TRASNA
THE FUTURE OF IOT

IOT SYSTEM-ON-CHIP PLATFORM

As IOT has expanded into industrial applications, several challenges need to be addressed, including the need for more connected, secure and affordable devices that can handle 5G and Hybrid IOT networks. Additionally, one must ensure that these devices and their related services have trusted identities, and can be deployed and interacted securely without having to worry about the IOT development costs and complexity needed to unleash the full potential of IOT.

TRASNA SOC Platform has been developed to meet all of these requirements, while offering the lowest bill of materials to the market to scale up the deployment of massive IOT.
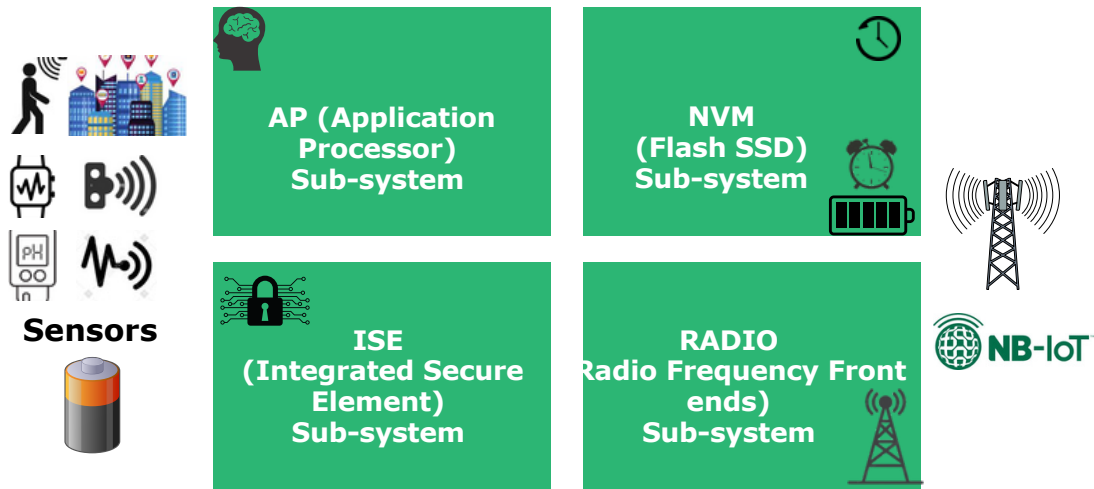
FOR NB-IOT DEVICES

TURNKEY SOLUTION SOC FOR DEVICE MAKERS

The emergence of 5G has facilitated huge NBIOT opportunities in which networks can meet the communication needs of billions of connected objects and where the NBIOT is part of 5G specifications. TRASNA NBIOT SOC family has been designed with the following objective :

> Build an all-in-one NBIOT SOC solution allowing the execution of multiple applications running in ultra low power mode for longer life battery (10-year support) while enabling edge computing and optimizing the die size for cost-efficiency.

TRASNA new SAFE012M is a very small SOC embedding advanced components such as RISC-V Application processor, NBIOT Radio, iSIM and GNSS, embedded Flash with required software and services to operate securely.

FULLY INTEGRATED SOC EMBEDDING 4 SUBSYTEMS

Sensors

AP (Application Processor) Sub-system	**NVM (Flash SSD) Sub-system**
ISE (Integrated Secure Element) Sub-system	**RADIO Radio Frequency Front ends) Sub-system**

NB-IoT

FEATURES

Application Sub-System

- RISC-V CPU core running at @266MHz (CORTEX M4 level)
- 1 Mbyte of NVM Memory with 100K Endurance capability
- 128 Kbyte of Executable & Data RAM
- Integrated 6-Channel DMA for Memory fast access
- Hardware 32-bit CRC
- 2 QSPI, 1 I2C / I3C, 1 UART / USART

Radio Sub-System

- CPU Core @160MHz
- 884 Kbyte of NVM
- 256 Kbyte of Executable and Data RAM
- ISO7816 USIM reader interface.
- Up to 9 GPIOs
- Radio range from 450 to 2200 MHz
- **Handling Software Defined Radio (SDR)**
- **Delivered with proven NBIOT R15 stack**

Embedded Flash Memory Sub-System

- 2 Mbyte of shared NVM for the 3 Sub-Systems
- 64-bit Read
- 4 Kbyte sectors
- 10 years Data Retention
- 100K NVM native endurance
- Endurance improvement through the Retention RAM(s) usage

Tailored Secure Processor Sub-System

- RISC-V CPU core @200MHz (CORTEX M3 level)
- 140 Kbyte of NVM
- 156Kbyte of Executable & Data RAM.
- Encrypted storage of iSE NVM content & secure download from NVM to RAM.
- Cryptologic algorithms through several approaches (full Software computation, accelerated computations with specific instructions and co-processors, full hardware solution for symetrics algorithms and Hash)
- **Proven iSIM stack already deployed for millions of devices**

KEY CAPABILITIES

- **GNSS Capabilities, GPS - L1, Beidou - B1, Galileo - E1, Assisted and standalone modes**
- **FOTA (Firmware-Over-The-Air) support**
- **PUF solution that eliminates the need of enrolement phase**
- **Ultra Low-Power modes (10 years lifetime on battery)**
- **Edge computing capability thanks to high computing power**
- **AI-on-Device**
- **Blockchain-on-Device**

FOR ANY KIND OF RF DEVICES

Since the SAFE012M is purely optimized for NBIOT, our next-generation SOC SAFE022M is aimed at addressing more RF interfaces as IOT requires different kinds of continuously evolving connectivity options.Each of these options has a range of advantages and disadvantages and do not fit for any use case. It is necessary to evaluate the best IOT wireless technology solution for your particular use case and business scope. TRASNA SAFE022M has been designed with the following objective :

Provide a fully flexible 3-Core Secure SOC architecture, allowing device makers to have one platform for any type of RF by reusing the entire software and adding the analog RF companion chip.

Very small footprint SOC including high-performing RISC-V application processor, an iSIM, GNSS and embedded Flash offering seamless connectivity through any kind of Radio (Analog) Companion Chip (LORA, BT, WIFI, NBIOT, CATM, LTE, ZIGBEE, DASH7 and other sub-GHz Radios, GNSS …).
With its wide range of RF capabilities, TRASNA SAFE022M can be used for many different applications with possible reuse of developments between applications.

- The Multi-core processor SOC reuses the same family of IPs and a similar architecture than the NBIOT SOC (SAFE012M) chip: 2 General Purpose Processor sub-systems, 1 Secure Enclave sub-system.

- In addition to the GP1, the GP2 sub-system has specific DSP capabilities to handle Radio support (DSP Accelerators) and some specific interfaces to connect to RF front-end chips (JESD207) and external SIM (USIM).

FULLY FLEXIBLE 3-CORE SECURE SOC ARCHITECTURE
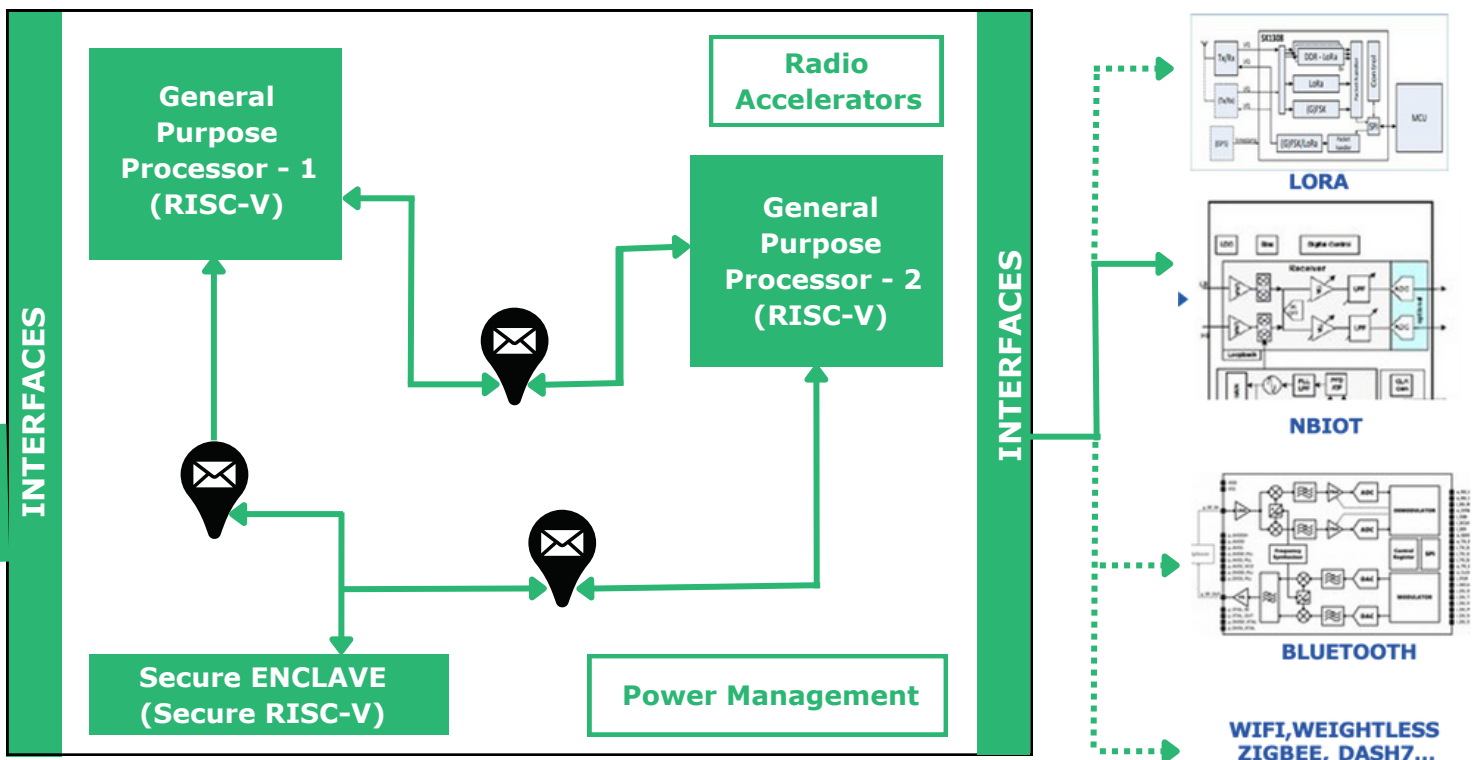
- Can connect to any kind of Radio (Analog) Companion Chip (LORA, BT, WIFI, NBIOT, CATM, LTE, ZIGBEE, DASH7 and other sub-GHz Radios, GNSS …).
- Radio DSP treatment can be handled by the GP2 processor thanks to the Radio accelerators.
- Radio Protocol Stack can be also handled by the GP2 processor.
- GP1 is more "dedicated" to the main application.
- GP2 uses standard JESD207 interface + SPI for Radio Companion control.
- Can also be connected to monolithic Radio chip (including stack) through SPI.

EVALUATION BOARD AND SOFTWARE DEVELOPMENT KIT (SDK)

TRASNA software development kits (SDKs) provide all the components needed to start embedded system development.

A generic SDK development board with a lot of peripherals and a demo board with a limited set of peripherals but better form factor.

- The THALIB driver layer provides a complete set of ready-to-use APIs that simplify the user application implementation.
- Device Drivers is a set of drivers used on our Evaluation Kit.
- All BSP (Board Support Package) for Trasna Evaluation Kit.
- Middleware component like RTOS support.

UNLEASH YOUR TALENT WITH
TRASNA IOT SOC PLATFORM !
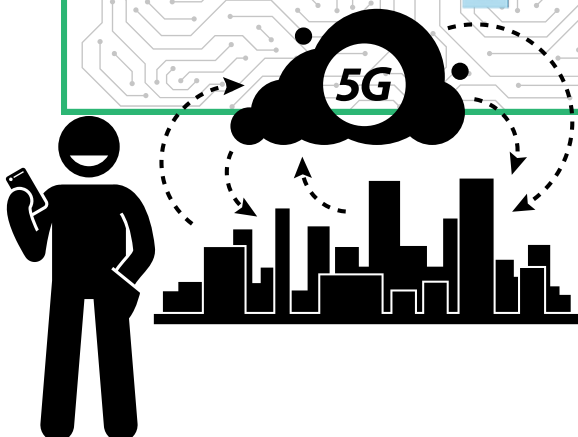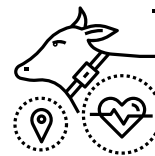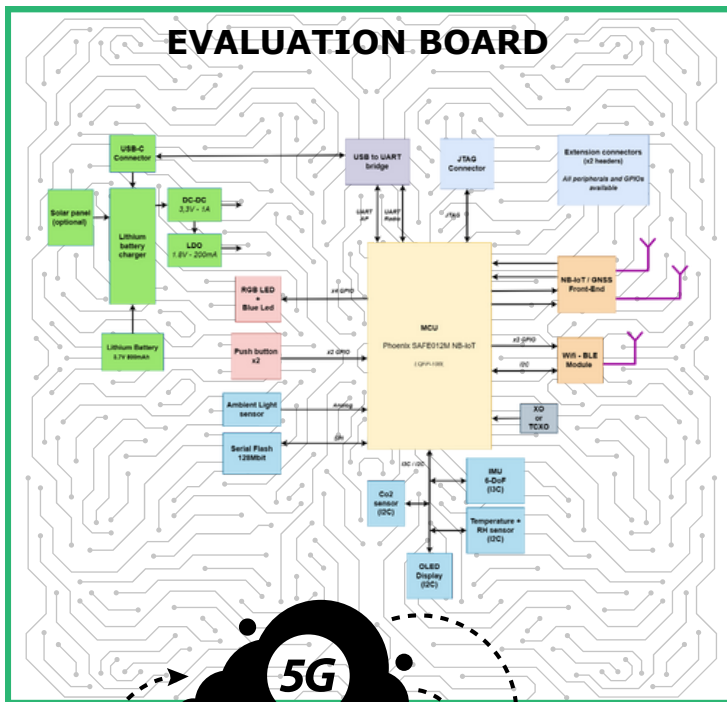
TRASNA THE FUTURE OF IOT

QUALITY ✓

We provide top quality at competitive prices. Thanks to economies of scale, we can maximise operational resource efficiency.
Quality is in our DNA!
We do continuous testing on our products (BAP cards, new materials, field & environmental testing).
Our Quality Assurance Unit, who are experts in modem behavior, can manage your test plan or help you to define one.

SUSTAINABILITY ✓

We consider the environment in every aspect of our business: when we design our products, when we select our suppliers, and when we participate in any project! We want to be an active contributor to the Sustainable Development Goals (SDGs) set by the United Nations, which defines global sustainable development priorities and aspirations for 2030

ABOUT TRASNA

TRASNA is focused on Technology leadership providing semiconductors and its related software and services solutions for IOT mass deployment. TRASNA combines innovation in semiconductor design, secure Software, edge computing, AI and blockchain integration to deliver the most innovative and optimized System-On-Chip (SOC) to take advantage of huge IOT opportunities facilitated by the emergence of 5G in which networks can meet the communication needs of billions of connected objects and where the NB-IOT is part of 5G specifications.

TRASNA SOC embed RISC-V cores, i-SIM and GNSS, developed to offer the lowest BOM to the market to scale up the deployment of massive IOT. With its Telecom BU, TRASNA provide a unique offer with all products and services related to IOT connectivity such as eSIMs / eUICCs and expertise so its customers can build, innovate, and grow successful businesses in a constantly progressing environment.

We support and guide our customers through every step of their IoT device journey.

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