C. Raineri-CTO FAE Technology
ST Dev Conf 2019
Santa Clara-USA

Custom Product Based on SensorTile.box Technology in Real Time-to-Market Mode

AGENDA

1. Company Introduction
2. New Product Introduction cycle
3. NPI boost from FAE Technology
4. SensorTile.box presentation
5. Real use cases
6. Real time to market mode product creation
7. Q&A

FAE TECHNOLOGY

WHO WE ARE

FAE Technology SpA is an Italian electronics design center and manufacturing company.

WHAT WE DO

We manage the complete PCBA or smart device industrialization cycle, from design to mass production. We offer services and solutions for the professional electronics market, from PoC to fullfilment.

PCBA Engineering

The engineering department is oriented towards industrialization and go to market, and is organized to design PCBAs and highly industrialized solutions. All the design steps take place in collaboration with the main players in the sector and thanks to a structured ecosystem of competences the solutions developed guarantee tangible benefits for customers, in terms of cost and performance.

Manufacturing Technology

Manufacturing departments are equipped with the latest generation machines. Processes are flexible and with maximum quality control. We have 4 complete production lines, one of which is dedicated exclusively to rapid prototyping. We also have departments for special treatments such as conformal coating, potting, parametric and functional tests, as well as automated assemblies for the realization of smart devices.

Innovation

We manage innovation through design and this means that research, PoC development, consulting and training are managed through our R&D department.
This guarantee the customer maximum flexibility according to an extremely innovation-oriented approach.

Numbers

3 Production plants

27% Average growth over the past 3 years

33 Average age of employees

40 Avarage design orders per year

85 Employees

110 Customers

5000 Mq total covered area of the plants

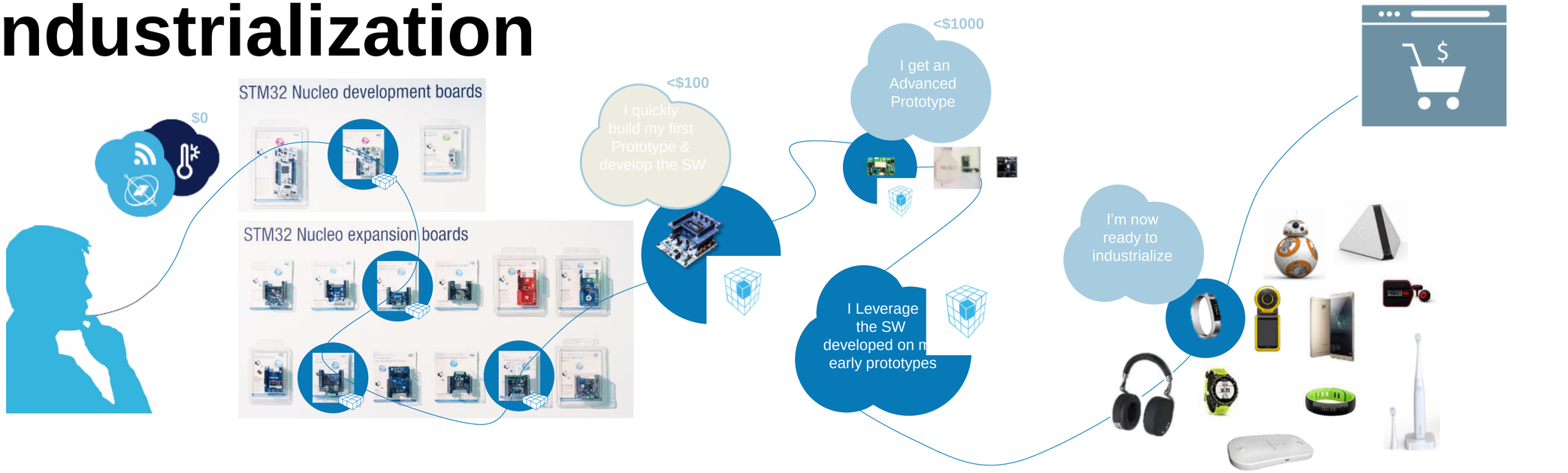
800.000 Chip mounted per day

14.000.000 Euro total revenues in 2018

New product introduction cycle

FAE TECHNOLOGY

From idea generation to product industrialization



Idea

Open hardware tools

Hardware prototype & development

Industrialization & validation

Go to production

Very expensive in terms of time and money!

FAE TECHNOLOGY

The R&D traditional approach (best case)

DOCUMENTATION PHASE

- Step 1: Study of the new technology
- Step 2: Purchase of the Eval Board
- Step 3: Startup of the Eval
- Step 4: Development on Eval
- Step 5: Test application on Eval

DEVELOPMENT PHASE

- Step 6: Custom PCBA HW design schematics
- Step 7: Custom PCBA HW design layout

DEVELOPMENT PHASE

- Step 8: Custom PCBA production
- Step 9: Custom PCBA HW tests
- Step 10: Custom PCBA FW porting
- Step 11: Custom PCBA Application tests
- Step 12: Custom PCBA review

VALIDATION PHASE

- Step 13: Custom PCBA validation
- Step 14: Market field test

VALIDATION PHASE

- Step 15: Mass production

1 year and about 100k€!

FAE TECHNOLOGY

NPI Boost from FAE Technology

How do we boost new product introduction cycle?

We created two innovative programs to accelerate design and manufacturing in order to speed up time to volume and then to boost the new product introduction:

- Product Accelerator Program
- FAST PCBA Program

FAE TECHNOLOGY

PRODUCT ACCELERATOR PROGRAM

To accelerate technology transfer and speed up product cycle development, offering the fastest and reliable way for the go to market of a new idea.

FAE TECHNOLOGY

Product Accelerators are easy to develop like an evaluation board and ready to PoC because are industrialized, boxed and certified.

FAST PCBA Program allows to produce electronics board on-line with few simple steps.

RE-DEFINE ELECTRONIC PCBA PROTOTYPING

Thanks to a complete digital interface connected to a dedicated area, easily is possible to access to a service faster and cheaper.

QUOTE AND ORDER YOUR PCBA ONLINE NOW

Dual phase acceleration pipeline

PRODUCT ACCELERATOR PROGRAM

Try your idea on our technology

PoC

Our R&D for Innovation department using product accelerators and years of experience can offer to our customer the best way to test their ideas in the market with minimum time and cost.

PoC phase takes on average 2 months

FAST PCBA PROGRAM

Engineering

Starting from the technology core of the product accelerator used for the PoC our engineering department can industrialize the custom PCBA required by the customer ensuring target price per volume and guaranting the shortest time to market.

Industrialization phase of the PoC takes on average 4 months

FAE TECHNOLOGY

The “accelerated” approach of FAE Technology: PoC steps

PoC

New technology intro from FAE Tech

Step 1

Startup of the PA

Step 2

Development on PA

Step 3

Test application on PA

Step 4

Market field test with PA

Step 5

Mass production with PA

Custom board based on PA

*Step **6***

2 months on average and minimal R&D investment!

FAE TECHNOLOGY

The “accelerated” approach of FAE Technology: Engineering steps

Engineering

Custom PCBA HW design schematics — *Step 1*

Custom PCBA HW design layout — *Step 2*

Fast PCBA production — *Step 3*

Custom PCBA FW porting — *Step 4*

Custom PCBA validation — *Step 5*

Mass production — *Step **6***

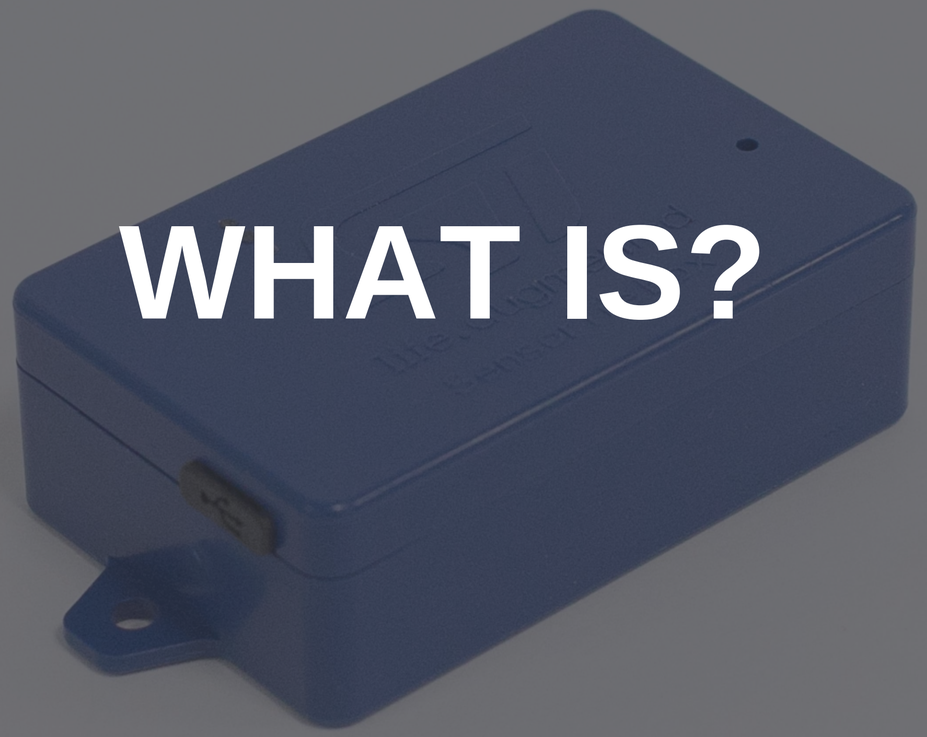
4 months on average, low risk in time & cost and minimum time to market!

FAE TECHNOLOGY

FAE TECHNOLOGY

SensorTile.box

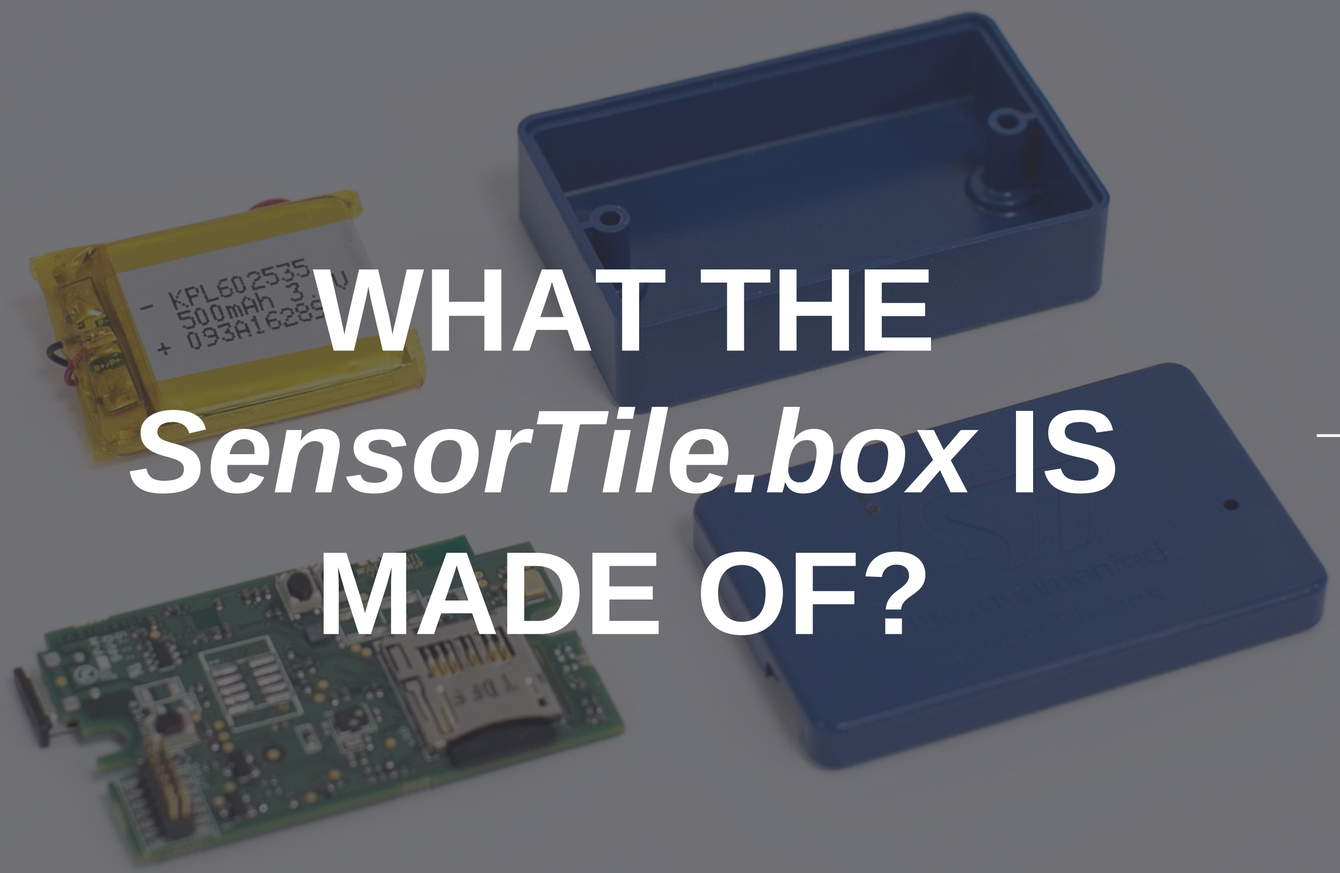
FAE TECHNOLOGY



WHAT IS?

Wireless multi sensors product accelerator with user friendly APP for IoT and wearable sensor applications

FAE TECHNOLOGY

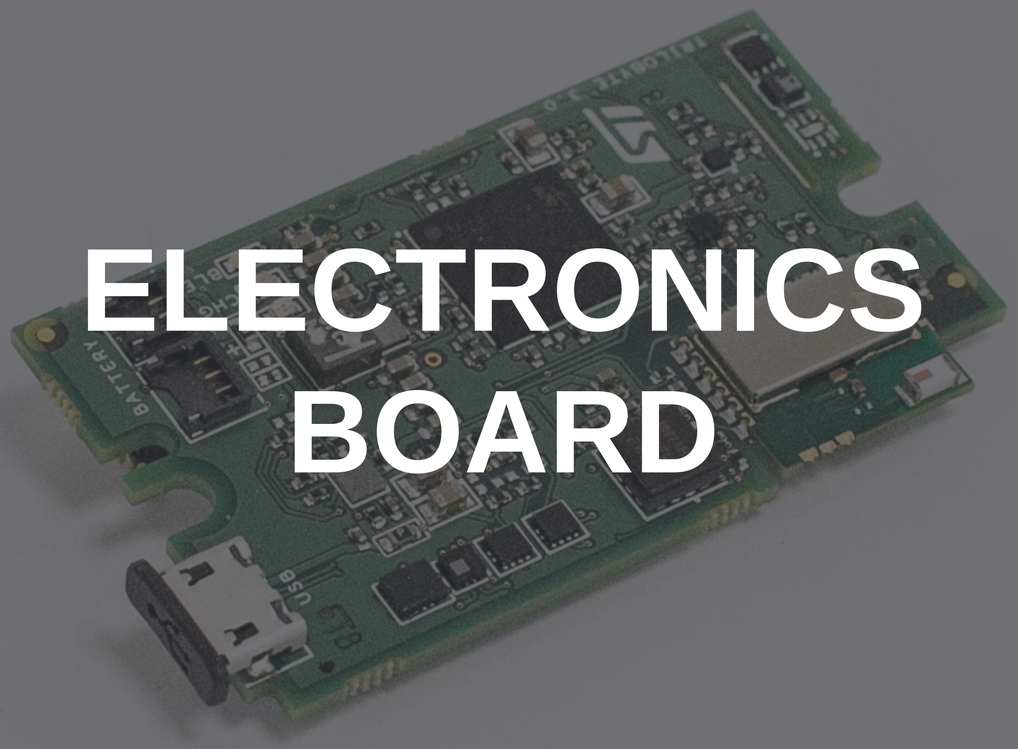


WHAT THE *SensorTile.box* IS MADE OF?

SensorTile.box is made up of these elements:

- Electronics board
- Li-Ion rechargeable battery
- Plastic housing with dual cover
- Mobile APP

FAE TECHNOLOGY



ELECTRONICS BOARD

State of the art microcontroller and MEMS sensors embedded in the SensorTile.box

- STM32L4R9ZIJ6 Ultra-low-power with FPU ARM Cortex-M4 MCU 120 MHz with 2048 kbytes Flash
- SPBTLE-1S Very low power application module for Bluetooth® Smart v4.2
- STTS751 digital temperature sensor
- HTS221 Capacitive digital sensor for relative humidity and temperature
- LIS3DHH High-resolution, highstability 3-axis digital inclinometer for industrial applications
- LIS2DW12 3-axis MEMS accelerometer
- LIS2MDLTR high performance 3-axis magnetometer
- LSM6DSOX iNEMO 6DoF inertial measurement unit (IMU), with advanced Digital Function, Finite State Machine. Ultra-low power and high accuracy and Machine Learning Core
- MP23ABS1TR High performance MEMS audio sensor single ended analog bottom-port microphone with Wide band analog audio amplifier
- USB
- Li-Ion battery connector
- STBC02AJR Li-Ion linear battery charger with LDO, load switches and reset generator
- STBB3JR 2MHz, high efficiency dual mode buck-boost DC-DC converter.
- JTAG STM32
- LEDs
- User button
- Boot button
- Power Button
- 8GB Micro SD card

FAE TECHNOLOGY

PLASTIC BOX

SensorTile.box plastic box has two parts:

- Cover
- Base

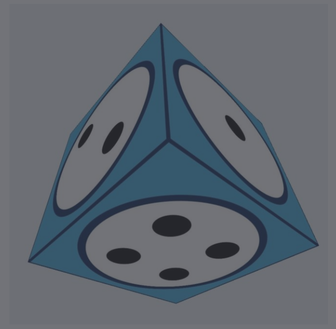
The package include also a second base with flanges for wall connection using screws.

DIMENSIONS: 2,38’’x1,45’’x0,80’’
(58mm X 37mm X 20,5mm)

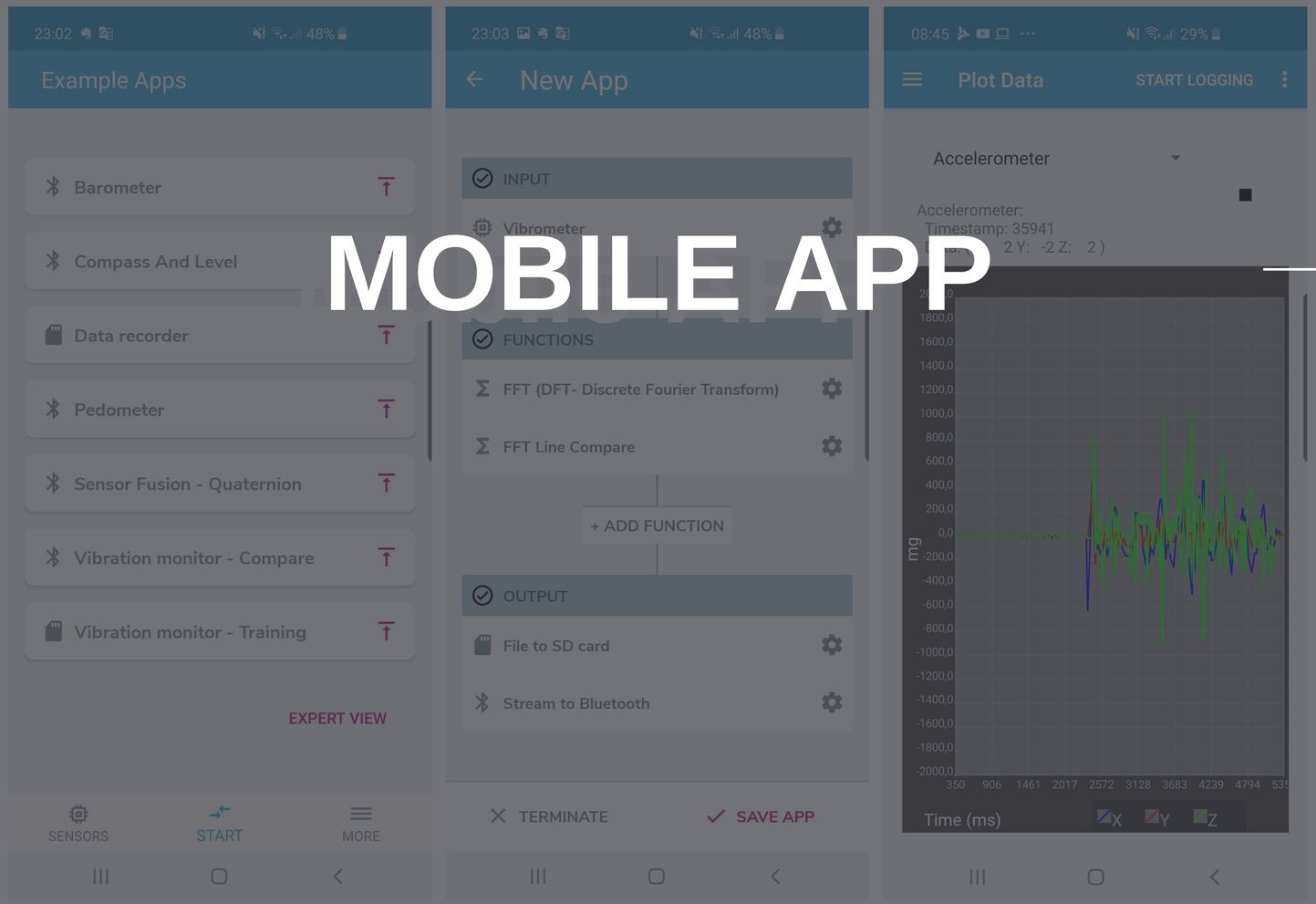
MATERIAL: ABS AF312A

INTERNATIONAL PROTECTION: IP 54

FAE TECHNOLOGY



MOBILE APP



SensorTile.box can be managed by using a software platform that offers two unique modes:

- Entry
- Expert.

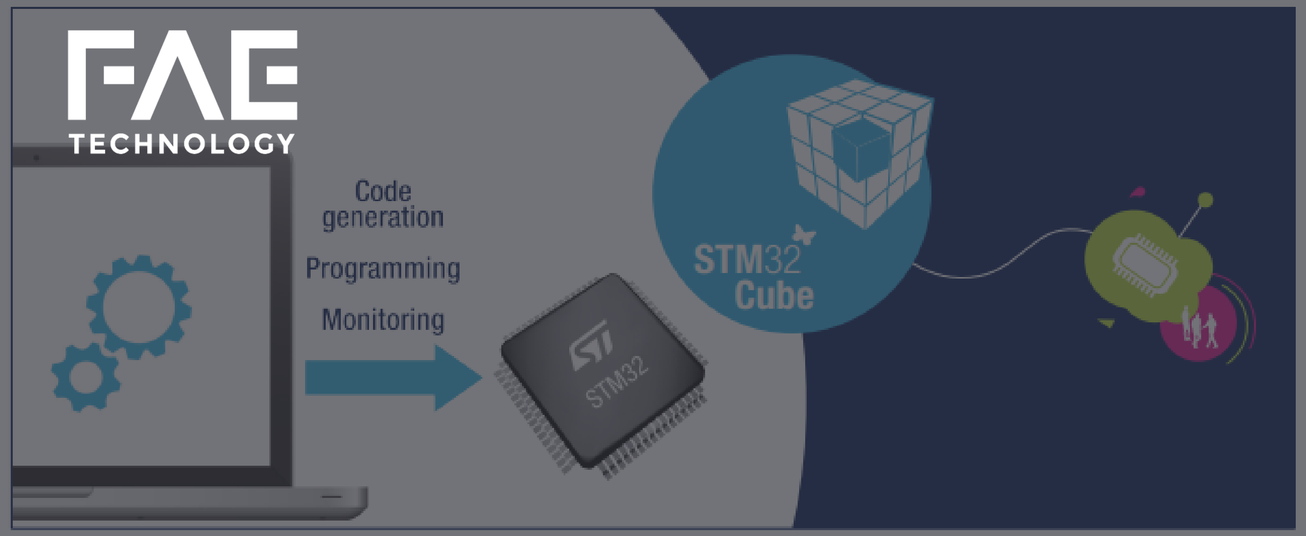
ENTRY MODE (ANYONE)

- Library of preconfigured applications
- Select, download and start using SensorTile.box
- No experience or coding knowledge are needed
- Asset tracking, predictive maintenance, motion sensors and pattern recognition.

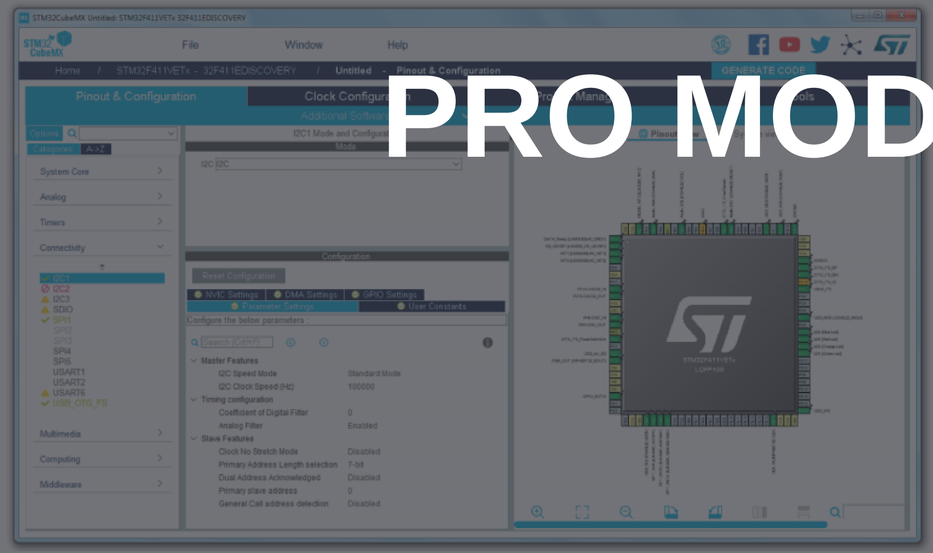
EXPERT MODE (“PROFESSORS”)

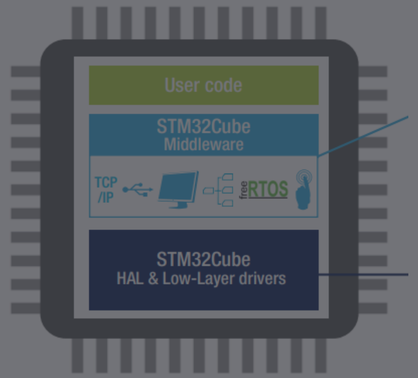
- **More complex but still doesn’t require an IDE or the input of C code**
- **Creation of user application through a graphical interface**
- **Input-function-output approach**
- **Mathematical and AI functions available**

ENTRY AND EXPERT MODES HELP ANY USER TO INTERACT WITH LATEST MEMS SENSORS IN ORDER TO CREATE IOT PoC IN MINUTES



PRO MODE





Windows

macOS®

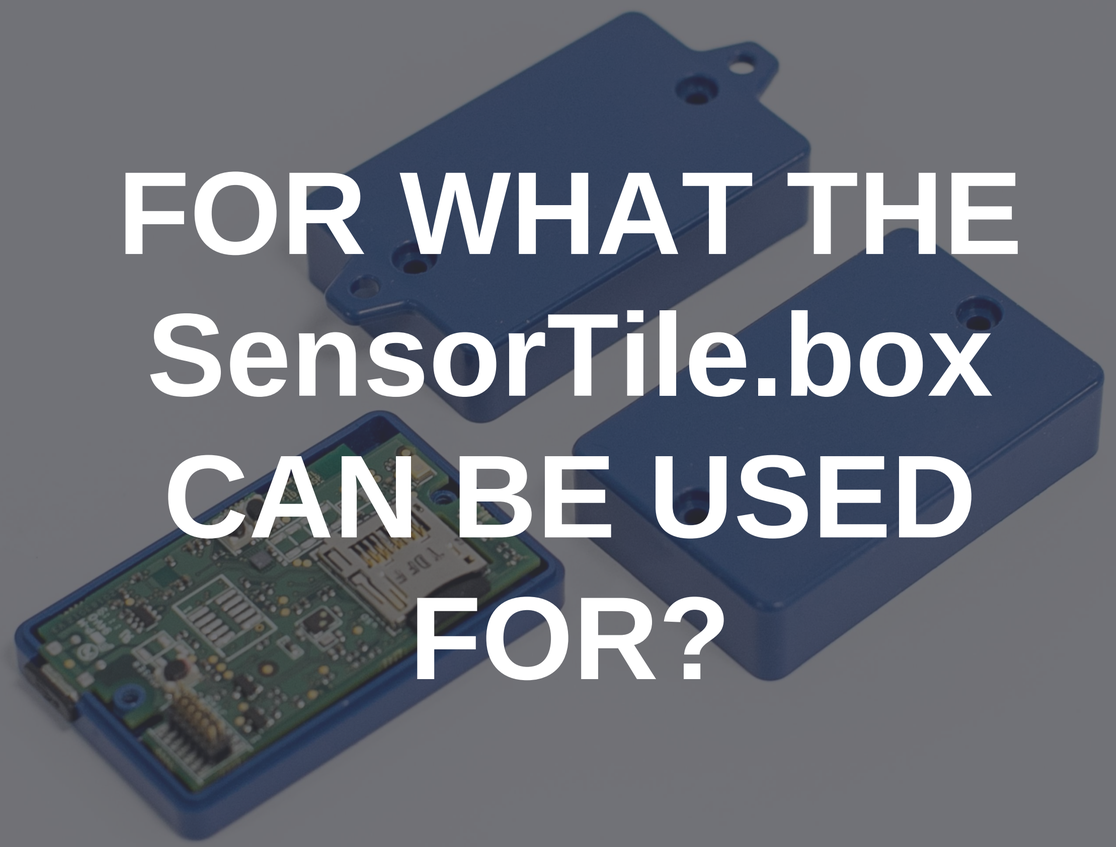
PRO MODE (FW ENG & DEVELOPERS)
Using ST-Link V3 programmer & debugger the developer can write code and debug applications.

SensorTile.box can be programmed and debugged as any other STM32 electronics board using standard development tools, part of the STM32 ODE.

- STM32Cube: set of tools and embedded software bricks available free of charge.
- STM32CubeMX: grafhical UI and code generator
- STM32Cube MCU specifica package for each series (L4 for SensorTile.box)

SensorTile.box IS READY FOR STM32CUBE.AI THAT IS AN EXTENSION PACK OF THE STM32CUBEMX CONFIGURATION AND CODE GENERATION TOOL ENABLING AI ON STM32L4+.

FAE TECHNOLOGY



FOR WHAT THE SensorTile.box CAN BE USED FOR?

Easy-to-use APP with immediate functionality for the following motion and environmental sensor applications:

- Pedometer optimized for belt positioning
- Baby crying detection with Cloud AI learning
- Barometer / environmental monitoring
- Vehicle / goods tracking
- Vibration monitoring
- Compass and inclinometer
- Sensor data logger

SensorTile.box Real use cases

- Climbing track application on Everest.
https://blog.st.com/live-updates-luca-colli-everest/

- Driver and car sensor application for analysis on Millemiglia race.
https://www.facebook.com/STMicroelectronics.NV/posts/2687968567897623

- Inertial profiling

- Vibration analysis on industrial machinery

- Ultrasound analysis

FAE TECHNOLOGY

Real-Time To Market mode product creation

FAE TECHNOLOGY

SERVICES OFFERED FOR SensorTile.box

- Custom design and production of electronics based on SensorTile.box technology
- Custom software development
- Creation of a customized version of the APP that interacts with the device
- Custom creation of the box

Real-Time to market for a product based on SensorTile.box

HW REVIEW

New schematics, new layout,

5 prototypes and tests

6wks

NEW CERTIFICATION

FCC/RED

8-12wks

FW/APP DEV

Hours Packs

HOUSING REVIEW

New prototypes (up to 100 pieces) in 2-4 wks

Mass production (1kpcs/week) in 6-8 wks

FAE TECHNOLOGY

Thanks!

FAE TECHNOLOGY S.P.A

Via C. Battisti, 136 - Gazzaniga (BG) - 24025 – Italia

P.IVA 02032310167 - T +39 035 73 81 30

info@fae.technology - www.fae.technology