

The logo for Aeneas features the word "Aeneas" in a white, sans-serif font. The letter "e" is highlighted in a vibrant green color and is stylized with a circular motion line around it, suggesting connectivity or a network.

Aeneas

CELTIC-NEXT Proposers Brokerage Day
Opportunities for joint R&I between Telecommunications and ECS Communities

Patrick Cogez, Technical Director, March 17th, 2023

Agenda



- e AENEAS & Xecs
- e ECS Strategic Research and Innovation Agenda
- e COREnect
- e Opportunities for joint R&I

AENEAS association

AENEAS is a not-for-profit Industrial Association representing its members in the **Electronic Components and Systems (ECS)** value chain:

Large industries, Small and Medium Enterprises, Research institutes, universities and associated org.

AENEAS aims at:

- ☪ Fostering **R&D&I**
- ☪ Creating an effective funding landscape

Supporting the Sustainable Digital transition of Europe:

- ☪ To maintain a competitive position
- ☪ To support its societal goals

AENEAS initiates and implements actions that:

- ☪ Promote networking
- ☪ Encourage collaborative consortia work
- ☪ Facilitate access to funding support

Visit <https://aeneas-office.org/>

AENEAS synergies and partnerships with other communities

- ☪ Agreement between **AENEAS, EPoSS & Inside** related to ECSEL, KDT and the Chips JU
- ☪ MoU with **SEMI Europe** in 2018
- ☪ MoU with **6G IA** in 2022

See PR <https://aeneas-office.org/2022/06/07/aeneas-and-6g-ia-join-forces-to-build-synergies-for-european-leadership-in-next-generation-telecommunications/>

- ☪ MoU with **QuIC**, the Quantum Industry Consortium, in 2022
- ☪ **Alliance** on Processors and Semiconductor Technologies: application submitted
- ☪ **ICOS** CSA on International Collaboration On Semiconductors, starting

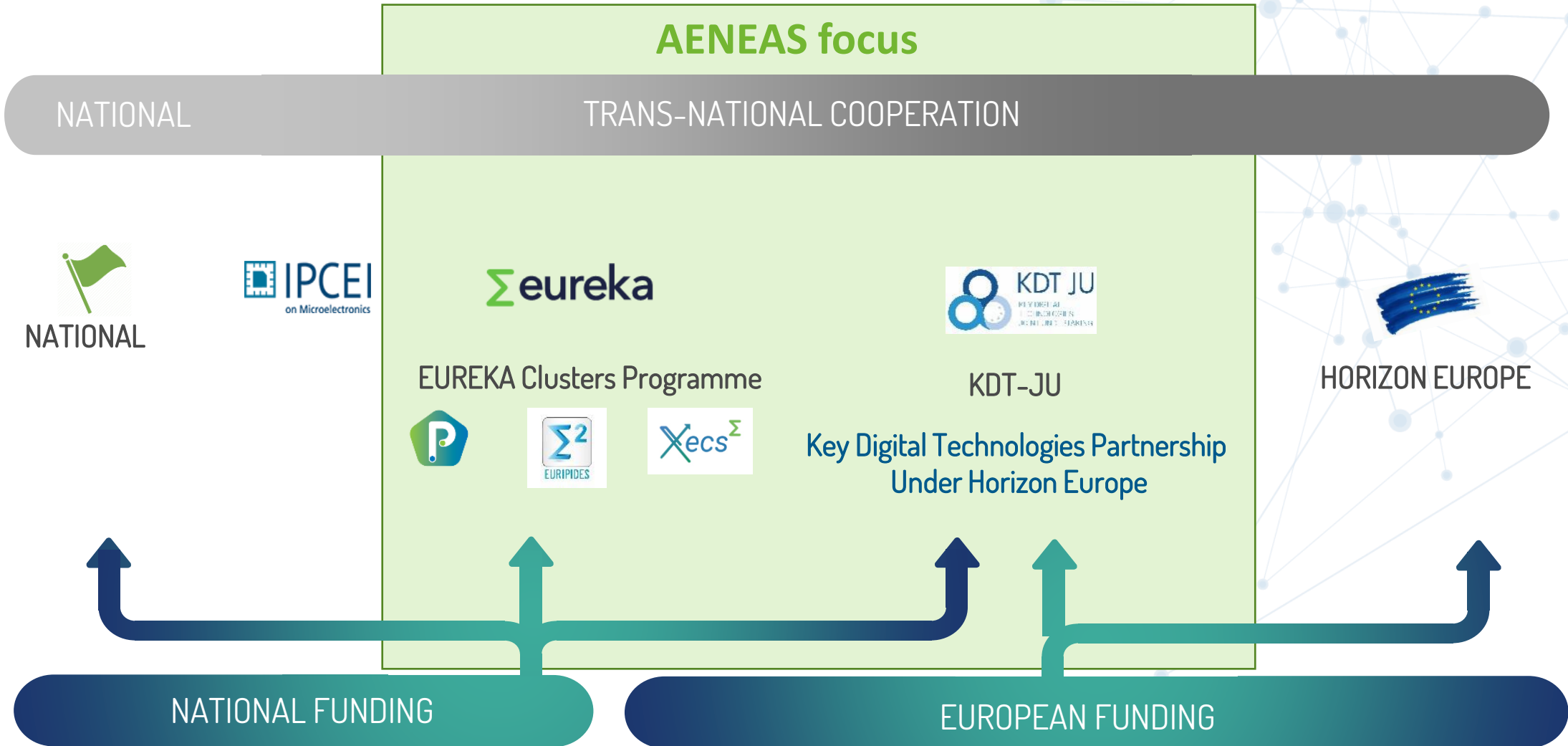
AENEAS members are key industrial players

Kurt Sievers, President and CEO of NXP Semiconductors, is AENEAS President



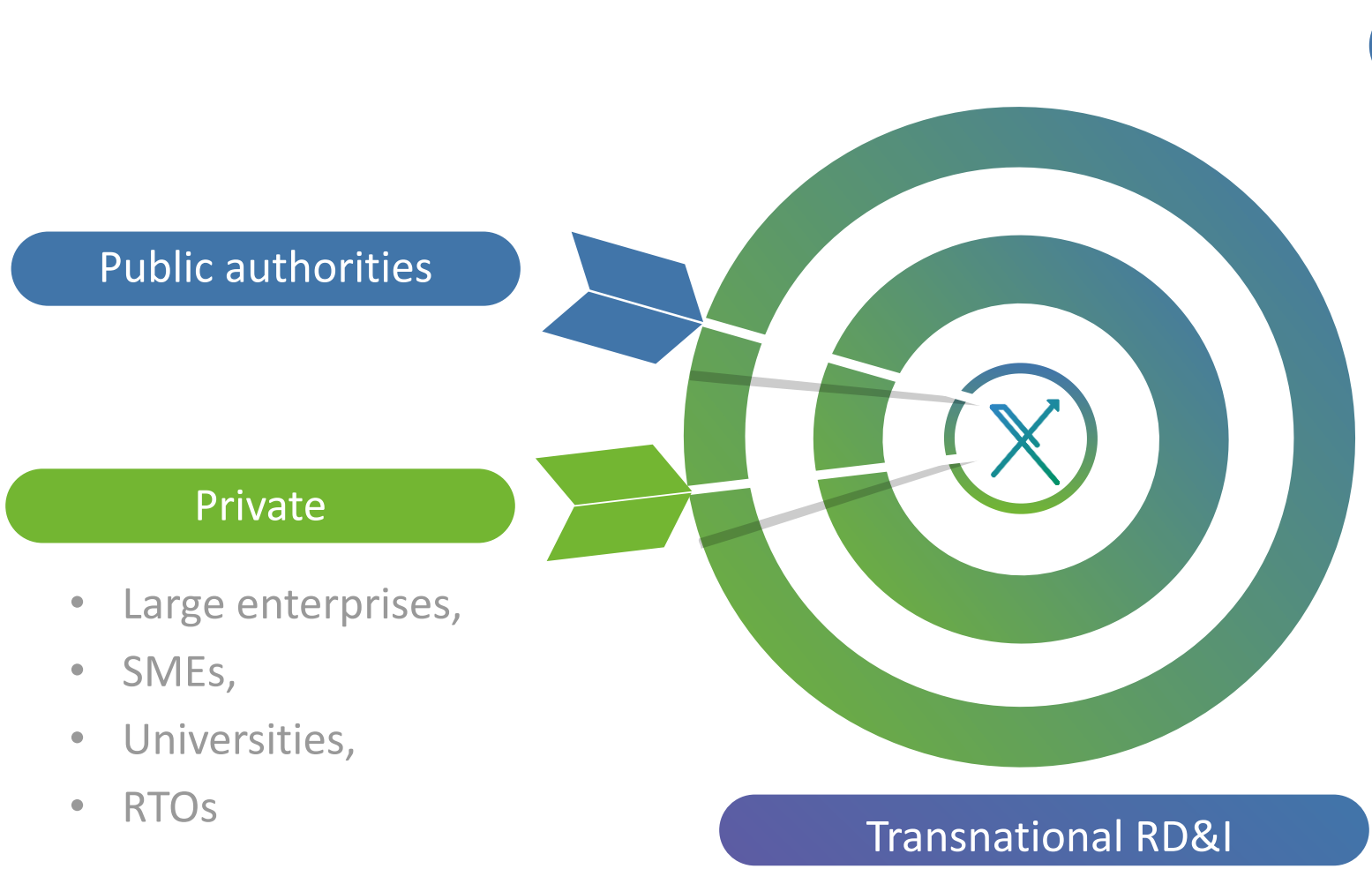
See <https://aeneas-office.org/>

EU RD&I funding landscape for the ECS industry





Xecs - A Eureka Cluster



Public authorities

Private

- Large enterprises,
- SMEs,
- Universities,
- RTOs

Transnational RD&I

A Eureka Cluster supporting:

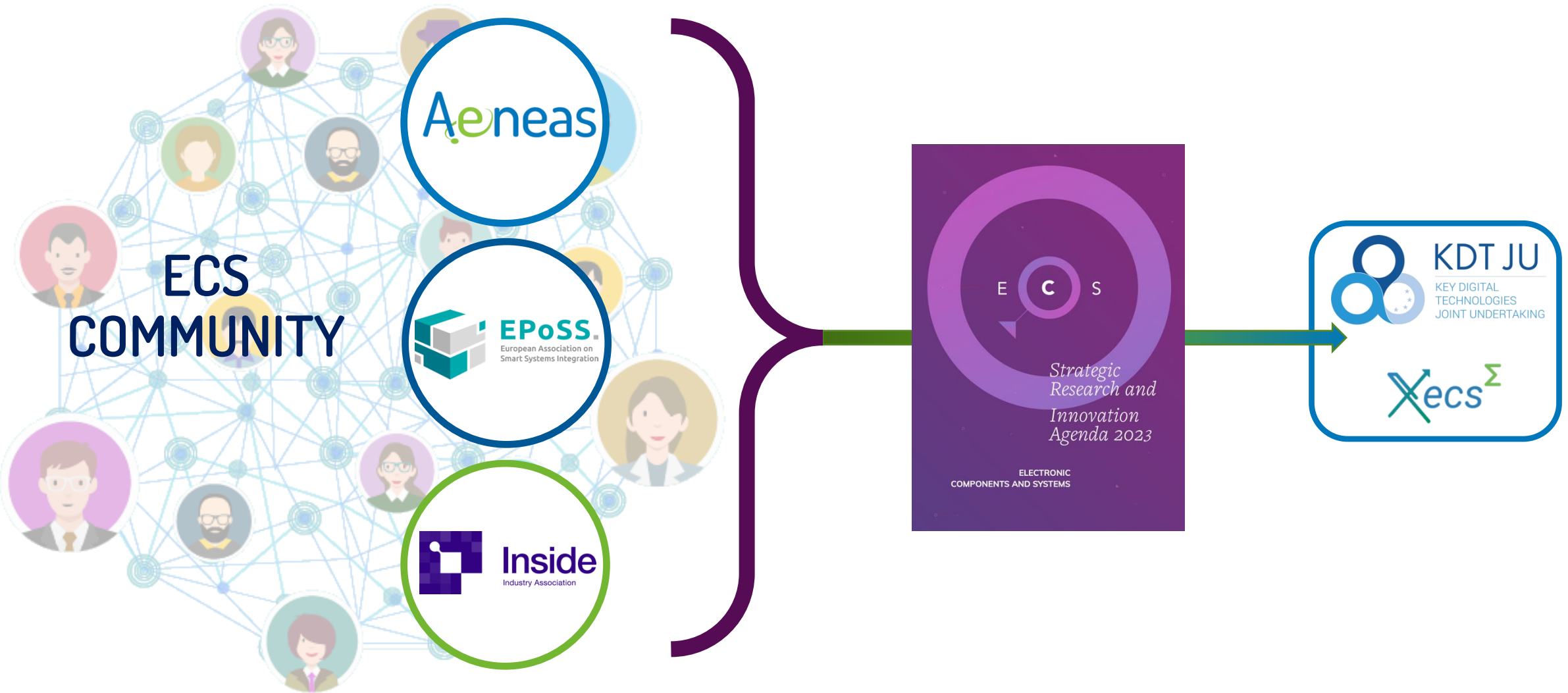
- ✕ RD&I in the field of Electronic Components & Systems

Xecs is managed and operated by the AENEAS Industry Association, benefiting from:

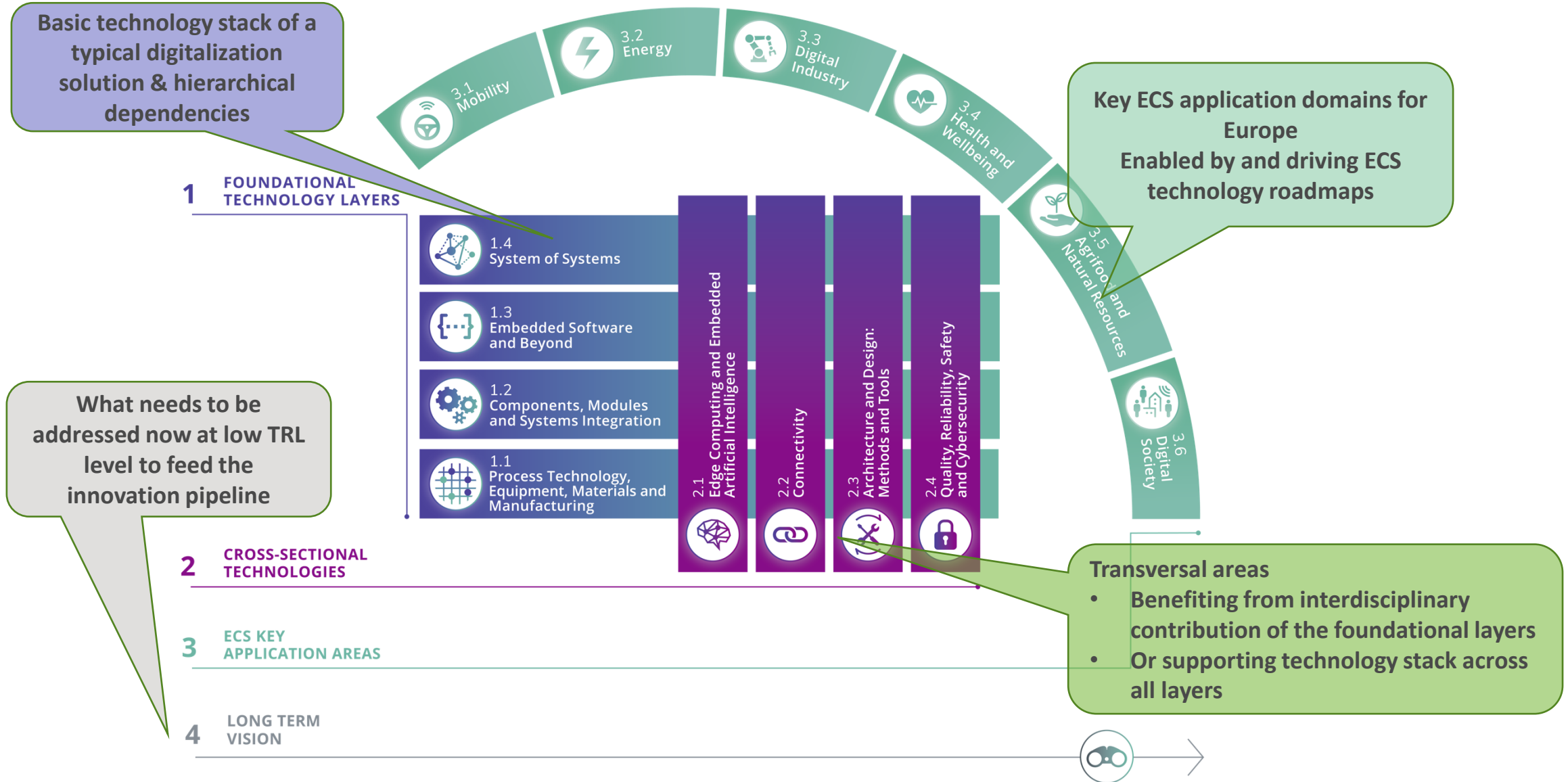
- ✕ Complementary activities within the KDT Joint Undertaking
- ✕ Direct experience from Catrene, Euripides² and Penta Clusters

Supported also by EPoSS and Inside Industry Associations

The ECS Strategic Research and Innovation Agendas Basis for KDT and Xecs Calls



ECS-SRIA structure



Identifying Common Ground ?

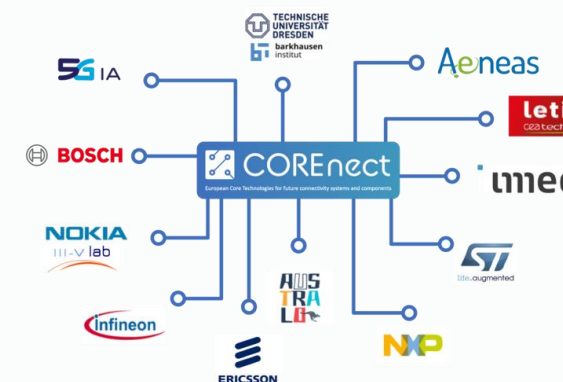


Vs. Telecommunications needs ?



COREnect in a Nutshell

- **COREnect —European Core Technologies for future connectivity systems and components**
 - Project duration: July 1st, 2020 – June 30th, 2022
 - Coordinator: Technische Universität Dresden
 - 12 Partners from 7 countries
- **Major objectives**



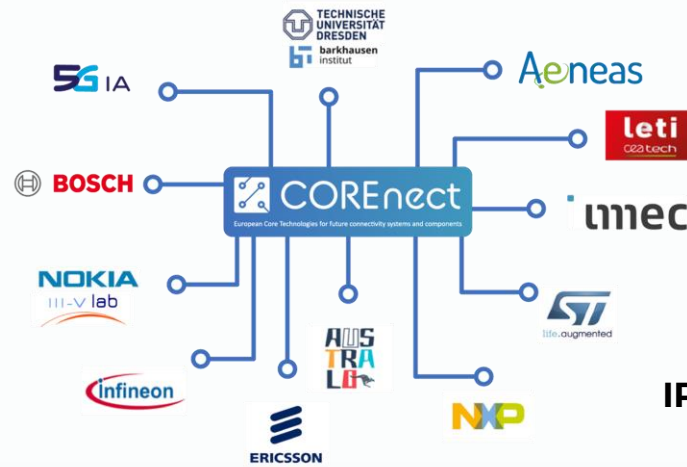
Objective #1	Bring European major players in microelectronics and telecommunications together, developing a strategic roadmap of core technologies for future connectivity systems, decreasing European dependence on other continents and building technological sovereignty in 5G and beyond 5G.
Objective #2	Establish a connection and collaboration between the Smart Networks and Services (SNS) community and the Key Digital Technologies (KDT) community at the strategic research & innovation agenda level;
Objective #3	Promote COREnect results to stakeholders in both private and public sectors and create the condition for one or more European champion(s) in the domain of core technology for attaining technology sovereignty in future connectivity systems.

Involving SNS and ECS communities

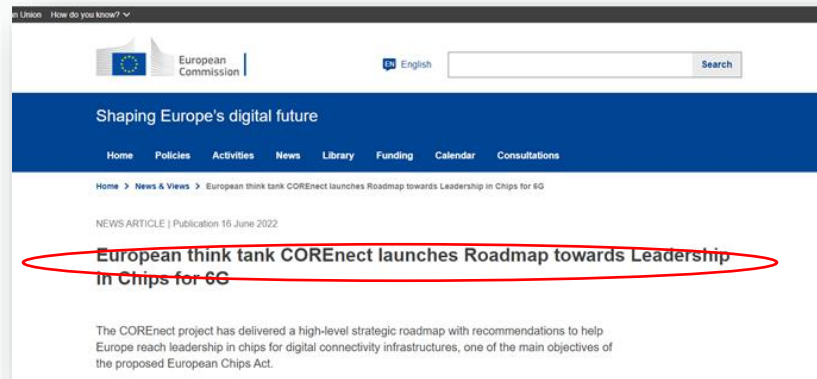


COREnect Expert Groups

100+ experts have been involved in the COREnect Expert Groups



IPCEI on Microelectronics II



54 organizations from both inside and outside COREnect for the roadmapping activities



Communications priorities in the ECS SRIA

Connectivity chapter

- MC1: strengthening the EU connectivity technology portfolio to maintain leadership, secure sovereignty and offer an independent supply chain
- MC2: investigate innovative connectivity technology (new spectrum or medium) and new approaches to improving existing connectivity technology to maintain the EU's long-term leadership
- MC3: autonomous interoperability translation for communication protocol, data encoding, compression, security and information semantics
- MC4: architectures and reference implementations of interoperable, secure, scalable, smart and evolvable IoT and SoS connectivity
- MC5: network virtualisation enabling run-time engineering, deployment and management of edge and cloud network architectures

- Differentiated semiconductor technology development: BiCMOS, RF SOI, GaN, FD SOI and GaAs/InP;
- Innovative packaging and PCB technology;
- Heterogeneous integration (multi-die system in a package, advanced assembly capability, advanced substrate manufacturing, etc);
- Antenna and packages at mm-wave and THz, on-chip antennas;
- Meta-materials for antennas, meta-materials for intelligent reflective surfaces and meta-surfaces

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- SubTHz connectivity application in the 200 GHz – 300 GHz band;
- Assess beyond 300 GHz spectrum relevance to future 6G standards;
- Standardisation activity targeting 6G cellular application in the frequency band < 10 GHz;
- Connectivity technology using unlicensed frequency in the 6 GHz – 7 GHz band
- New propagation mediums.
- Use of AI (leveraging edge AI) for efficiency, adaptability and complexity management

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- Virtual connectivity architecture supporting multiple technology platforms, including 5G, B5G and 6G.
- Reference implementation of virtual connectivity architecture
- Engineering and management frameworks and tools for virtual connectivity architectures

Communications priorities in the ECS SRIA

Process Technology, Equipment, Materials and Manufacturing

- MC1: advanced computing, memory and in-memory computing concepts
- MC2: novel devices and circuits that enable advanced functionality
- MC3: advanced heterogeneous integration and packaging solutions
- MC4: world-leading and sustainable semiconductor manufacturing equipment and technologies

- Advanced 3D and optical input/output (I/O) technological solutions to circumvent limitations of traditional I/O's architectures;
- Development of new embedded non-volatile memory (eNVM) technologies to enable local AI processing and storage of configuration data.

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- New energy-efficient RF and mm-wave integrated device options, including radar (building on e.g. SiGe/BiCMOS, FD SOI, CMOS, Photonics IC);
- Bringing MOEMS and micro-optics, nanophotonics, optical interconnections, photonics-enabled device and system options into a CMOS-compatible manufacturing and/or packaging flow;
- Integration of solid-state light emitters such as LED and laser with, or onto, a CMOS-compatible platform

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- Solutions for high-frequency miniaturisation, such as for mm-wave applications (> 60 GHz) and for > 100 GHz towards THz applications for which no package solutions currently exist

Communications priorities in the ECS SRIA

Components, Modules and Systems Integration

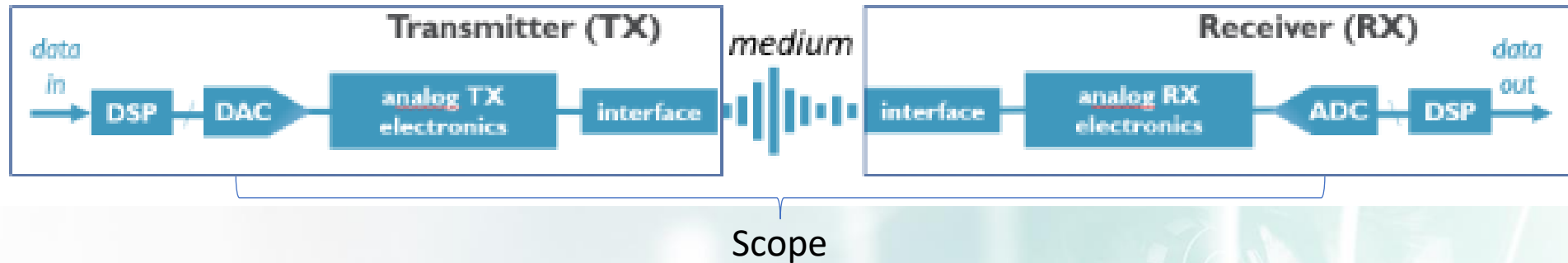
- MC1: Enabling new functionalities in components with More-than-Moore technologies
- MC2: Integration technologies, processes and manufacturing
- MC3: sustainability and recyclability

Communications focus research area, targeting

- Module-level high-speed wireless communication features, including current and new frequency bands.
- High-speed photonics communications modules beyond 1 Tb/s.
- New front-end components, filters and functionalities e.g. active antennas for 5G and 6G communications and non-terrestrial network solutions.
- Low latency and low power communications in-package/module as well as at system level for the edge and IoT devices.
- Continuous delivery of new features and fixes through Over-The-Air (OTA) updates to ensure the security of the device over time and reduce the digital waste increasing the life of a device.
- Strategies and components for Electromagnetic interference (EMI) mitigation and reliable operation in harsh environmental conditions.

1st concrete implementation Focus Topic in 2023 KDT Call

“6G Integrated Radio Front-End for TeraHertz Communications”



- Semiconductor technologies targeting THz connectivity (III-V on Si, FD SOI, RF SOI, advanced BiCMOS)
 - cost-effective deployment,
 - Ft and Fmax of 500 GHz and beyond
 - combination with CMOS.
- Antenna and packages at THz, including substrate-integrated waveguides (SIW), meta-materials for antennas, meta-materials for intelligent reflective surfaces and meta-surfaces.
- Advanced packaging, PCB and heterogeneous 2.5D/3D integration technologies
- High power, high efficiency heterogeneous integration of III-V and silicon MMICs
- Architecture and design tools and methodologies for radio front-end modules for THz communications and joint communications and sensing, including chip-package-antenna co-design, test, validation, and verification solutions.
- Novel phased-array antenna and/or system architectures, incl. hybrid beamforming, MIMO, sub-arrays, sparse arrays, for efficient THz phased-array scaling for arrays with >>100 elements
- Beamforming for sub-THz and THz to overcome the high path loss of THz bands that can be integrated by 6G networks to meet the new demanding KPIs.
- Efficient heat management solutions for THz MMICs and front-end modules and systems

Summary



- e Many potential synergies for joint R&I projects between the Telecommunications and ECS communities
- e COREnect provided a solid ground upon which to prepare calls for project
- e 1st implementations exist within the Horizon Europe framework
- e The flexibility of EUREKA Clusters should allow for even more integrated R&I projects between CELTIC-NEXT and Xecs

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Aeneas

Thank you

For more information
www.aeneas-office.org