ECS R&D&I Timelines

Concertation and Consultation on Computing Continuum - 10-11/05/2023 - Brussels

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INSIDE is the European Technology Platform for research, design and innovation on Intelligent Digital Systems and their applications.

Main focus areas:

- Embedded & Cyber Physical Systems
- Dependable & Trustworthy ECS
- Autonomous, Adaptive & Evolutionary Technologies
- Hyper-connected & High-Performance Embedded Systems
- Edge Computing & Edge AI
- IoT & SoS

• Engineering and ECS lifecycle
• Education and professional training

INSIDE is part of KDT JU, the largest tri-partite industry oriented PPP ever, supporting the digital transformation of all economic and societal sectors and the Green Deal. KDT covers the continuum, excluding cloud.

The KDT will evolve in the Chips Act.

Tri-partite organisation (PPP)

Chips JU CHIPS ACT
ECS Strategic Research & Innovation Agenda

- Identifies the major technological challenges, priorities and required R&D&I efforts in the next decade, covering the entire ECS value chain
- Live, open and funding programme agnostic
- Edited every year by the ECS community, with more than 300 European experts
- Extensive and detailed report, serving as a basis for collaborative research

The ECS-SRIA is the reference document for the KDT (and Chips Act) calls for proposals.

https://ecssria.eu/
ECS-SRIA Structure & Timelines

Global and detailed (per chapter) timelines identify the main milestones foreseen in the next 10 years at TRL 8–9 (prototype or early commercialization)

ECS-SRIA structure:
- **Foundational layers**: cover the technology stack of a typical digitalization solution based on ECS
- **Cross-sectional technologies**: focus on transversal areas, where innovation emerges from the interdisciplinary contribution at the different levels of the foundational layers
- **Key application areas for Europe**: having a push/pull relation with foundational/cross-section chapters
- **Long term vision**: illustrating the vision beyond the time horizon covered by the other chapters

Timelines periods:
- **Short term** (2023–2027): the industry has a precise idea of what must be achieved during that timeframe
- **Medium term** (2028–2032): reasonably good knowledge of what can possibly be achieved
- **Long term** (2033 and beyond): expected achievements are more of a prospective nature
Short term priorities (2023–2027):

- Improving features and computing capabilities on the edge
- Increase the autonomy of systems on the edge (AI)
- The continuum from the SoS perspective (e2e monitoring, orchestration & control)
- Towards circular economy in the continuum
- The engineering continuum
- Key applications based on the computing continuum

- System of Systems reference architecture and implementation platforms
- Embedded software enabling systems to be easily configured and to adapt to changes in the environment
- Green awareness in software integration
- Physical and chemical sensors and imaging and image-based detection
- Materials enabling recycling and repair
- Additive manufacturing, rapid prototyping, heterogeneous integration in multiple levels
- Semiconductor equipment for 2nm node for logic and memory
- ULP 18mm FDSOI technology
- 3D heterogeneous integration
- Devices enabling 5G connectivity
- Development of technologies and scalable devices for new AI paradigms
- Leveraging open source or alternatives to develop advanced & efficient European AI Edge solutions
- Energy-efficient and sustainable AI-based design techniques for edge AI
- AI supported translation of pyroelectric information between limited set of ontologies and semantics standards
- Supply-chain aware design flows
- Hardware AI
- Development and secure deployment of safe updates based on selected data from the field
- Interoperable tool chains
- AI-based multi-objective optimization
- Modular architectures supporting AI and Advanced Control
- Data science as enabler for improving the quality and reliability of SoS
- Trustworthiness, secure and privacy-by-design EU Data Strategy & Sovereignty
- Establishing common framework for user knowledge, skills, & performance
- Internet of medical things for patient generated data
- IoT for crops & animals health key parameters monitoring
- Monitoring in real-time water key parameters
- Environment monitoring of forests, fields and sea
- IoT and robot-based infrastructure inspection management systems
- VR/AR pilots for remote training, both support and work
- EV passenger car
- Energy-optimized EV urban and H2 long distance mobility
- Driver assisted and partially automated mobility
- V&V procedures for partially automated mobility
- Pilot European AI Framework
- Remote engineering and operations, telepresence
- Pilots of Digital twins combined with data-driven models
- Real Time (RT) digital twins for energy and conversion and storage systems
- Smart energy networks for RT application in smart grid
- Communication infrastructure to support self-organised communities
- Secured supply chains
Medium term priorities (2028–2032):

- Improving features and computing capabilities on the edge
- Towards intrinsically interoperable continuum (AI)
- The evolutionary nature of the continuum (SoS level)
- Improved circular economy in the continuum
- The continuum in engineering
- Key applications based on the computing continuum
Long term priorities (2033 & beyond):

- Improving features and computing capabilities on the edge
- Next generation of continuum connectivity
- Autonomous evolution of the continuum (SoS level)
- Full circular economy in the continuum
- The continuum in engineering
- Key applications based on the computing continuum
Thank you for watching