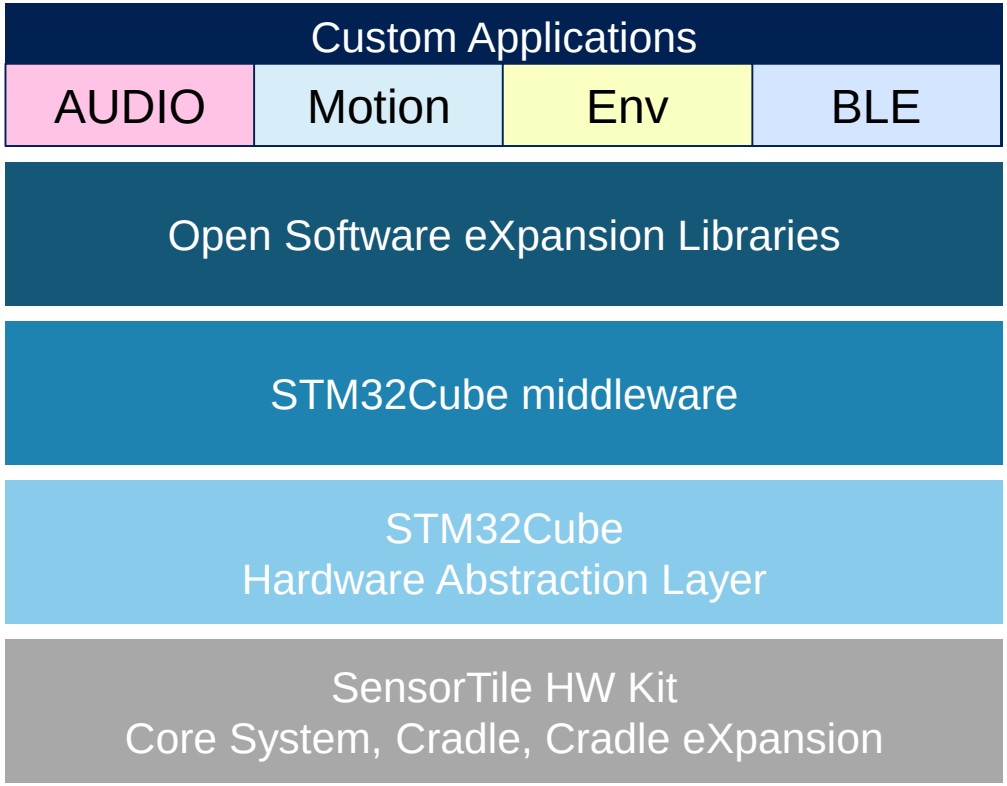
- **Standalone mode:**
  Turn it on, configure it via BLE and start acquiring sensor data remotely on your Smartphone
- **Sensor and Connectivity HUB mode:**
  Plug the SensorTile into new designs and access all features through a convenient command interface (I2C/SPI/UART)
- **Programmable development kit:**
  Leverage on the on-board STM32 processing capability and provided software API to create your new BLE-connectable sensor node

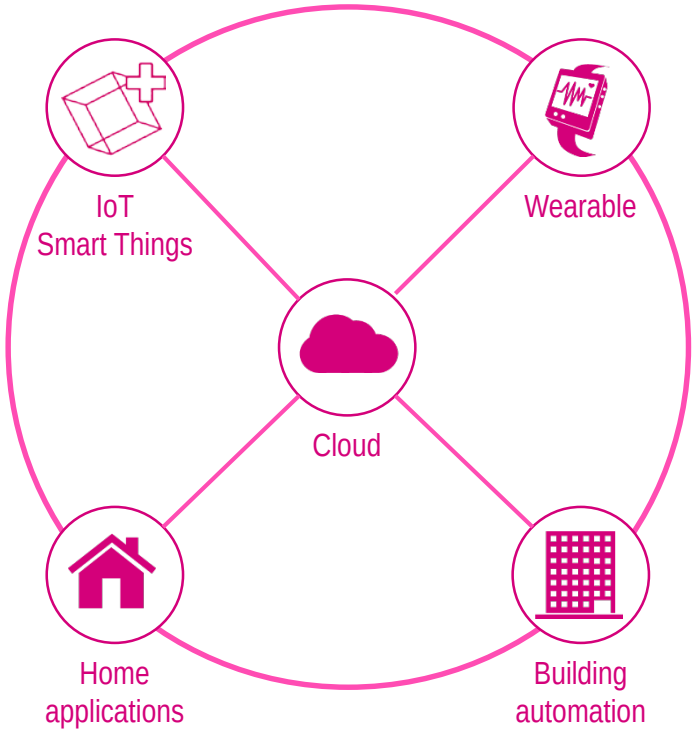


SensorTile Firmware / Software

SensorTile Firmware
for Design and Prototyping

Modular design environment to fast prototype your designs in all application domains





SensorTile Development Kit is built on STM32Cube
and supported by the STM32 Open Development Environment

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SensorTile

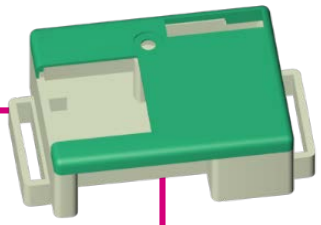
Hardware and Software Development Kit

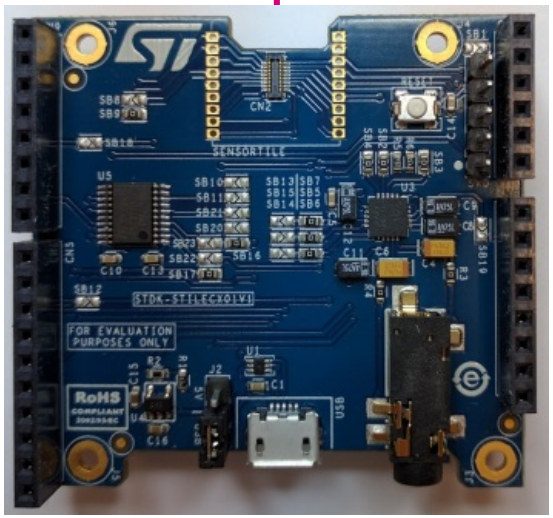
Basic Firmware

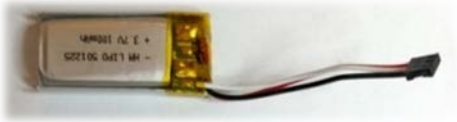
BlueMicrosystem

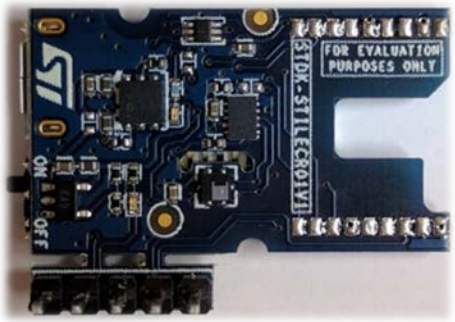
BlueVoice

Function Pack









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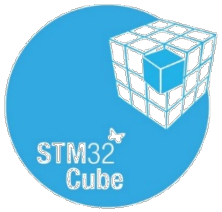
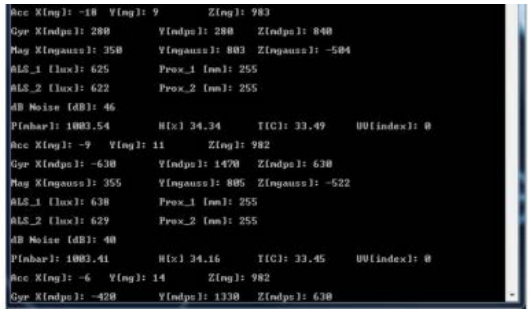
Starter Firmware: «Hello Sensor World!»

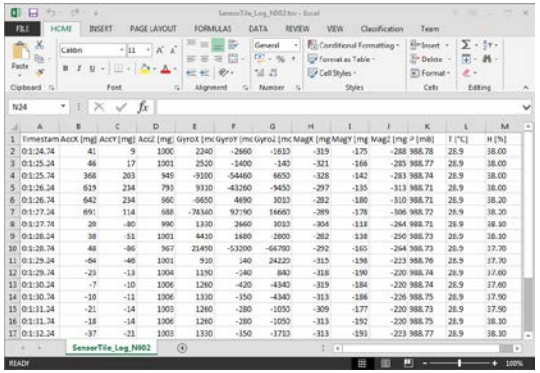
Starter Firmware is based on STM32Cube

It provides two example applications

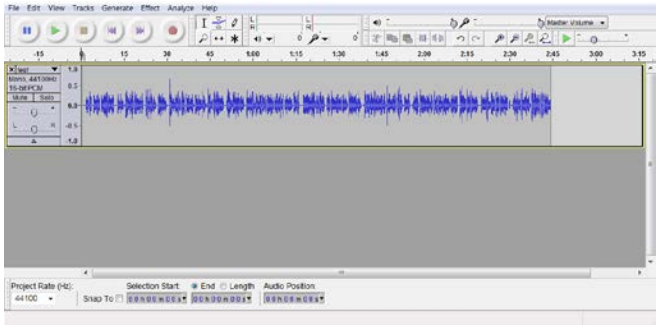




- DataLog:
  - Sensors data streaming via USB (Virtual COM Port)
  - Sensors data storage on micro-SD card

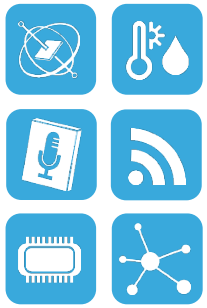


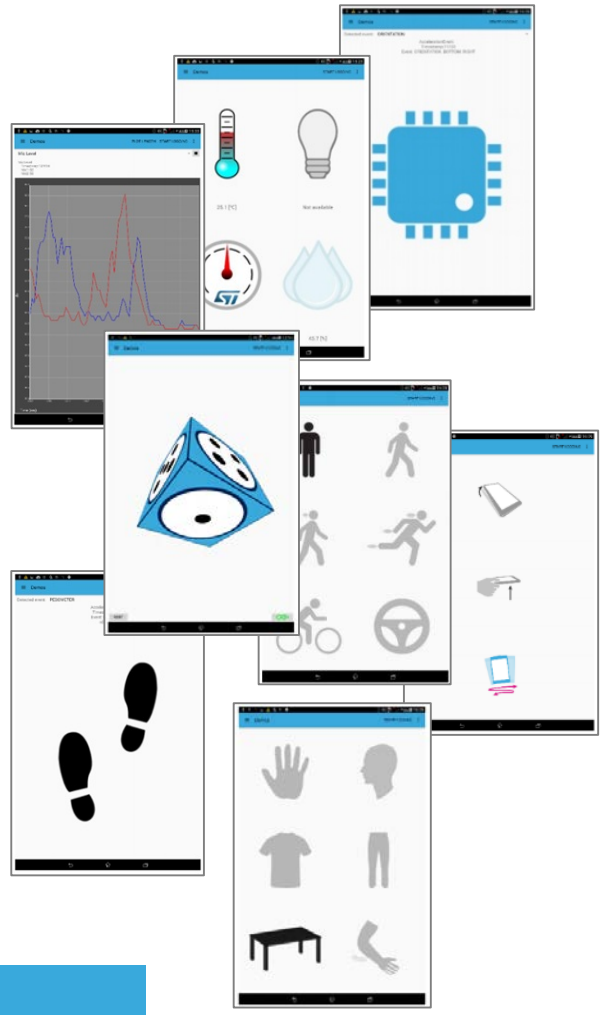
- AudioLoop
  - Microphone acquisition, output via USB (Microphone class) or I2S
  - Record the sound on a PC or play it on loudspeakers/headphones



BlueMicrosystem

STM32 Open Development Environment





open.MEMS

STM32 OTA Firmware upgrade

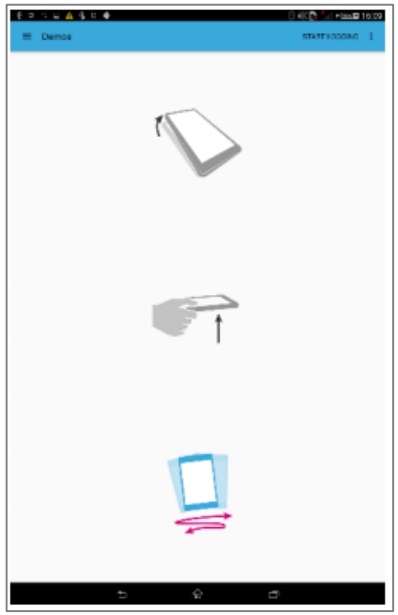
BMS Android and iOS App free download

open.MEMS

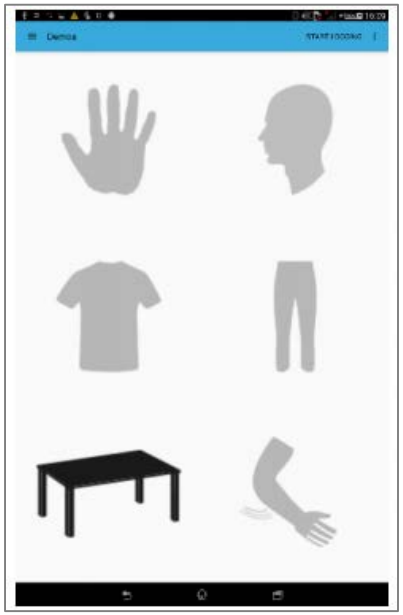
Sensor Fusion

Activity Recognition

Gesture Recognition



Carry Position

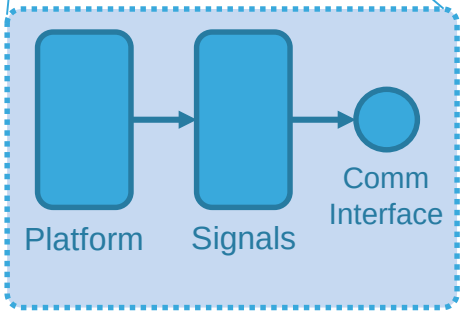


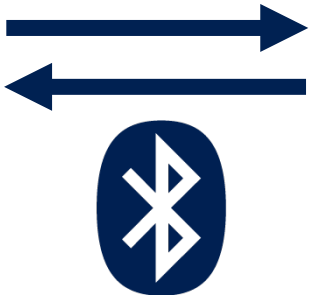
BlueVoice + Mobile Devices

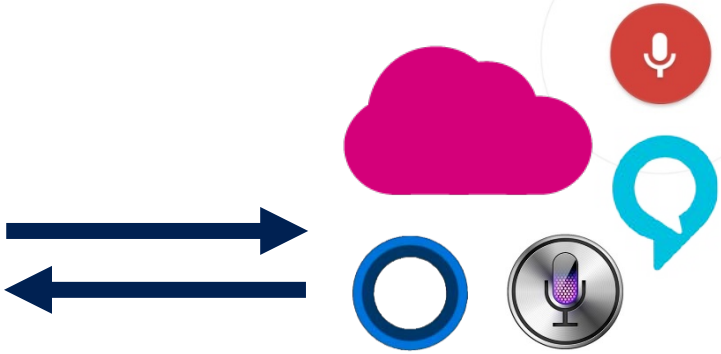
SensorTile Terminal

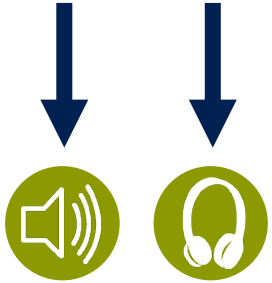
Mobile Device

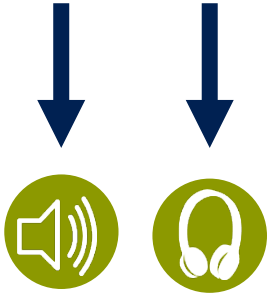
Cloud-based Services











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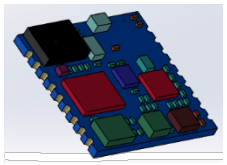
SensorTile Development Kit

SensorTile Kit: STEVAL-STLKT01V1

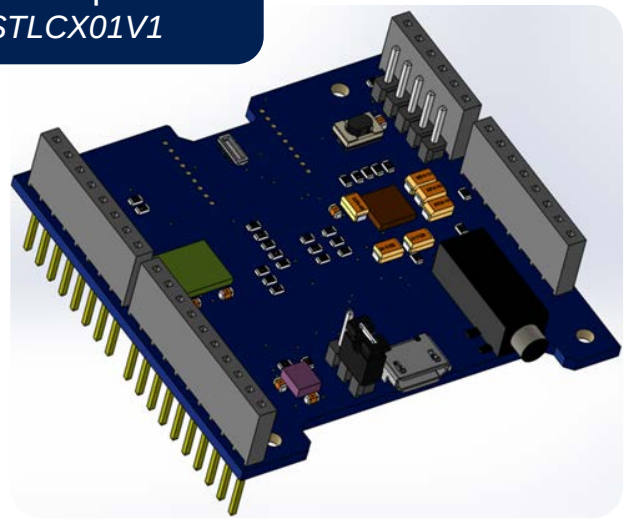


SensorTile
Core System
STLCS01V1

Programming cable

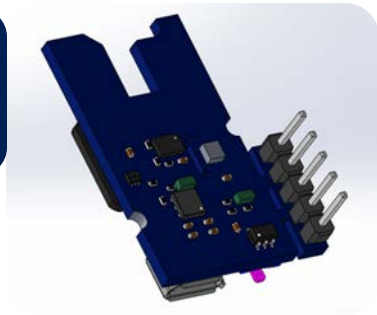
Programmable development kit

SensorTile
Cradle eXpansion
STLCX01V1

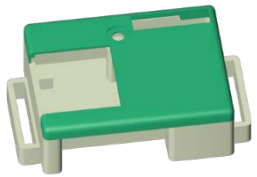


Standalone mode bundle

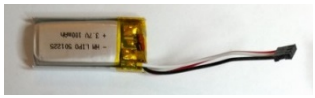
SensorTile
Cradle Board
STLCR01V1



Plastic Box



LiPo Battery



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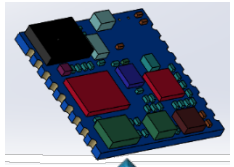
SensorTile Cradle eXpansion Board

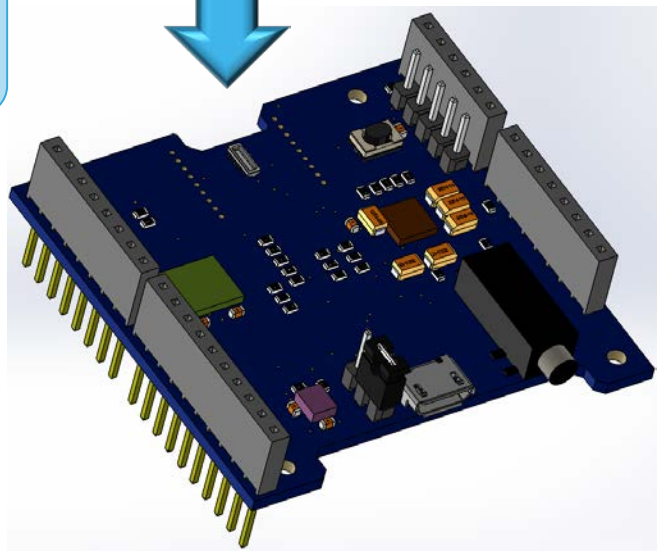
Host board for firmware development

plug, program, unplug the Core System



SWD programming i/f

SensorTile Connector



Use with any STM32Nucleo ST-Link

Arduino Connectors

Reset button

bridging into developer communities

Micro-USB i/f

Audio DAC and 3.5mm Audio Jack

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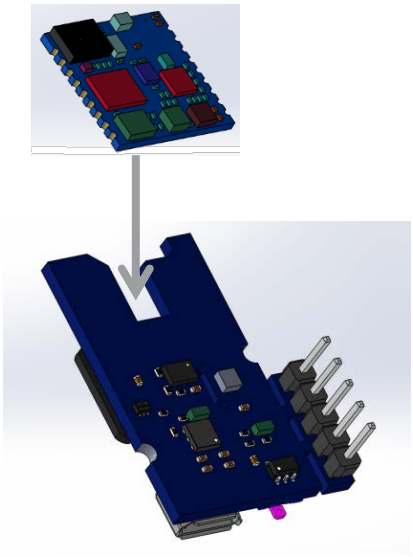
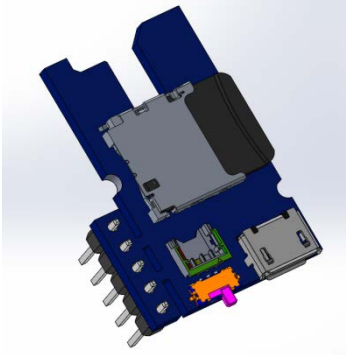
SensorTile Cradle Board

Host board for Standalone Mode



- Solderable SensorTile Footprint
- Breakable SWD interface for programming
  - E.g. may use STLink on STM32Nucleo
- HTS221 Humidity and Temperature sensor

Bottom Side View



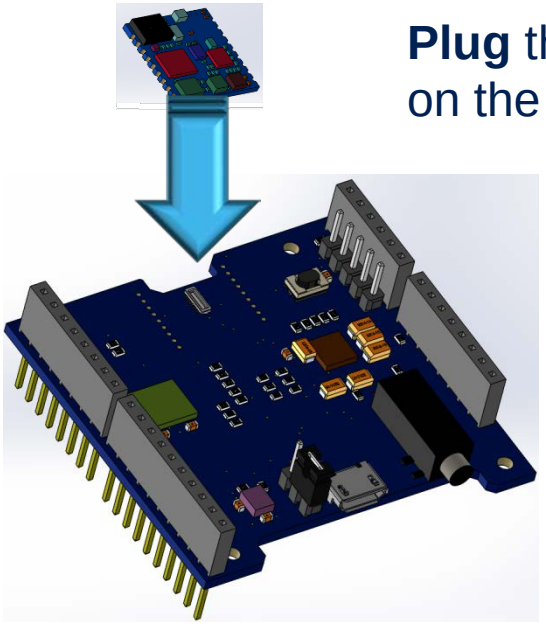
- SD Card
- Micro-USB interface
- HTS221 Humidity and Temperature sensor
- Battery Charger and Battery Connector
- ON/OFF Switch

Hint: Customizing the ST Wearable Mockup

Use the cradle as a reference design for other wearable solutions using the same SensorTile Core System

- Cradle-mounted humidity and temperature sensor shows that not all the sensors must be on the Core System
- The simple 2-layer Cradle can be easily redesigned to accommodate any ST sensor or actuator you may want to field-test
- There is no need to modify the highly optimized SensorTile Core System to do that!

BLUEMICROSYSTEM Startup
with the eXpansion Cradle



Plug the SensorTile Core System on the eXpansion Cradle.

Power it via USB

Connect to your Android or iOS smartphone or tablet

Run the BlueMS App

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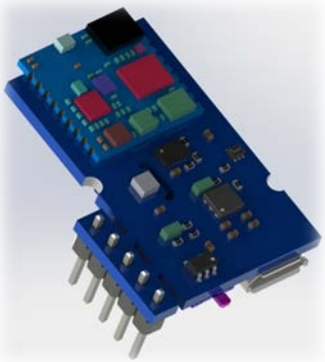
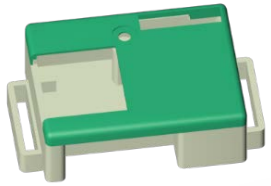
BLUEMICROSYSTEM Startup
with the SensorTileCradle



Solder the SensorTile Core System to the Cradle.

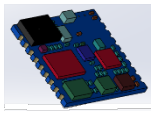


Plug the battery, protect it with the plastic cover

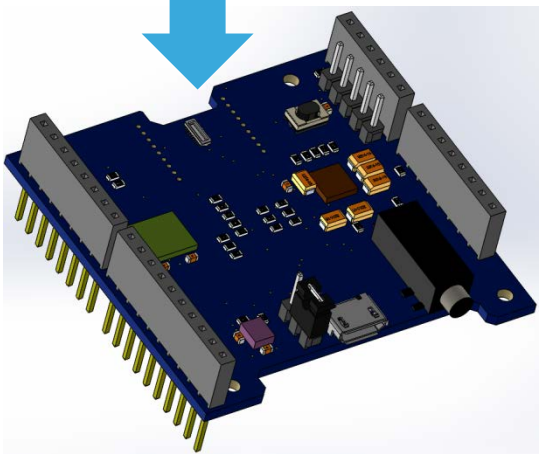
Connect to your Android or iOS smartphone or tablet

Run the BlueMS App

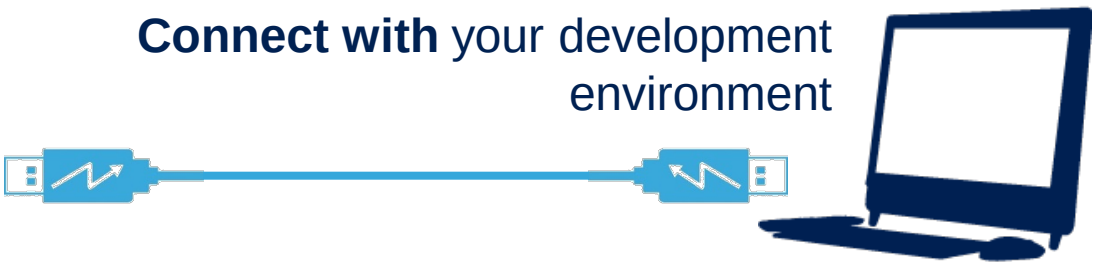
New Design Startup
with the eXpansion Cradle

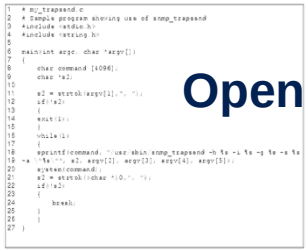


Plug the SensorTile Core System on the eXpansion Cradle.



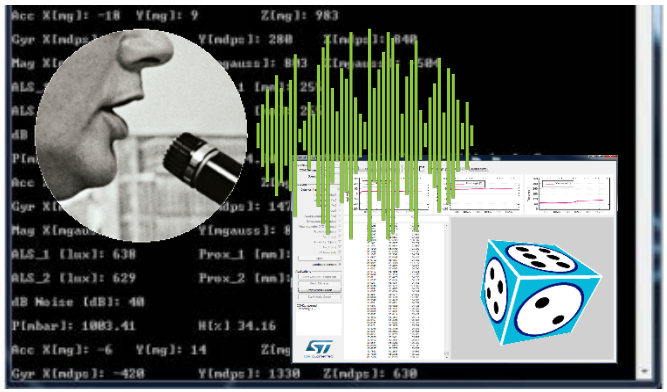
Connect with your development environment





Open the USB starter project on your PC

Compile & Run the USB Audio or Datalogging example application



Design your custom application

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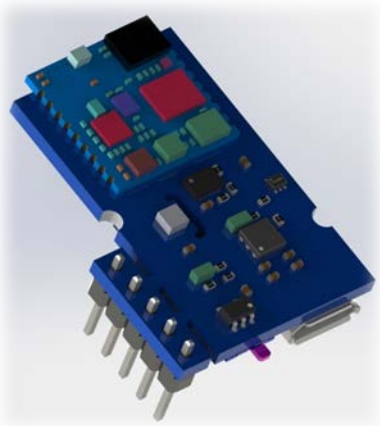
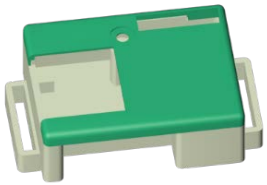
New Design Startup
with the SensorTile Cradle



Solder the SensorTile to its Cradle

You better protect it with its plastic cover!



Setup your PC programming environment

Program your data tracking application

Field test your application

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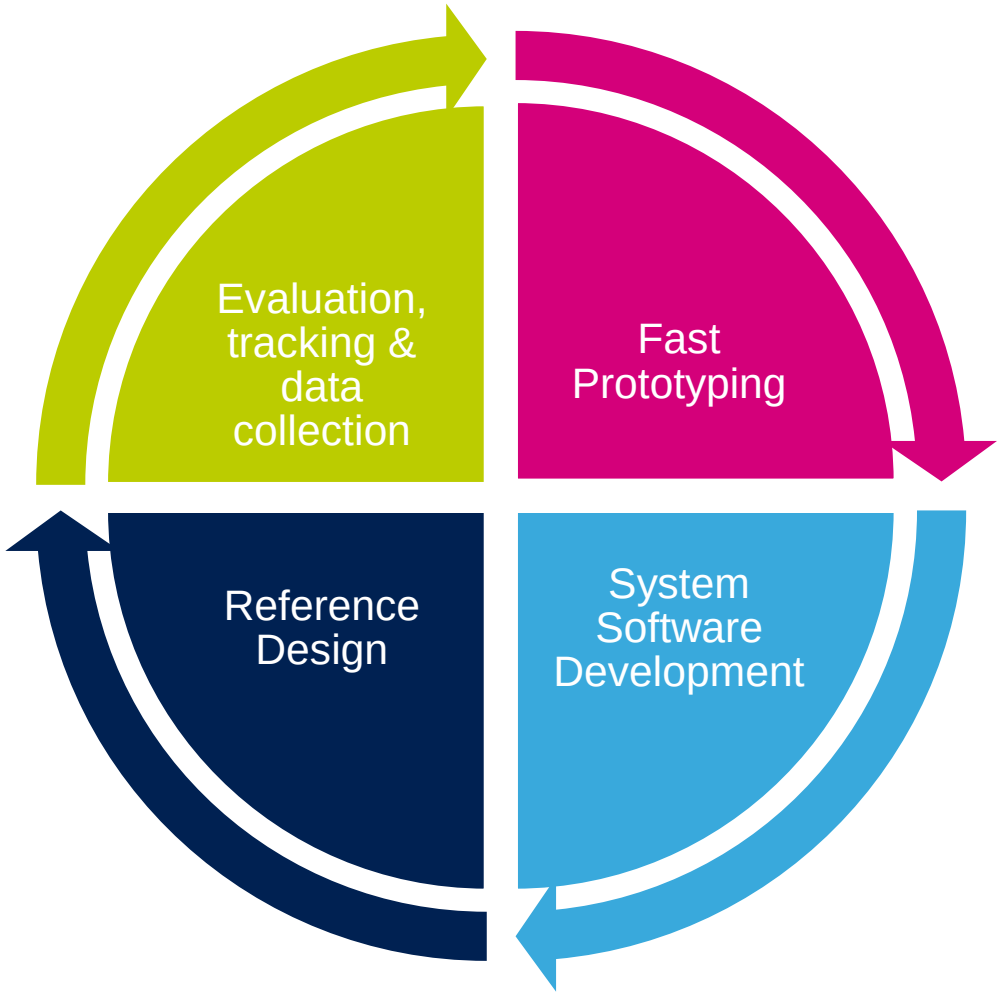
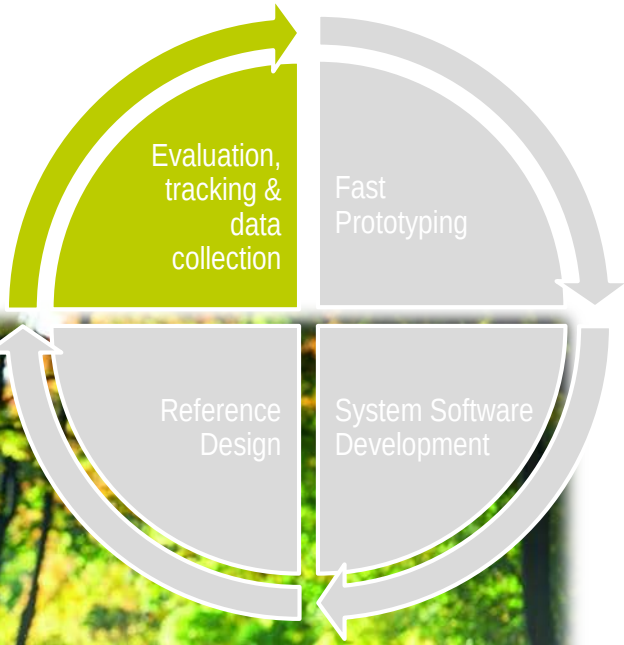
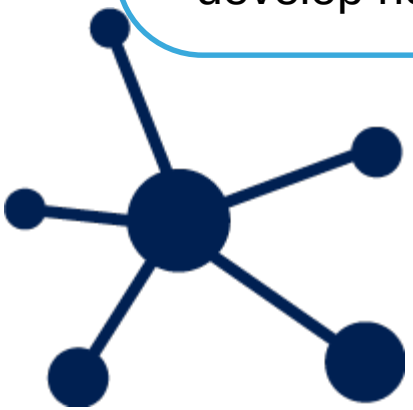
One SDK fits all IoT Design Needs



Evaluation, monitoring, data collection

- ***Evaluate*** the most advanced ST sensors in an all-ST optimized **system architecture**
- ***Field-test*** Data-Fusion and Embedded Signal Processing **Algorithms**
- Use it for ***Data collection*** campaigns, to develop new customized algorithms





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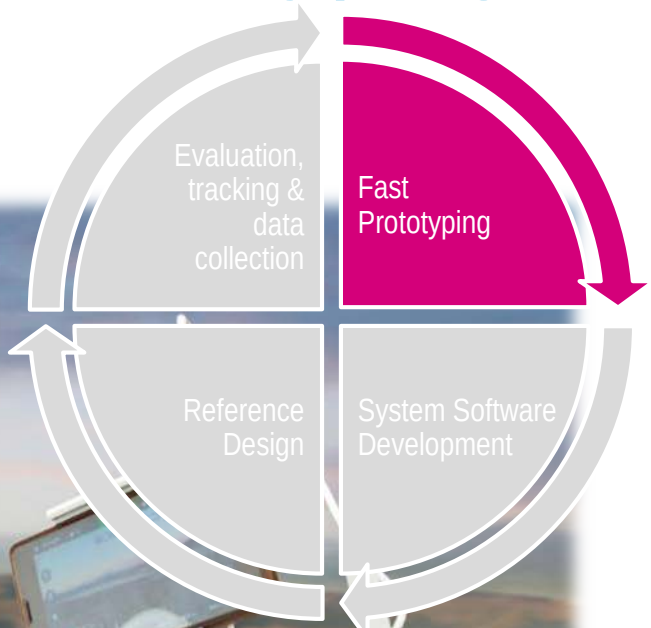
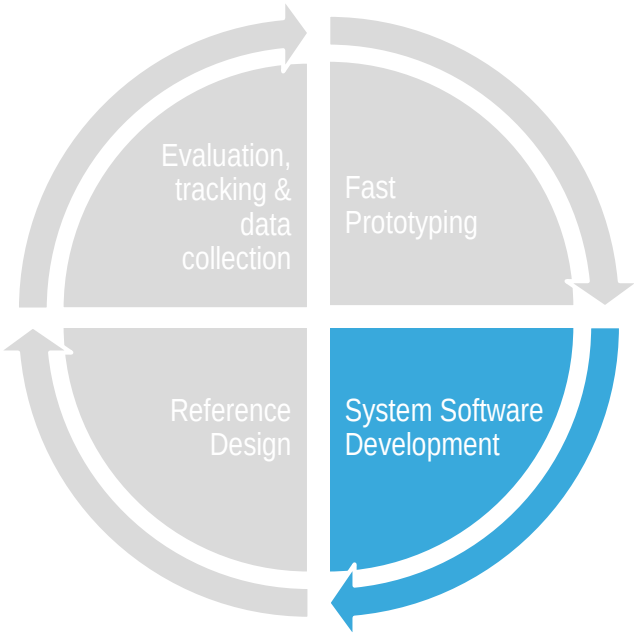
Fast Prototyping



- ***Plug* the SensorTile on your *prototype* motherboard to instantly add its embedded sensing and communication functionalities to your design**
- ***Use the provided 3D CAD files to integrate it in your mechanical prototype***

Software Developer's Platform

- **Firmware** examples based on **STM32Cube**
- Supported by the **STM32 Open Development Environment**
- Host board supports Ar**duino expansion connector** to bridge into most makers ecosystems from Arduino itself to the STM32ODE, and other developer communities.



STM32 Open Development Environment

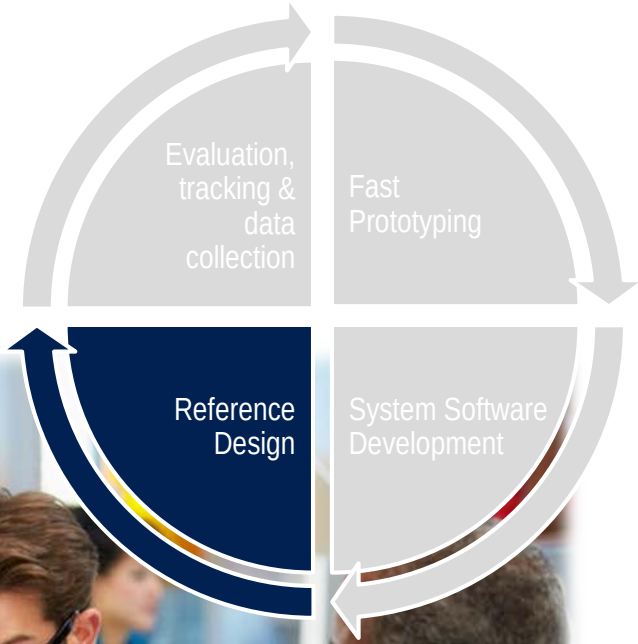
open.AUDIO
open.MEMS
open.RF

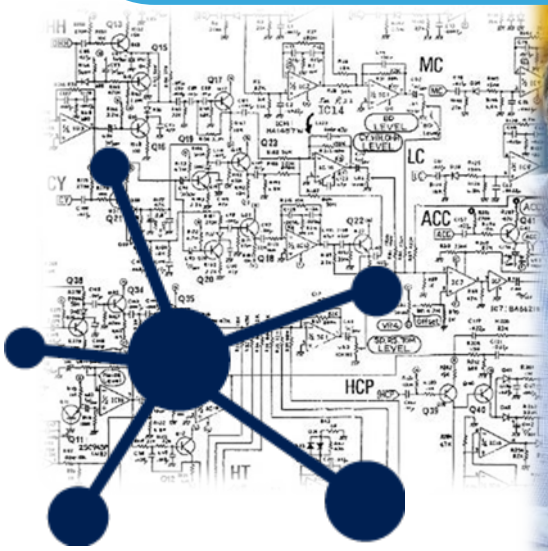
STM32 Cube

BlueMS

Reference Design

- **A complete *HW and SW example*, the starting point for your design**
- ***Freely download all design information:***
- ***HW: Schematics, Gerber, BoM, 3D CAD***
- ***FW: from basic examples to the complete BlueMicroSystems application***





SensorTile

IoT design lab
on the tip of a pencil

Internet of Things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