

SOIL

SOLIDIFY THE EUROPEAN FDSOI ECOSYSTEM
ACCELERATING ITS INDUSTRIAL DEPLOYMENT



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Solidify the European FD-SOI ecosystem and accelerating its industrial deployment

Martin LABRUNE

Europe & French Public Affairs

STMicroelectronics

Agenda

- 1 STMicroelectronics overview
- 2 FD-SOI and applications
- 3 SOIL : roots, consortium, & objectives
- 4 SOIL project: WP structure, demonstrators, & impacts

Who we are



One of the world's largest semiconductor companies



Over **50,000** employees
of which **9,500+** in R&D



\$17.3 billion revenues
in 2023



Over **80** sales & marketing
offices serving over **200,000**
customers across the globe


















14 main manufacturing
sites



Signatory of the United Nations Global Compact (UNGC)
Member of the Responsible Business Alliance (RBA)

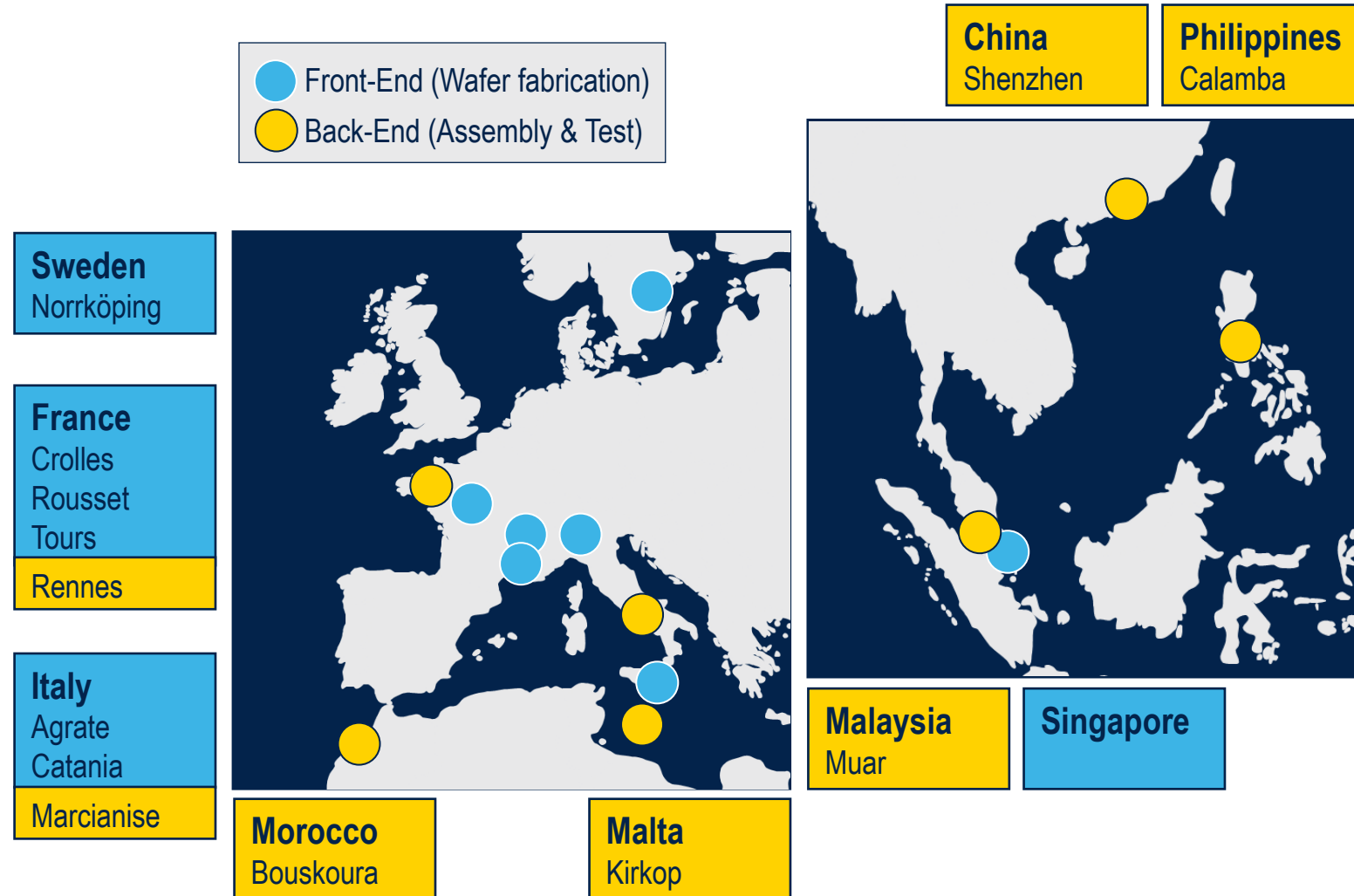
As of December 31, 2023

Four end markets

Automotive	Industrial	Personal electronics	Communications Equipment, Computers & Peripherals
 Lead in car electrification	 Lead in embedded processing	 Lead in selected high-volume smartphone applications with differentiated products or custom solutions	   Address selected high-volume applications with differentiated products or custom solutions
 Lead in car digitalization	 Lead in Power & Energy Management	   Leverage broad portfolio to address high-volume applications	  Leverage broad portfolio to address high-volume applications
	 Lead in Sensors		
	 Accelerate in Analog		

Global presence & technology

MEMS for sensors & Micro-actuators	Smart power: BCD (bipolar - CMOS - power DMOS)
FD-SOI CMOS FinFET through foundry	Discrete, power MOSFET, IGBT silicon carbide, gallium nitride
Analog & RF CMOS	Vertical intelligent power
eNVM CMOS	Optical sensing solutions
Packaging technologies Leadframe – Laminate – Sensor module – Wafer level	

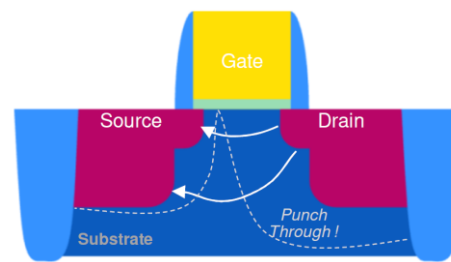


FD-SOI was developed by STMicroelectronics, SOITEC, and CEA.
It is a simpler process, compatible with bulk CMOS.

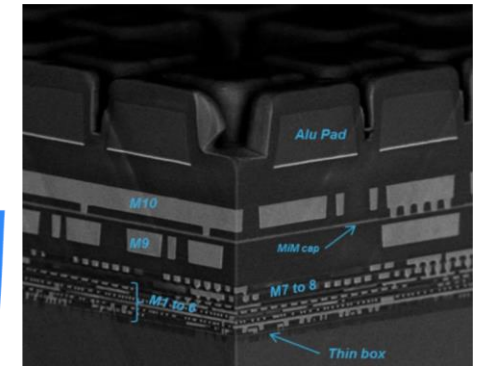
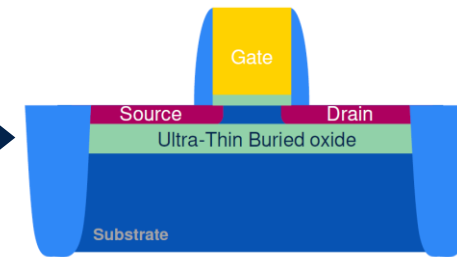
UTBB FD-SOI features:

- Better electrostatic characteristics & thin channel controlled by the gate → lower leakage power
- Body biasing tuning performance/leakage trade-off, statically or dynamically

Bulk CMOS



Bulk FD-SOI



Advantages:

- Intrinsic RF & mm-W performance due to local isolation of devices vs substrate
- Possibility to bias transistor at a low voltage
- Wide operating voltage range for different applications
→ competitive performance, power, and area advantages

FD-SOI market applications



Audio processing (edge AI)



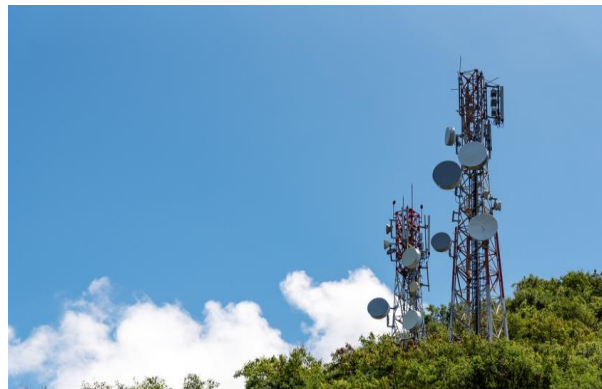
Video processing (Edge AI)



ADAS, radars



Microcontrollers and FPGA



5G infrastructure, handsets



Wearables

Embedded memory generations for MCUs leveraging the FDSOI technology evolution



Long term vision building a solid and impactful SOI ecosystem in Europe

SOIL project : roots

2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023

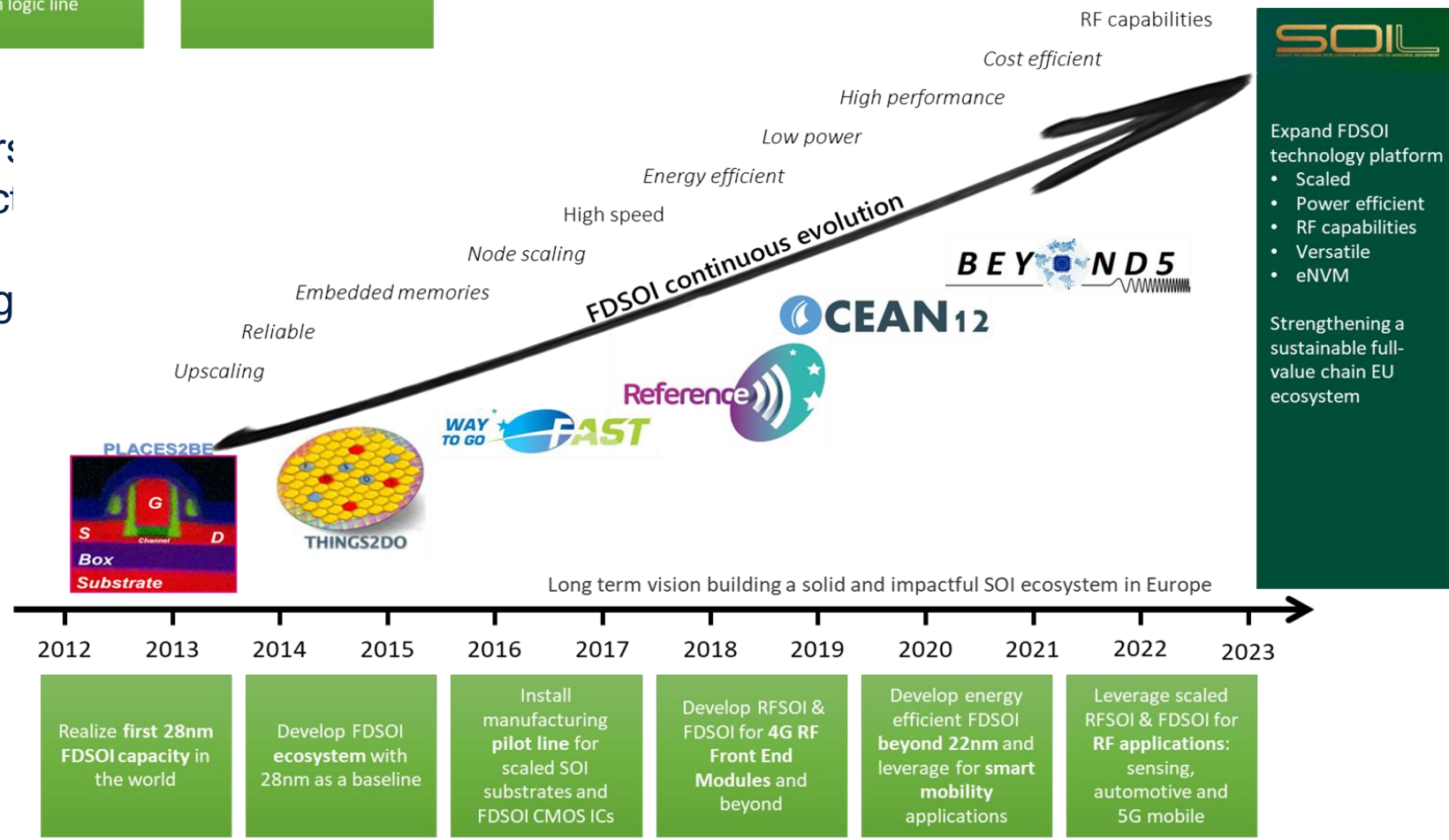
Setup an embedded Flash technology pilot line for innovative MCU prototyping

Establish an open ultra-low power technology and memory platform for IoT applications, leveraging 22nm FDSOI

Setup an advanced MCU pilot line for smart mobility based on ePCM on top of a 28nm logic line

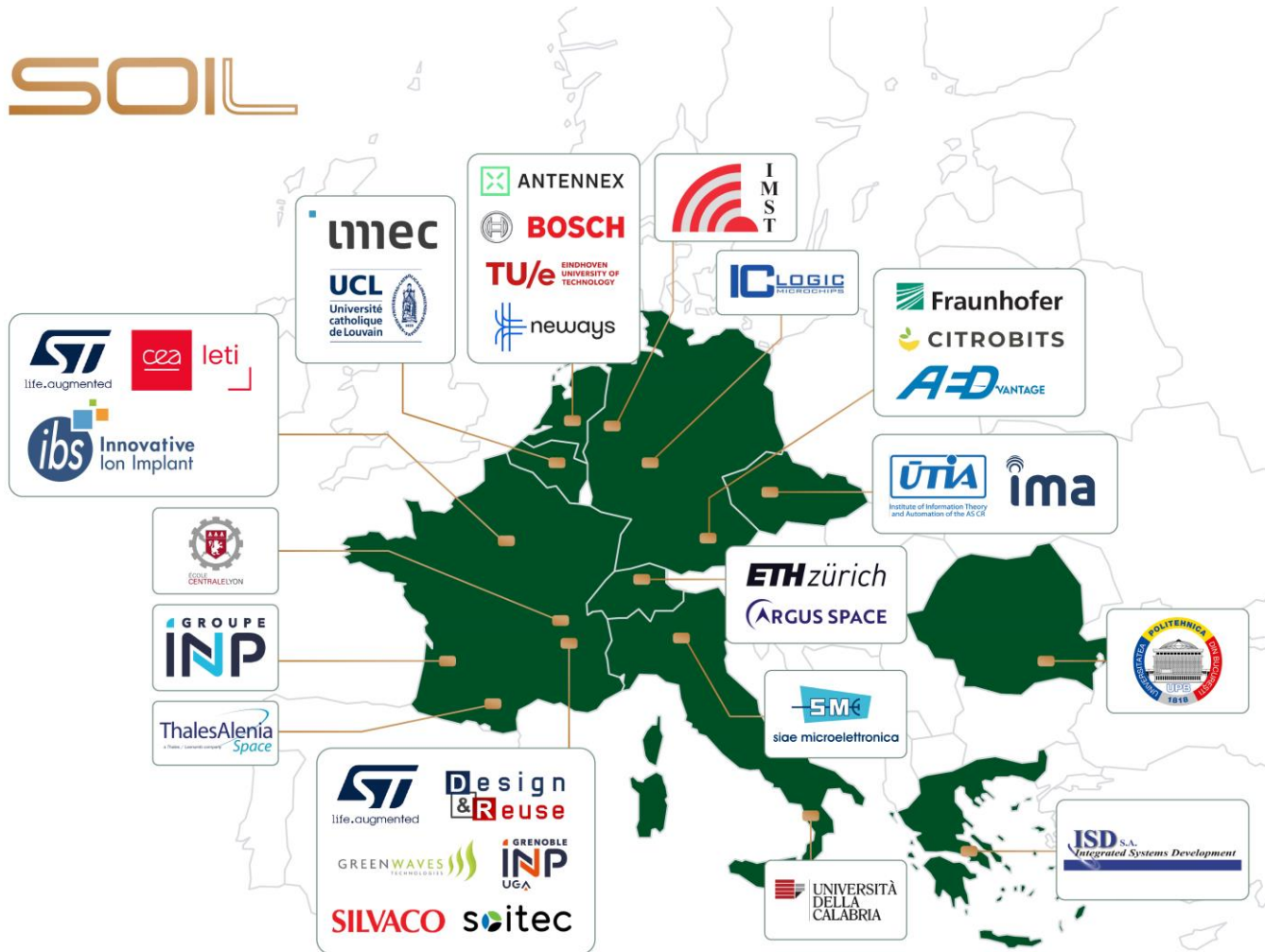
Develop & mature FDSOI 28nm & ePCM for Edge AI

The SOIL project is rooted in 10+ years of successive European funded projects aiming to develop a full FD-SOI ecosystem, from technology and design platform providers, all the way to system and applications.



SOIL consortium: a European initiative

SOIL



The SOIL project is funded by the CHIPS JU and the participant states.
It comprises **34 partners** in **9 countries**

36-month project with a **95.7 M€ budget**

SOIL main objectives

1

European strategic sovereignty for semiconductor technology based on a resilient European value chain for FD-SOI technology

2

Achieve world-leading energy efficiency for sustainable semiconductor applications and production

3

Establish semiconductor, IP, and components for securing and leveraging European semiconductor leadership

4

R&D capacity building in key semiconductor technologies

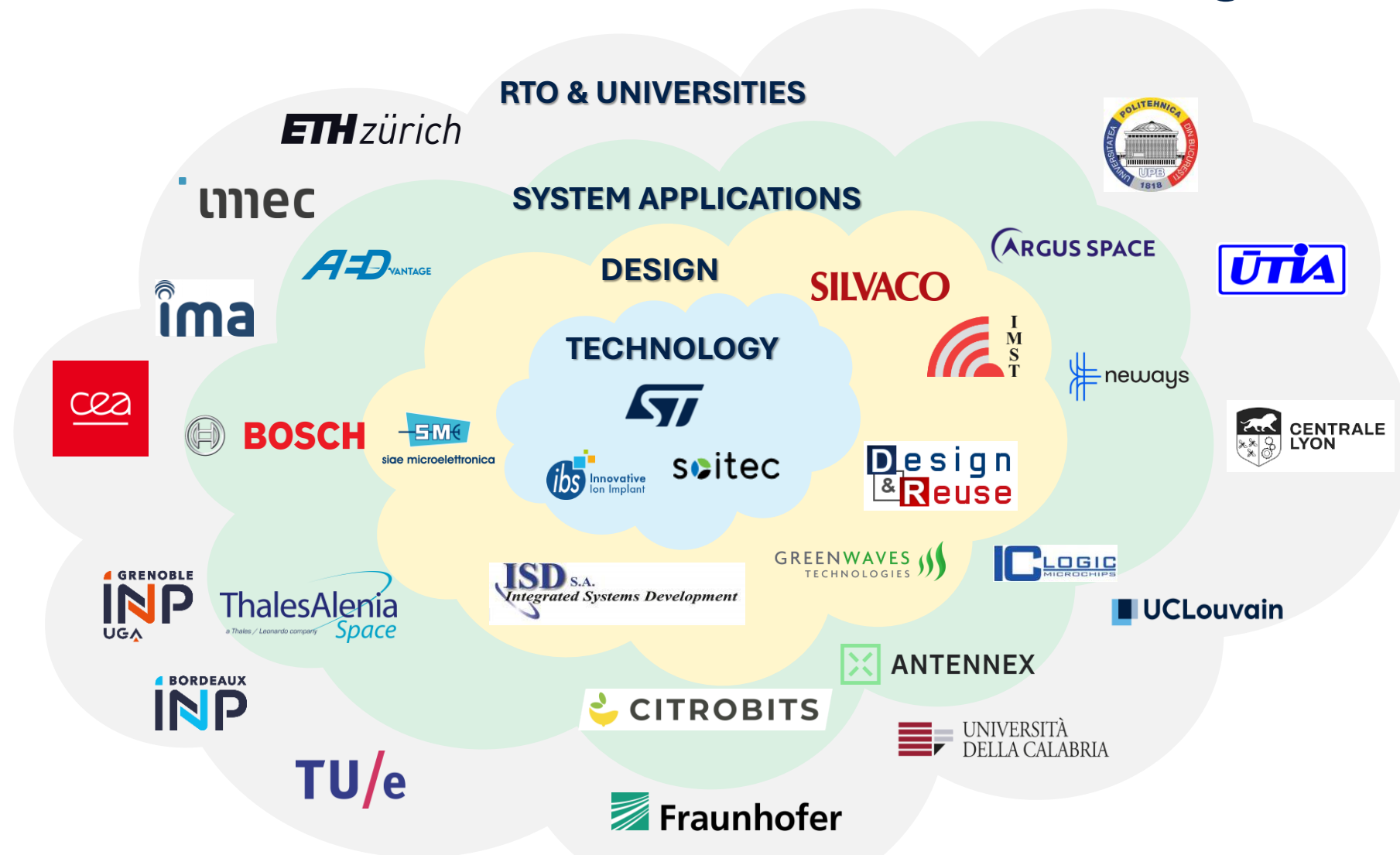
SOIL
Support the European value chain, accelerating its sustainable development

Expand FDSOI technology platform

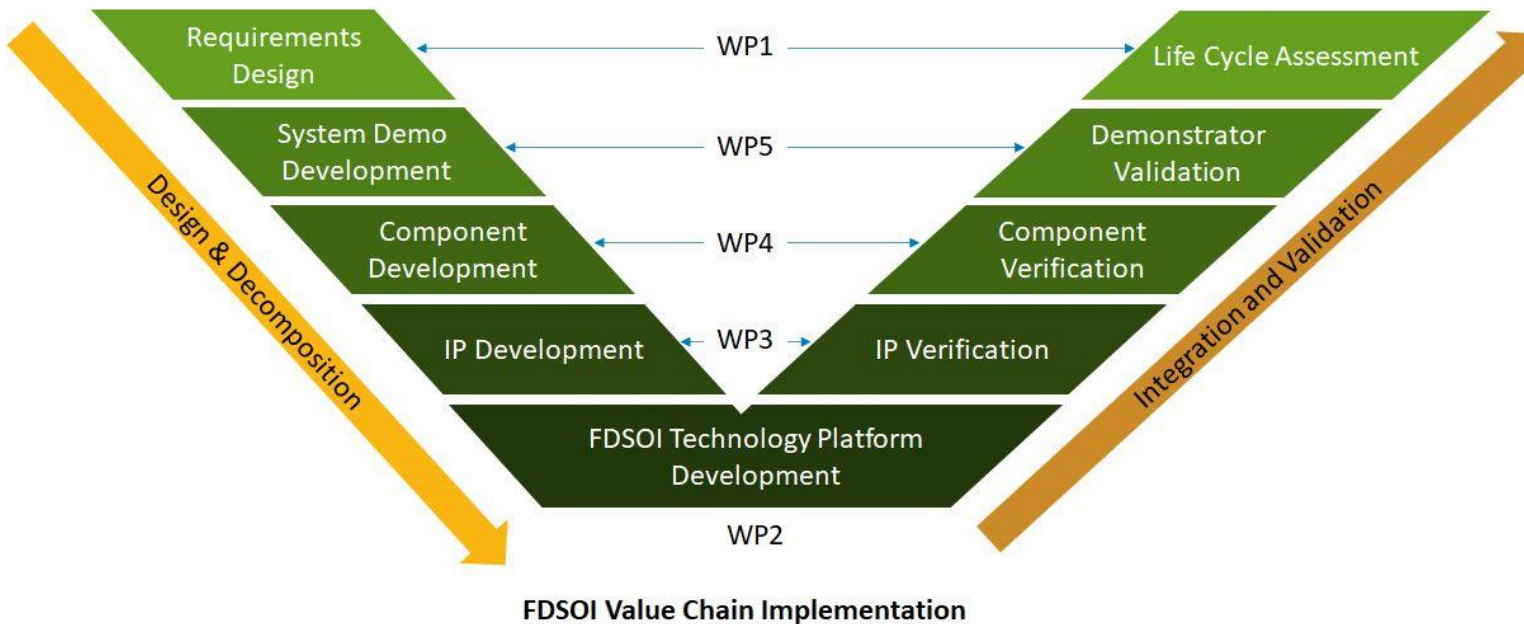
- Scaled
- Power efficient
- RF capabilities
- Versatile
- eNVM

Strengthening a sustainable full-value chain EU ecosystem

...all along the value chain



Work package: tasks along the value chain



WP1 Use cases & specifications



WP2 SOI technology platform



WP3 IP platform



WP4 Component development



WP5 System demonstrators



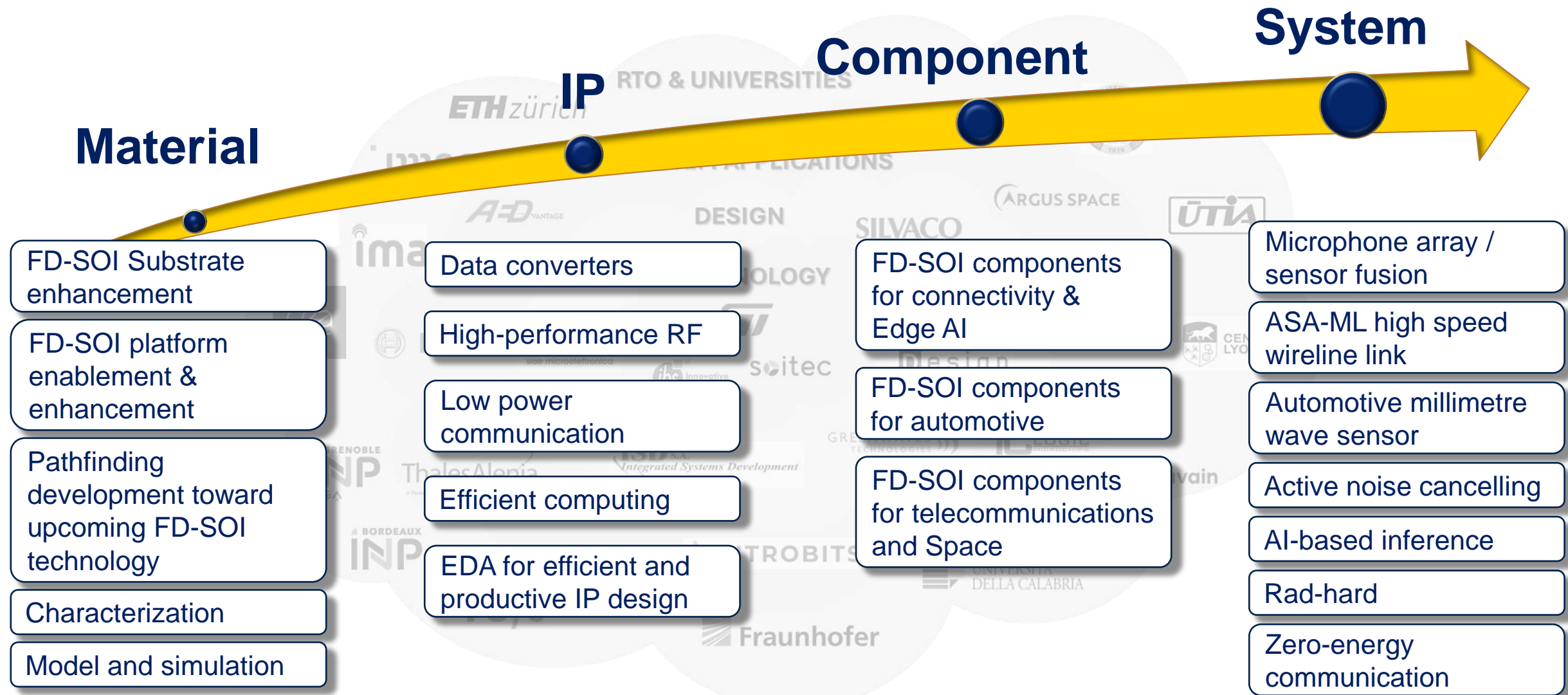
WP6 Exploitation & dissemination



WP7 Project management

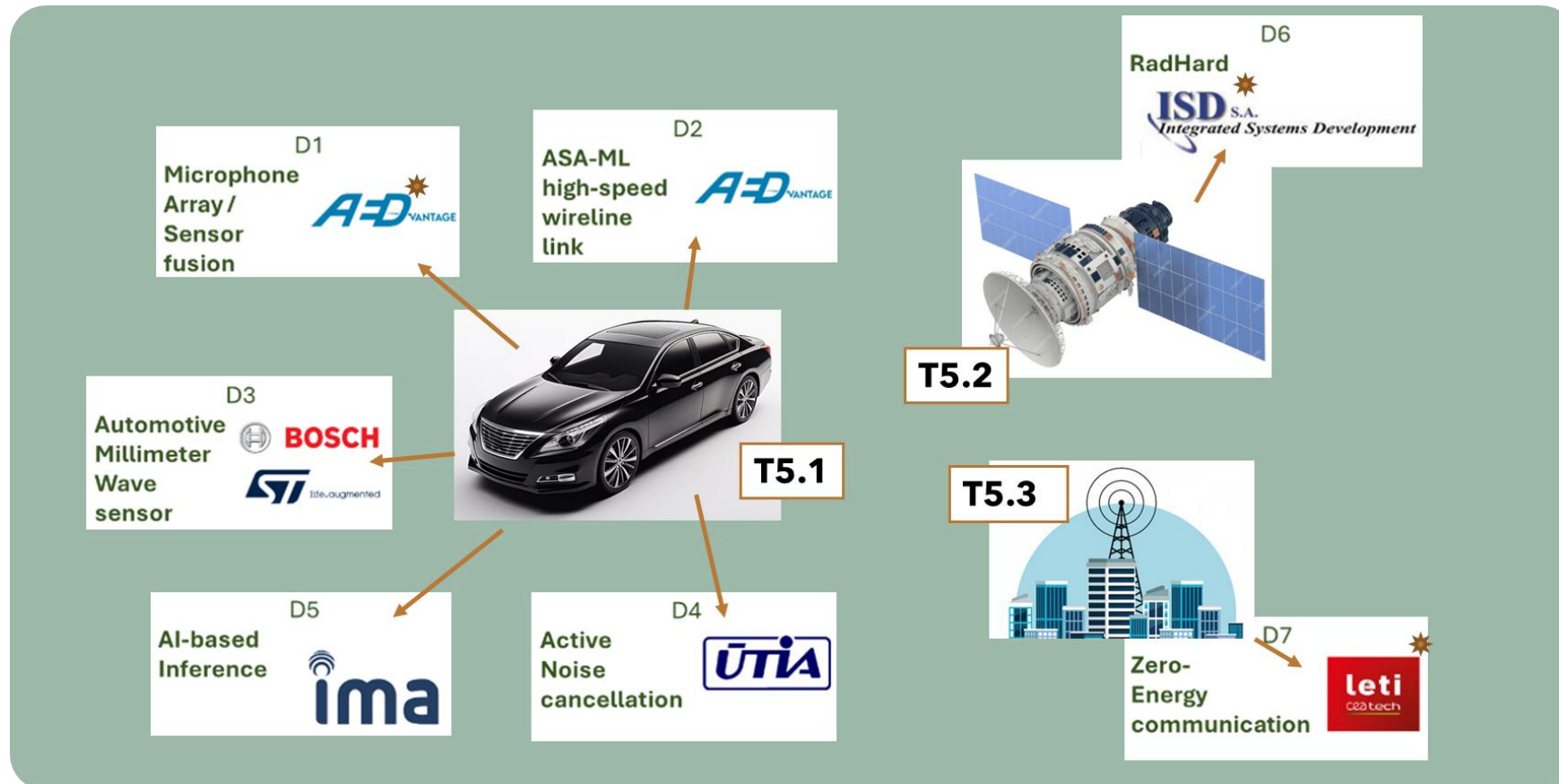


WP organization in the development chain



SOIL demonstrators

Seven demonstrators, addressing three different markets



Project impacts

Strengthen the ecosystem around European FD-SOI IC technology

Expected results in various areas

FD-SOI ecosystem: enlarge existing environment, resulting from ECSEL/KDT projects. Lab2Fab model.

Matching objectives of SRIA Foundation Technology Layers: Process Technology, Equipment, Materials And Manufacturing (eNVM, substrates) & Components, Modules and Systems Integration (sensing, sustainability)

Scientific: collaboration with RTOs, dissemination

Economic/technological: heart of digitalization (ADAS, IoT, etc) 18nm MCU

Environmental sustainability: quantitative evaluation of environmental targets for MCU production and networking equipment in Europe

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This project has received funding from the European Union's Horizon Europe research and innovation programme under the HORIZON-KDT-JU-2023-1-IA grant agreement No 101139785.

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The views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or CHIPS. Neither the European Union nor the granting authority can be held responsible for them.

Our technology starts with You



Find out more at www.st.com/FD-SOI

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