

THE TACTIGON™

Perfect Link Between Human and Digital Worlds

THE TACTIGON™

Mountain View (CA) – Meet Up TACTIGON SDK

07-24-2018

TACTIGON SKIN

01

It's a Platform

It's also compatible with Arduino IDE. You can download APP and the system change functionality

02

Ergonomic Form Factor

The hand are free and you can use the device in very simple way. It's very easy to wear it

03

Hand + Finger Recognition

It's no a glove it's no a bracelet it's no a ring. It's new way for the hand gesture controller. The system recognize the movement of the hand and the fingers with capacity key

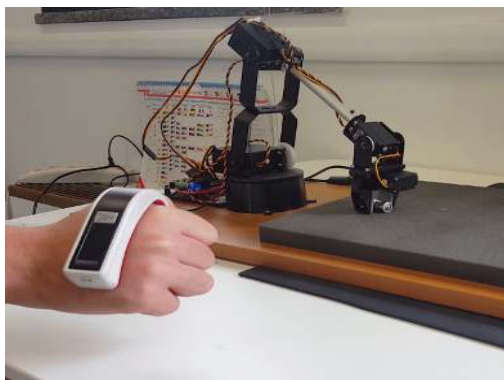
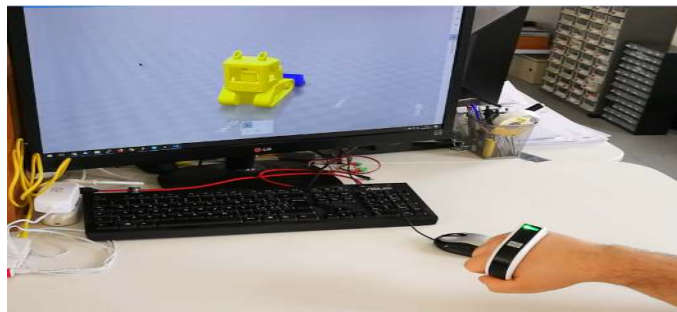


Examples

Rover Control



CAD/CAM software

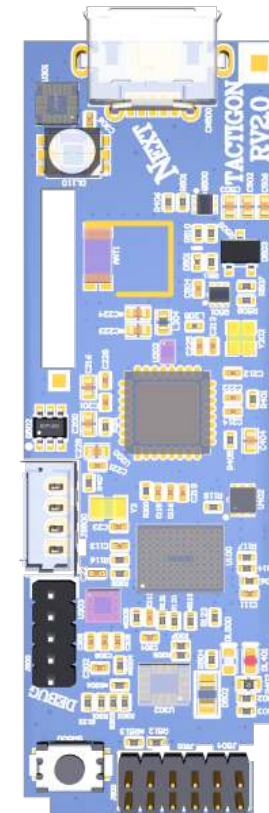
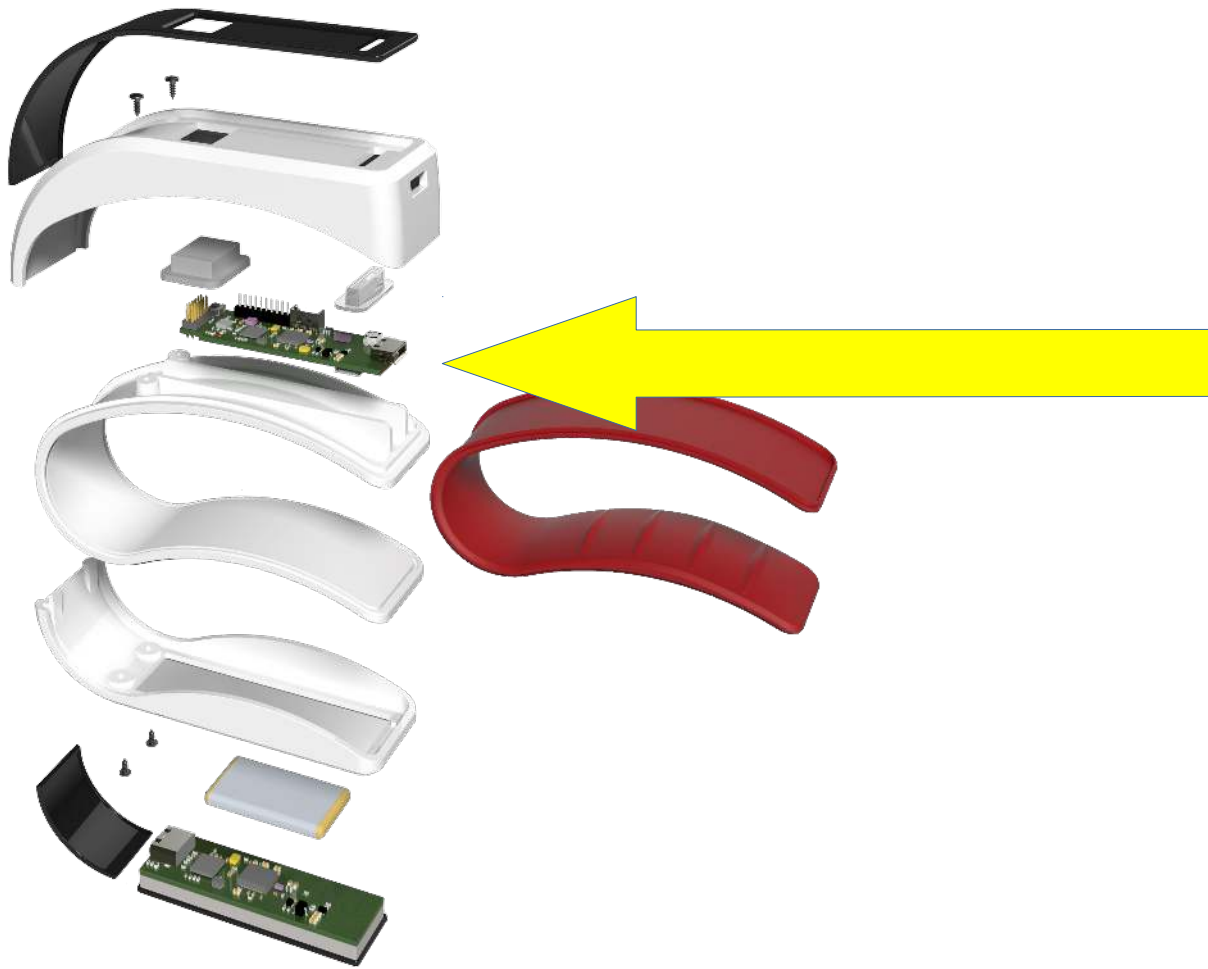


Robotic harm

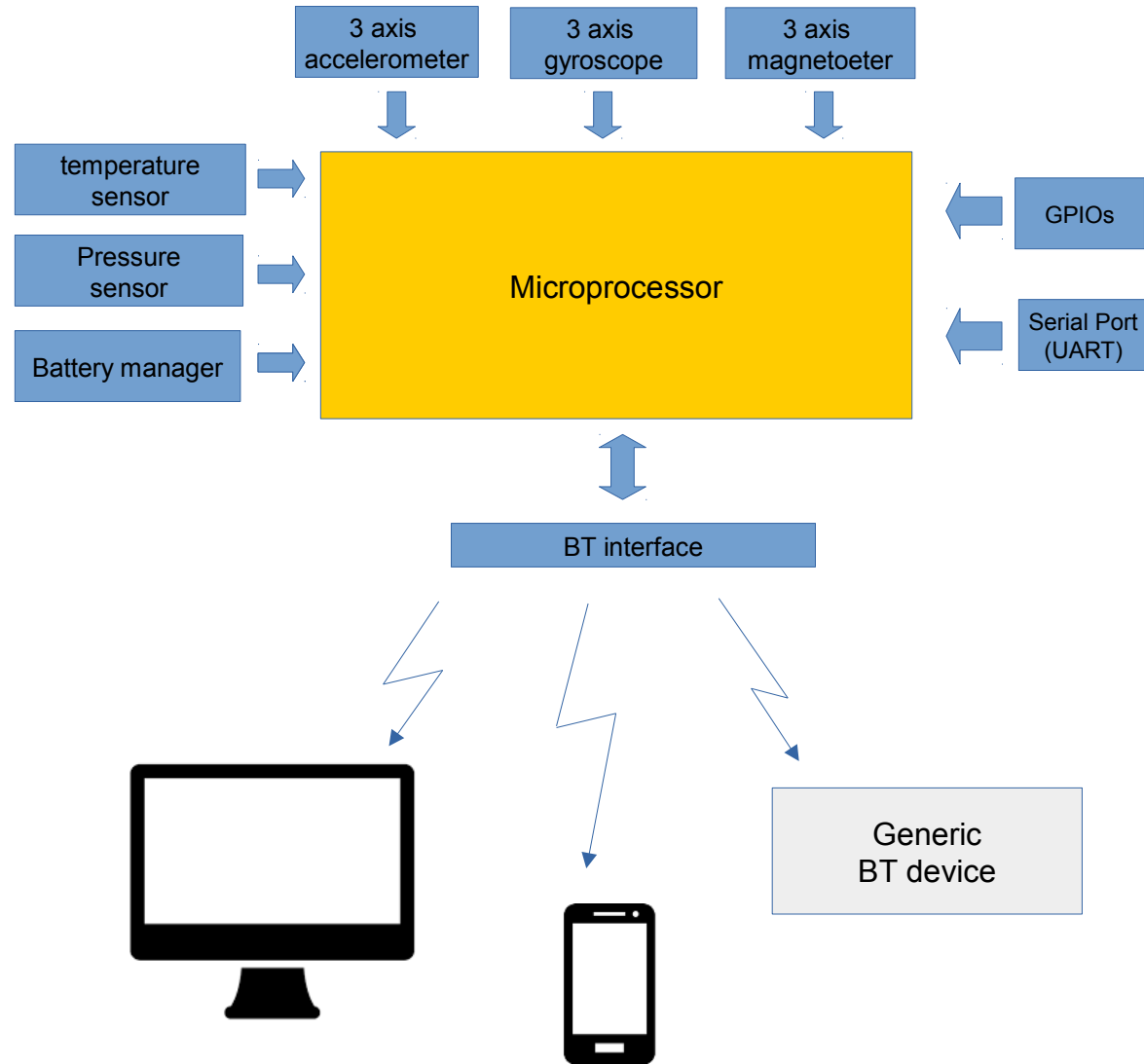


AR/VR

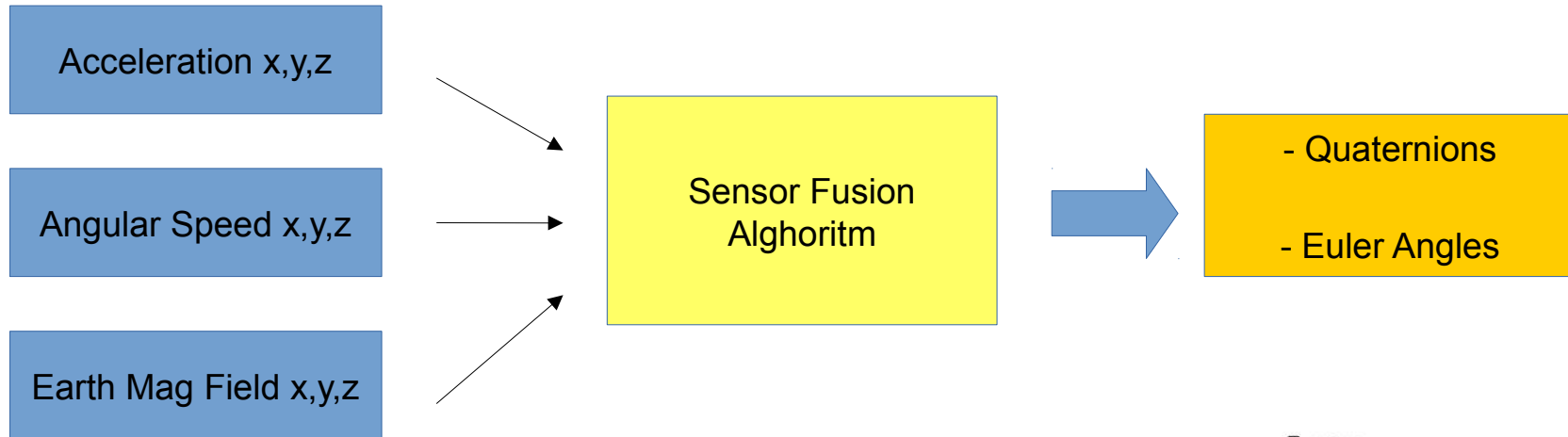
TACTIGON SKIN & TheTactigon One



HW Architecture



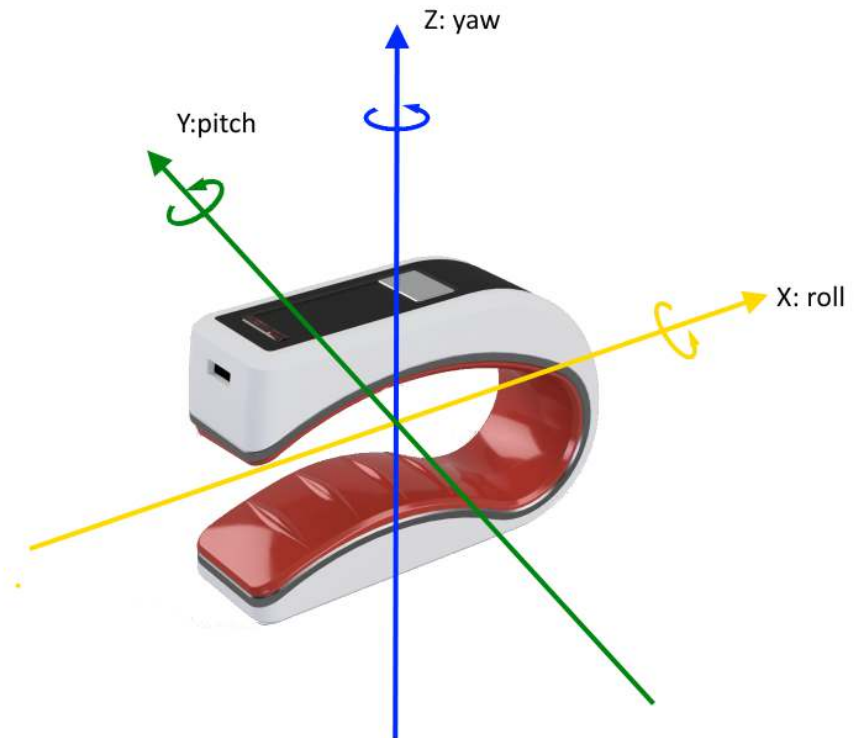
Sensor Fusion Algorithm



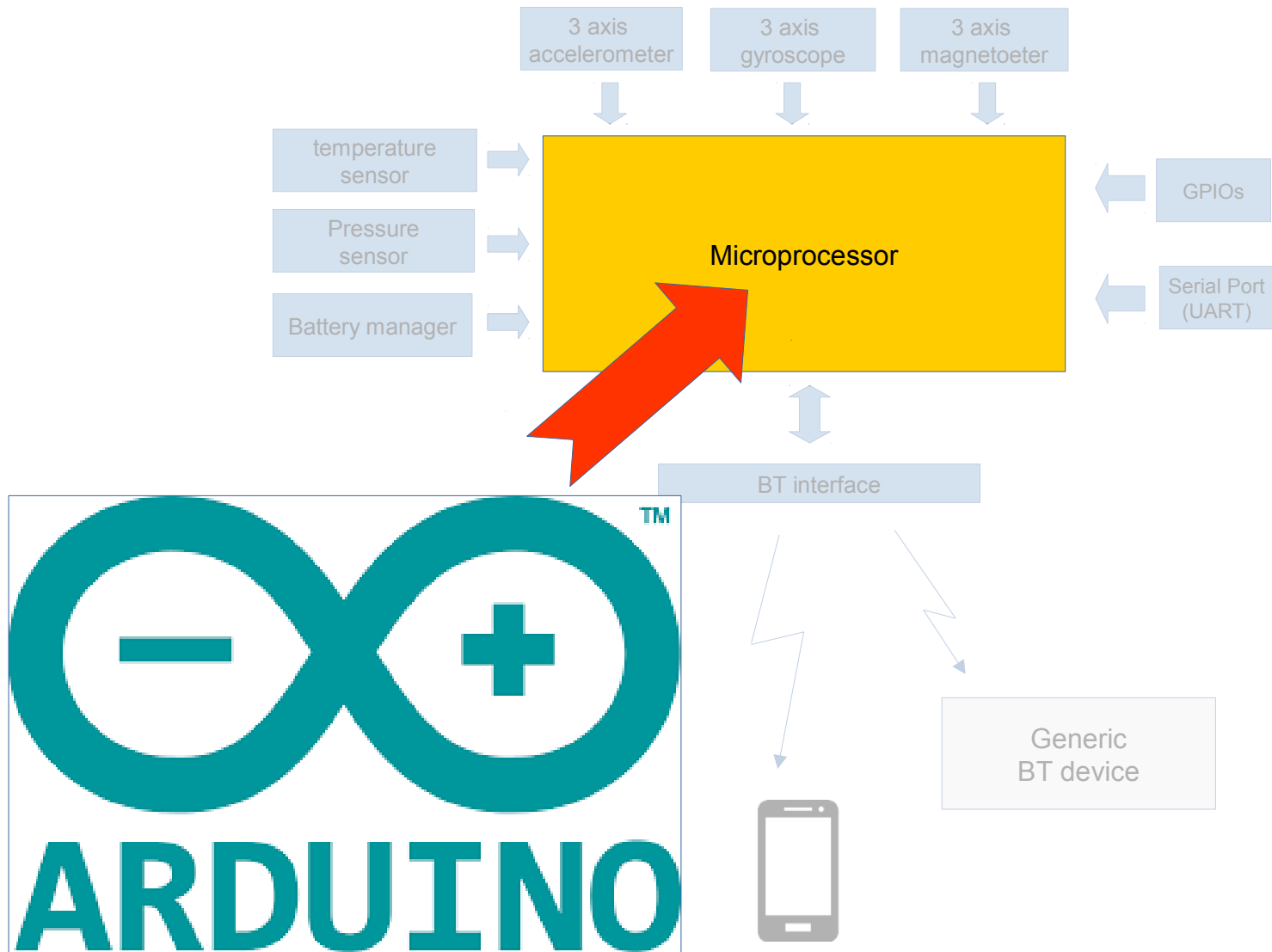
-detection of orientation in the space of the device in terms of Euler Angles: roll, pitch, yaw

- Based on Kalman filter

- Running by default at 50 Hz. Customizable in next API release



HW Architecture



HW Details

Microcontroller:

- STM32
- 32 bit
- 32Mhz

Flash Memory: 512 KB

RAM: 80KB

EEPROM: 16KB

IMU:

- 3 Axis gyroscope (FS: 2000 deg/s)
- 3 Axis accelerometer (FS: 16g)
- 3 Axis magnetometer (FS: 16 Gauss)

Temperature Sensor

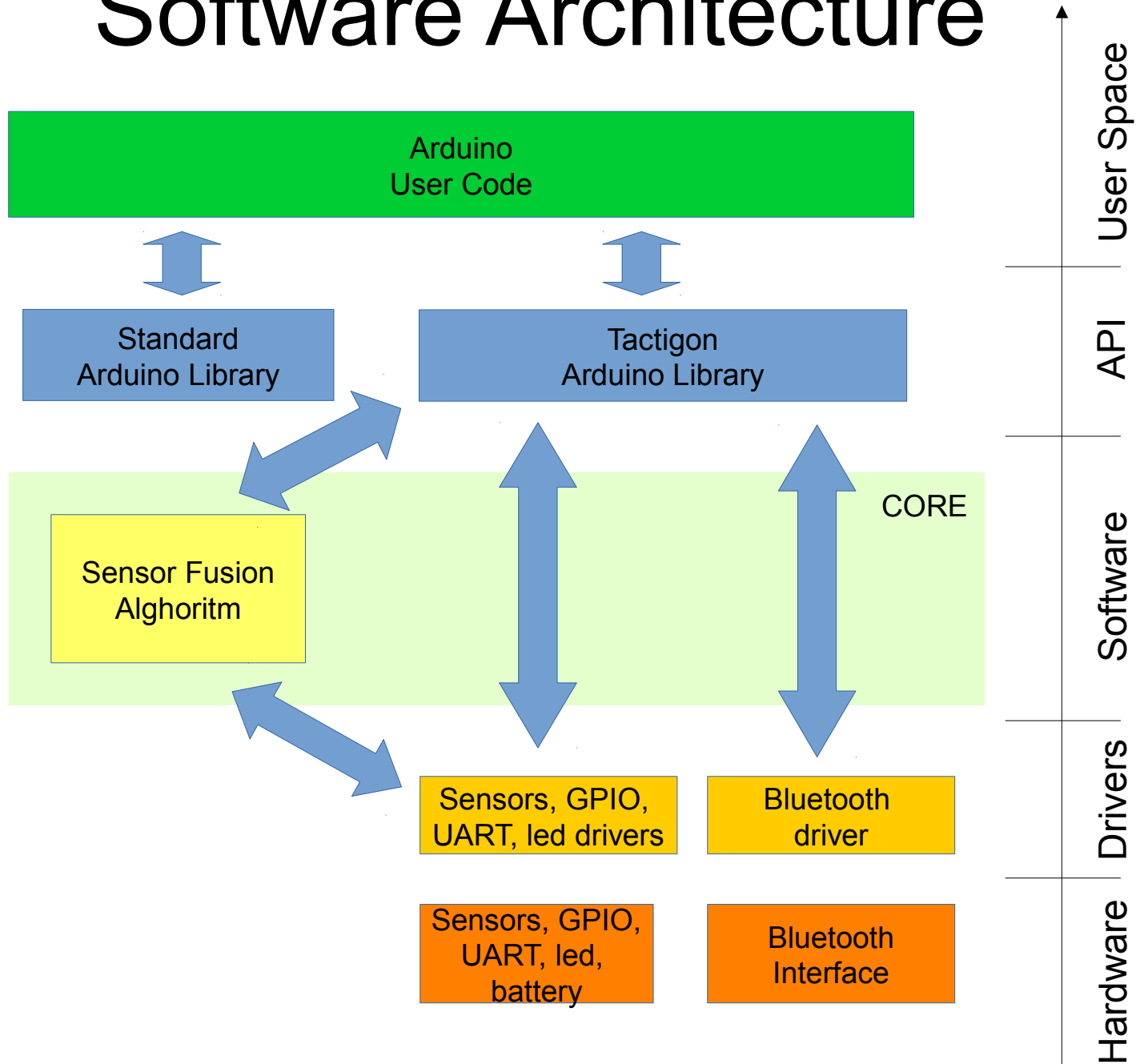
Barometric Pressure Sensor

Connectivity:

- Bluetooth Low Energy
- Up 2 UART
- 4 GPIO

Battery: 3.7 Li Ion Rechargeable via Micro USB connector

Software Architecture



Software Architecture – CORE

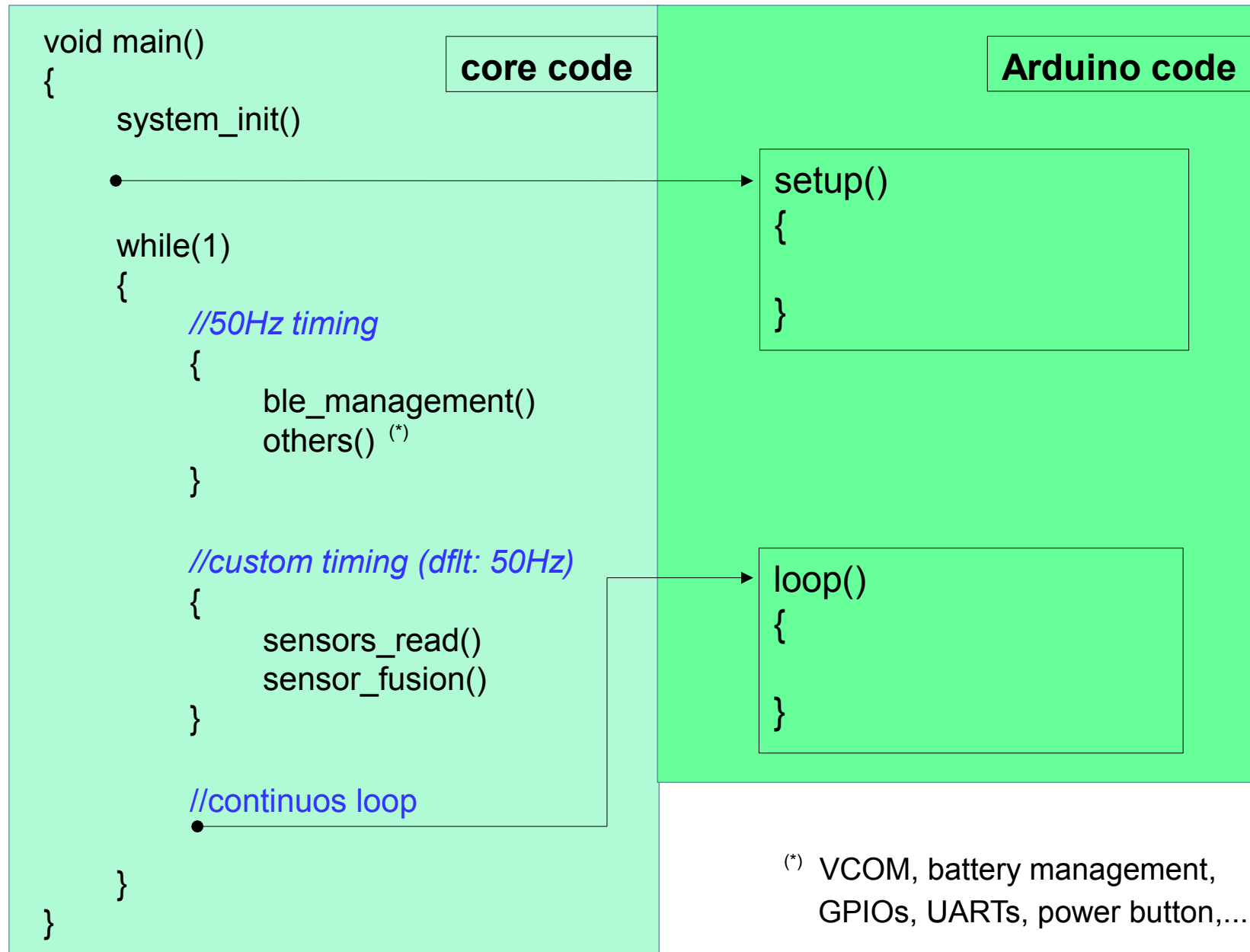
CORE

- ```
{
 - Sensors management: call drivers, get data
 - Sensor Fusion
}

{
 - Battery management
 - BLE management:
 • connection manager
 • Role management (CENTRAL, PERIPHERAL)
 • Read/write BLE characteristics
 - Virtual COM port management for fw downloading and debug
}

{
 - Hook to Arduino setup() function
 - Hook to Arduino loop() function
}
```

# Software Execution

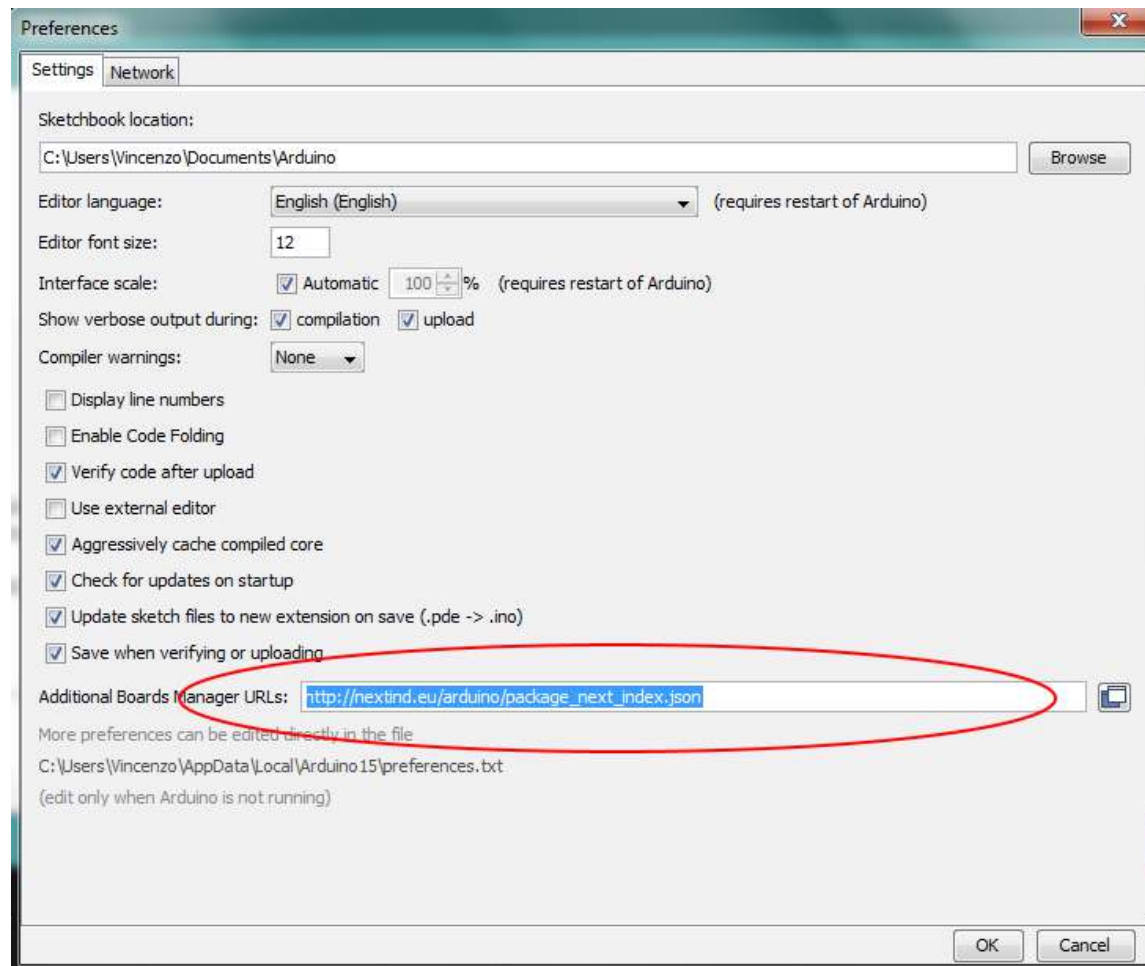


# SDK installation - Arduino config

*File → Preferences*

In “*Additional Board Manager URLs*” add:

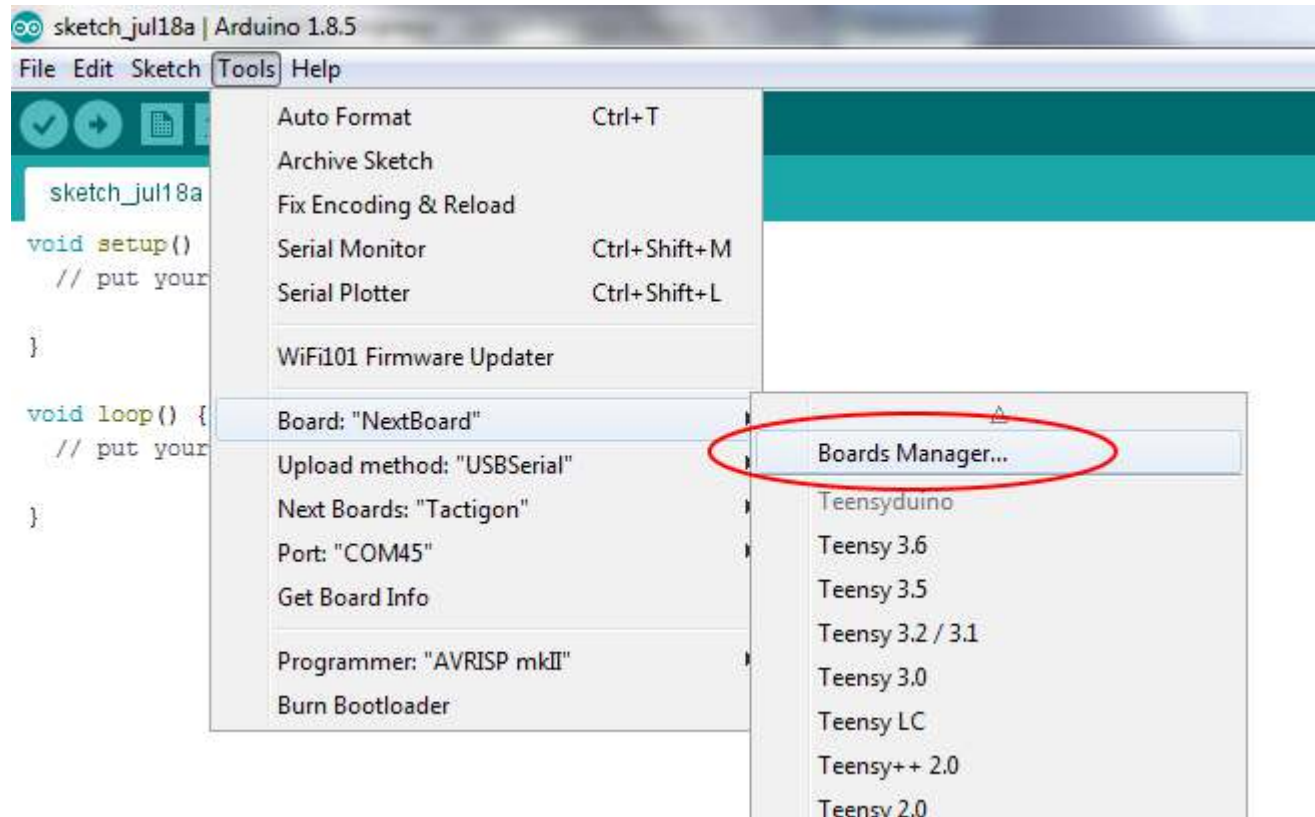
[http://nextind.eu/arduino/package\\_next\\_index.json](http://nextind.eu/arduino/package_next_index.json)



# SDK installation – Board Manager

Arduino IDE is now able to download the SDK by mean of “Boards Manger” tool:

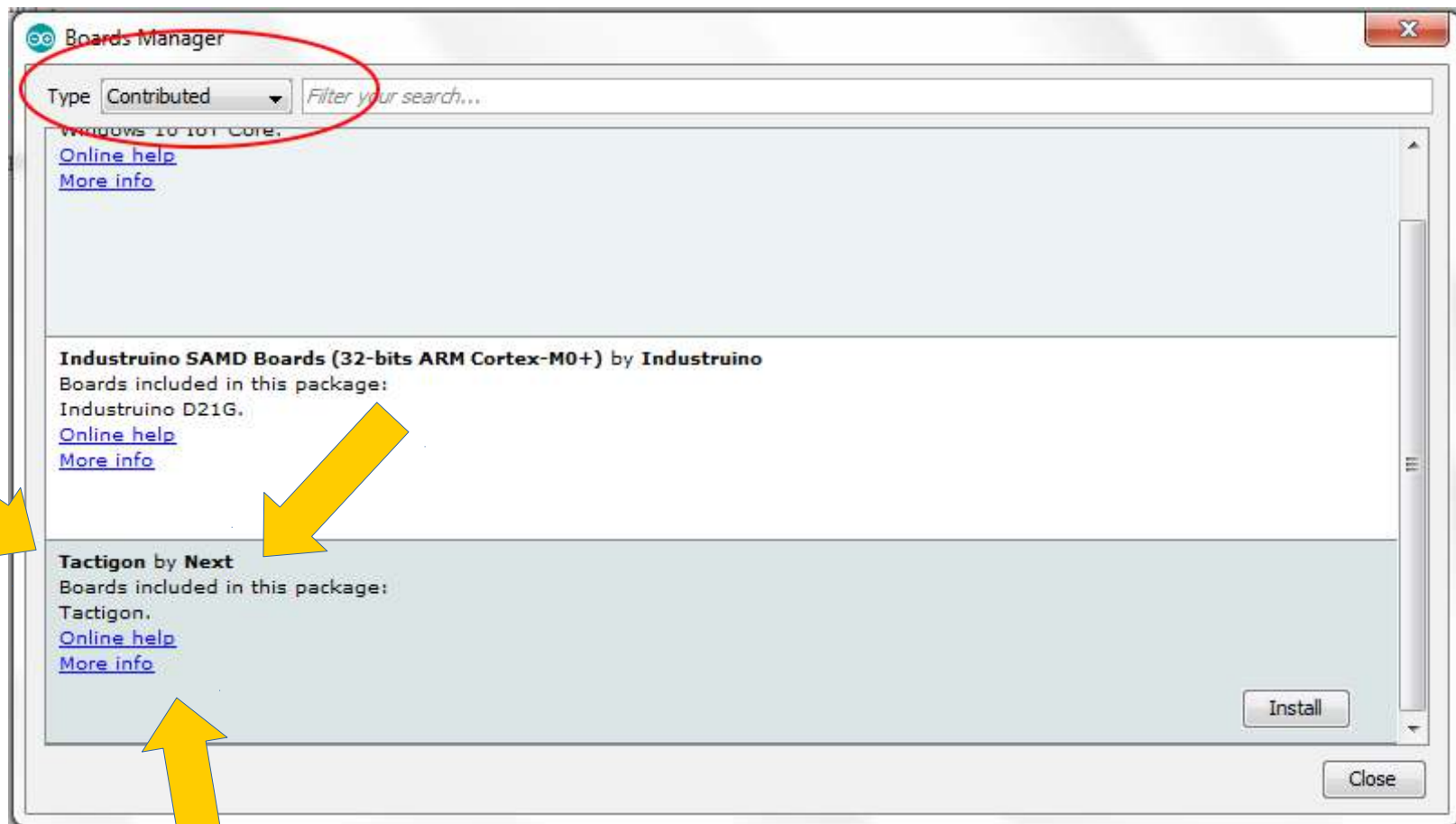
*Tools*→*Board: xxx* → *Boards Manager...*



# SDK installation – Board Manager

In Boards Manager:

- Type: select "Contributed"
- Tactigon board is included in list of supported board
- Click on "Install" to download and install the whole SDK



# SDK installation - Details

Following components are included in SDK:

- Tactigon library
  - API documentation (doxygen; also available at <http://thetactigon.com/arduino/doxygen>)
  - gcc toolchain for STM32
  - USB Driver: STMicroelectronics Virtual COM Port
  - STM32 loader(jtag or Serial via VCOM)
- 
- First whole installation takes about 90MB
  - Updates usually involves only Tactigon library (about 30MB)

At the moment only Windows platform is supported.  
Coming soon Mac & Linux



# SDK installation – VCOM driver

Arduino environment stores all the downloaded boards packages in the following directory:

*C:\Users\<<UserName>\AppData\Local\Arduino15\packages\*

Starting from this folder, Tactigon SDK is in subfolder *.\Next-packages*

VCOM port driver are located in the following subfolder

*.\Next-package\tools\STM32Tools\2018.7.16\tools\win\stlink\ST-LINK\_USB\_V2\_Driver*

# SDK installation – Last Settings

In *Tools* → *Board*:

|                |                      |
|----------------|----------------------|
| Board:         | Next Board -Tactigon |
| Upload Method: | USBserial            |
| Port:          | COM35                |

# SDK installation – Recap

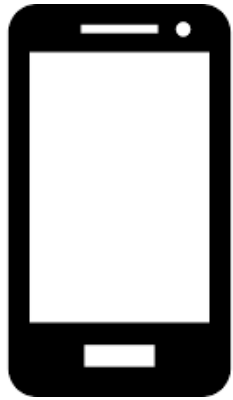
- SDK download via Arduino Boards Manager
- VCOM driver installation
- Board-UploadMethod-Port selection

Detailed step-by-step manual available at:

<https://thetactigon.com/download>

Quick Start Guide – Arduino IDE Configuration

# T-SKIN BLE Peripheral Role



scan

pairing

MAC = {11 22 33 44 55 66}  
BLE\_name = "TACTI"



BLE Characteristics [20 byte]  
128bit UUID

MAC = {11 22 33 44 55 66}  
BLE\_name = "....."

Heart Rate Band

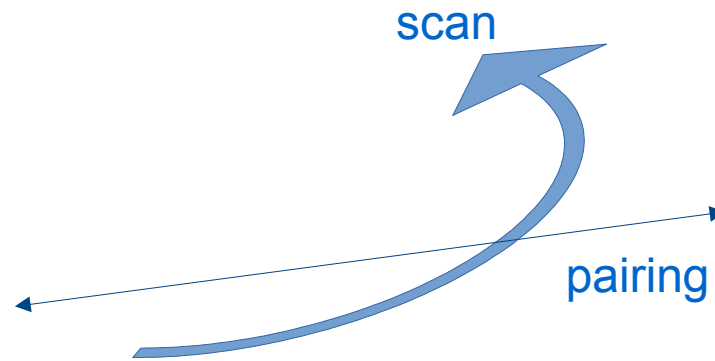
BLE Characteristics [20 byte]  
128bit UUID

MAC = {11 22 33 44 55 66}  
BLE\_name = "....."


SmartWatch

BLE Characteristics [20 byte]  
128bit UUID

# T- SKIN BLE Central role



MAC = {11 22 33 44 55 66}  
BLE\_name = "....."



BLE Characteristics [20 byte]  
128bit UUID

MAC = {11 22 33 44 55 66}  
BLE\_name = "....."

Any BLE devices

BLE Characteristics [20 byte]  
128bit UUID

MAC = {11 22 33 44 55 66}  
BLE\_name = "....."

BLE – COM converter

BLE Characteristics [20 byte]  
128bit UUID

# Raw data Sensors

Acceleration x,y,z

Battery Charge Status

Angular Speed x,y,z

Environment Temperature

Earth Mag Field x,y,z

Barometric Pressure

# LABs

PrintAngles.ino

PrintGyro.ino

BLE\_HelloWorld

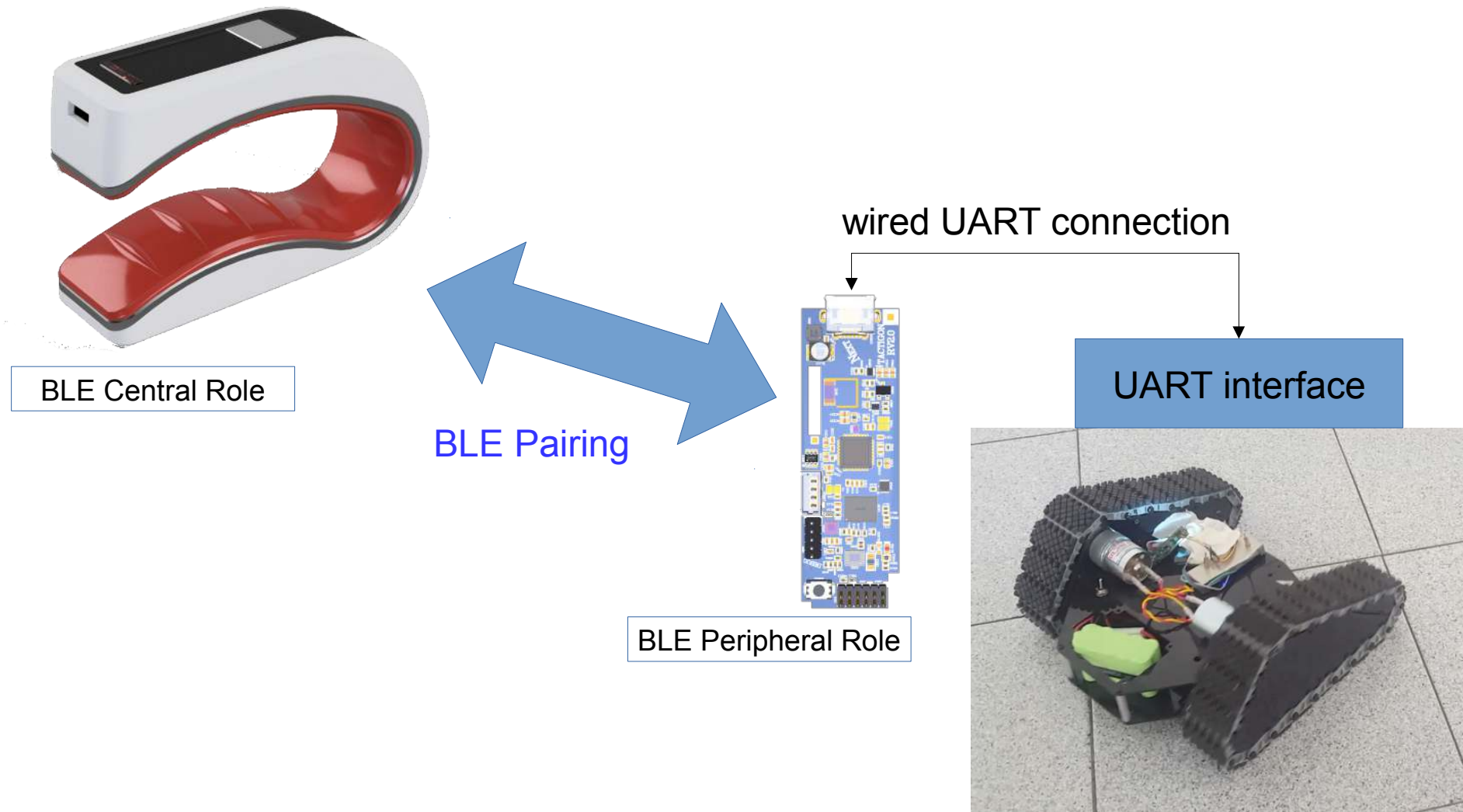
TactigonAcc - Android App

TactigonCube – Android App

CINGO\_controller

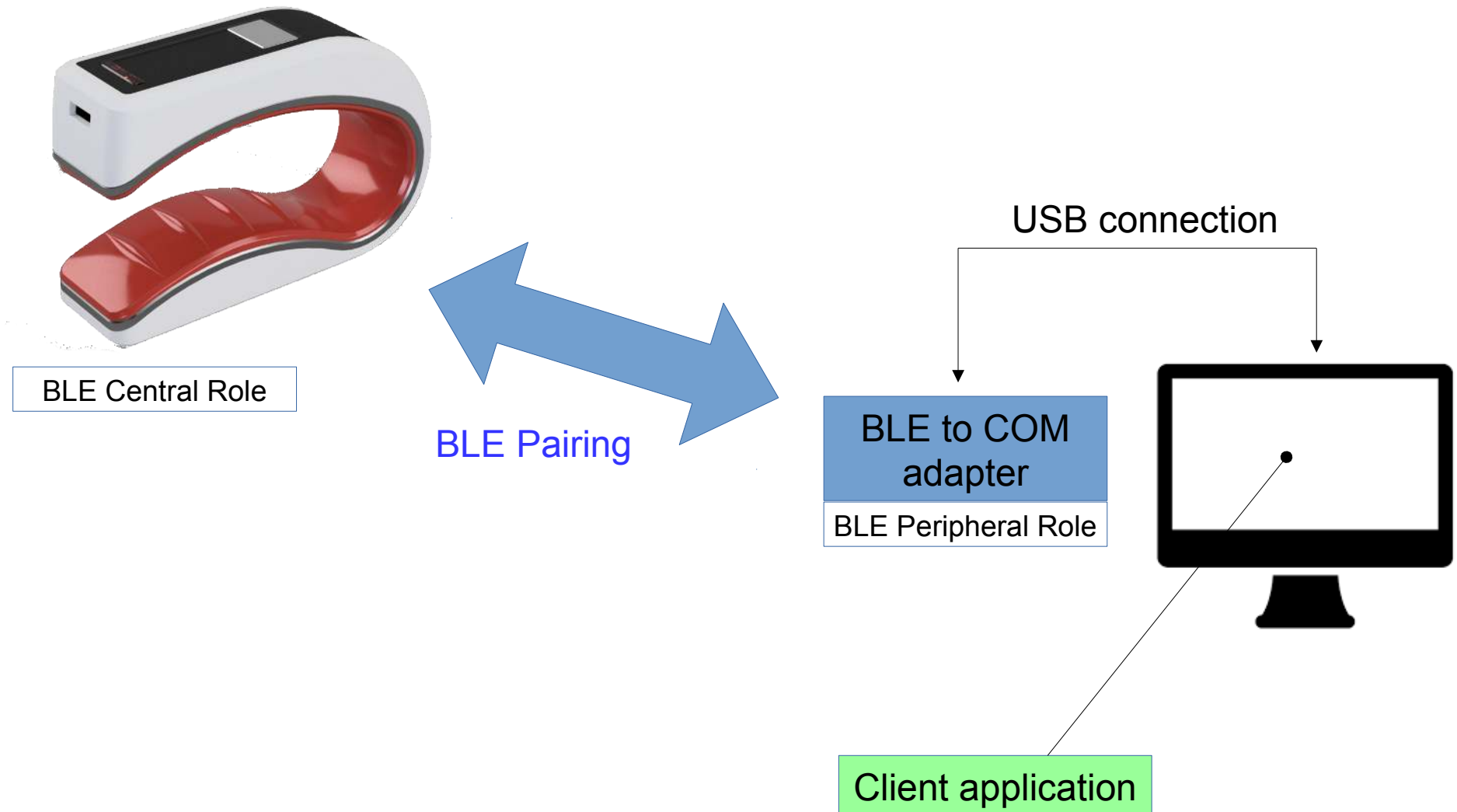
Swipe

# ROVER project



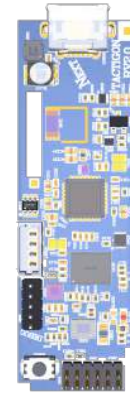


# PC connection project



# Conclusions

- Tactigon board is:
  - Very little
  - Equipped with inertial sensors
  - Powerful: it can run Sensor Fusion algorithm on board
  - Self powered with Lithium battery



Suitable for gesture controller

Arduino: to be open to all possible use cases

Design and ergonomic approach: T-Skin



thank you.