



Xecs Σ

RD&I Focus Areas

29.09.2022

Patrick Coge, AENEAS Technical Director

Aeneas

Σ eureka

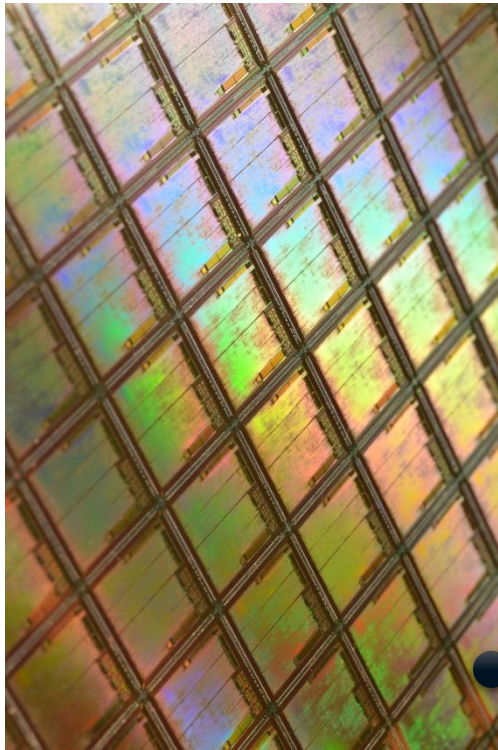
For more information:
www.eureka-xecs.com

Follow us  

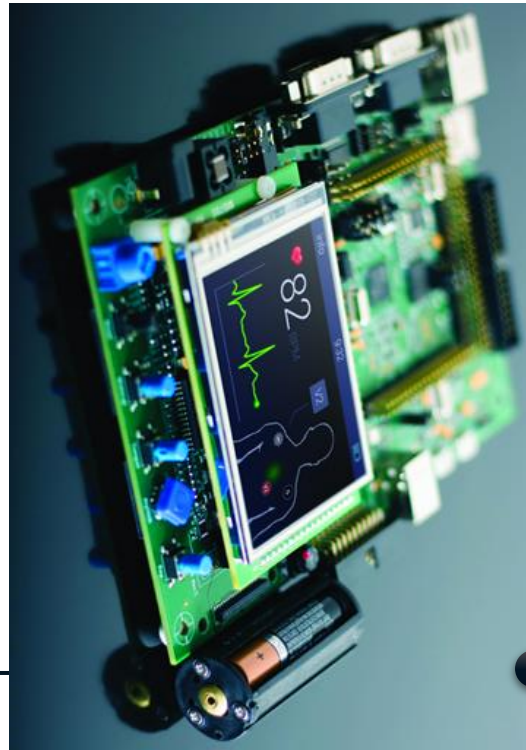
The ECS-SRIA 2022 Basis for Xecs Call 2



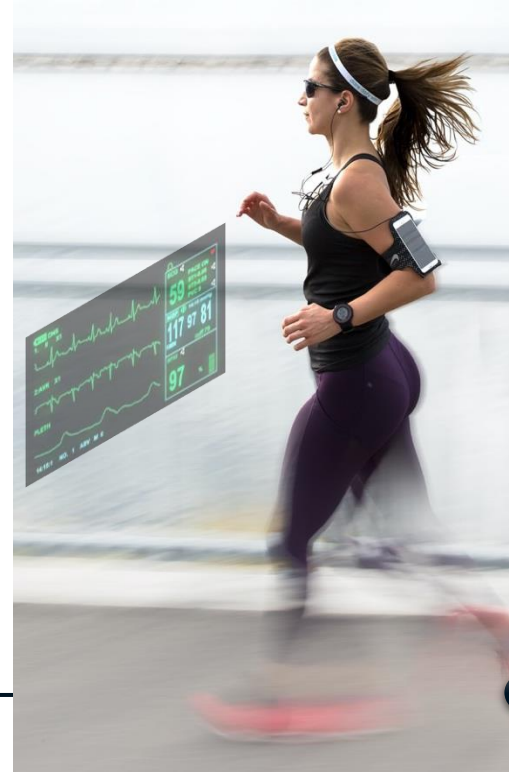
The SRIA covers the entire ECS value chain



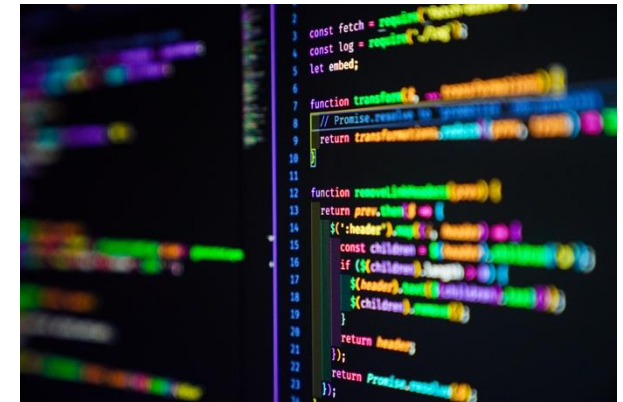
Materials, processes, semiconductors, micro & nano electronic components, ...



Smart sensors, integrated devices, edge AI, embedded SW, ...



Systems and applications, value creation, societal goals, ...



ECS engineering tools



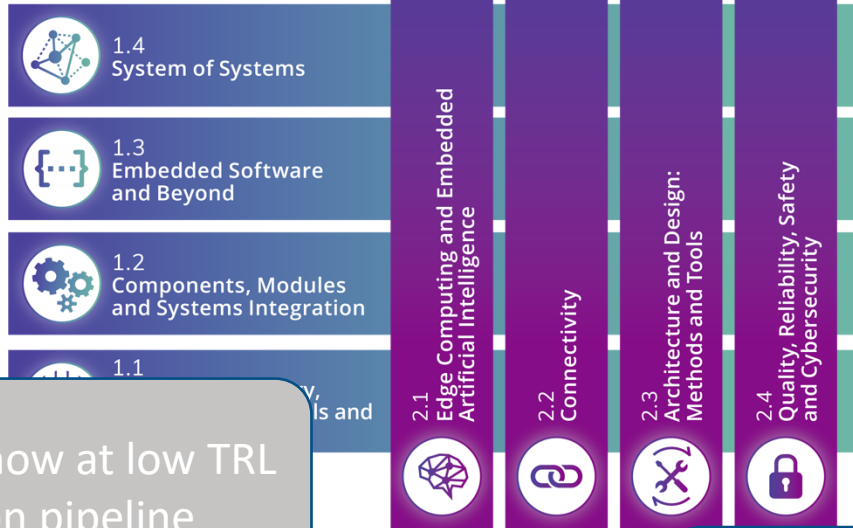
ECS-SRIA structure



Basic technology stack of a typical digitalization solution Hierarchical dependencies

Key ECS application domains for Europe Enabled by and driving ECS technology roadmaps

1 FOUNDATIONAL TECHNOLOGY LAYERS



What needs to be addressed now at low TRL level to feed the innovation pipeline

Transversal areas

- Benefiting from interdisciplinary contribution of the foundational layers
- Or supporting technology stack across all layers



KEY APPLICATION AREAS


4 LONG TERM VISION





 SRIA 2022 content updates cover the entire SRIA and include:

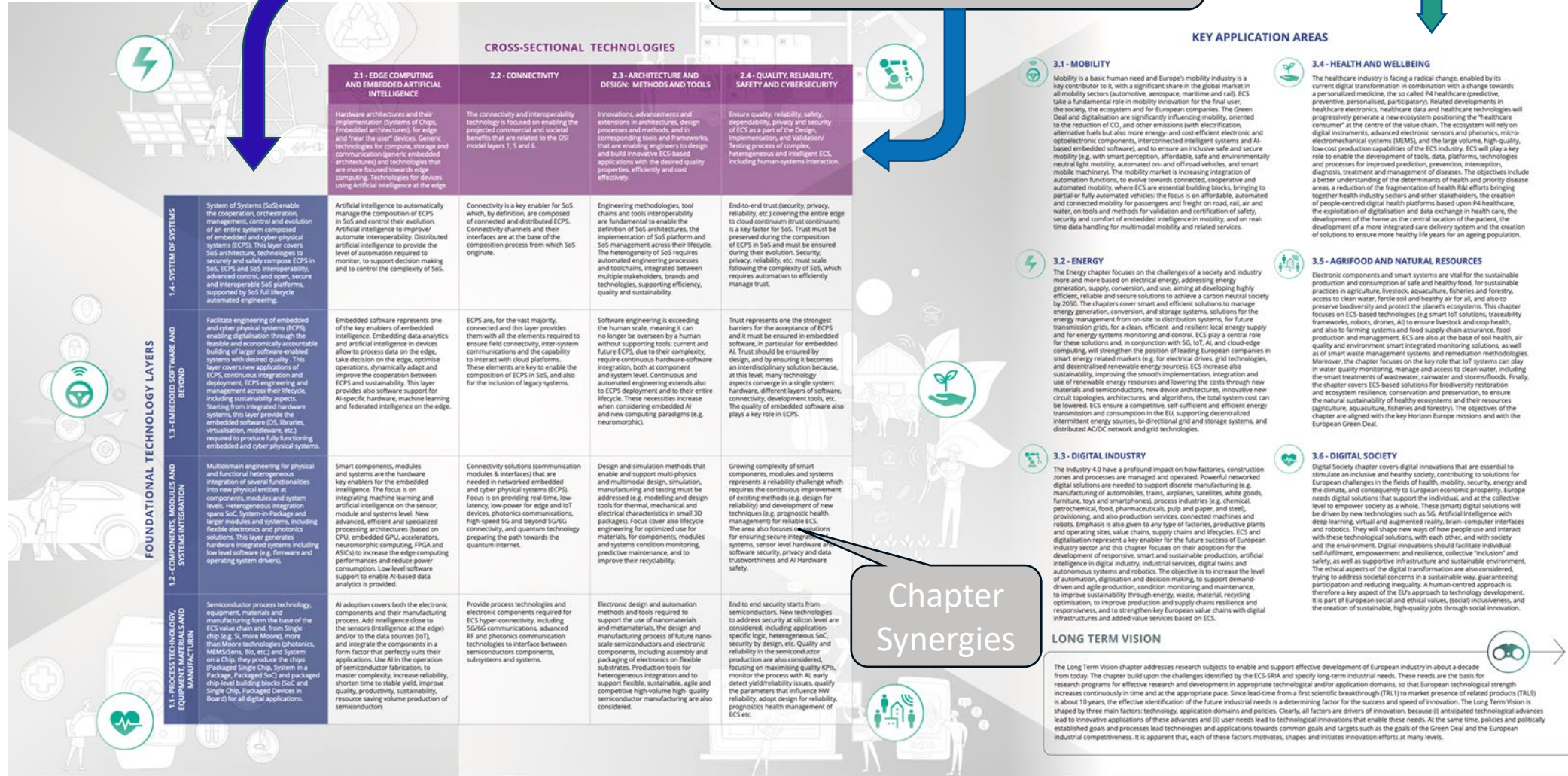
- Feedback from the ECS community and the EU Commission on specific topics
- The input provided by the 6 thematic workshops
- Updates planned in 2020 or emerging in 2021

 **Scope extension** to include quantum technologies, integrated photonics, flexible electronics and open-source hardware.

 **New leaders** for some chapters.

 **New contributors** in almost all the chapters

Chapter scope summary



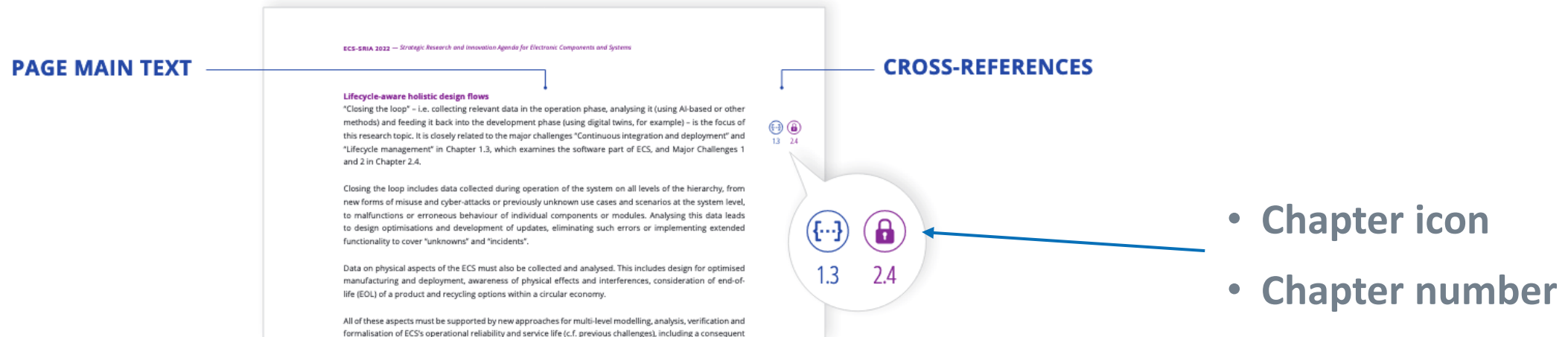
Chapter Synergies

LONG TERM VISION

The Long Term Vision chapter addresses research subjects to enable and support effective development of European industry in about a decade from today. The chapter build upon the challenges identified by the ECS-SRIA and specify long-term industrial needs. These needs are the basis for research programs for effective research and development in appropriate technological and/or application domains, so that European technological strength increases continuously in time and at the appropriate pace. Since lead-time from a first scientific breakthrough (TRL1) to market presence of related products (TRL9) is about 10 years, the effective identification of the future industrial needs is a determining factor for the success and speed of innovation. The Long Term Vision is shaped by three main factors: technology, application domains and policies. Clearly, technology, application domains and policies are drivers of innovation, but also lead to innovative applications of these advances and (i) user needs lead to technological innovations that enable these needs. At the same time, policies and politically established goals and processes lead technologies and applications towards common goals and targets such as the goals of the Green Deal and the European Industrial competitiveness. It is apparent that, each of these factors motivates, shapes and initiates innovation efforts at all levels.

Chapter cross references

X To highlight the synergies between Chapters and provide hints to the reader, cross-references have been introduced alongside the text



PAGE MAIN TEXT

ECS-SRIA 2022 – Strategic Research and Innovation Agenda for Electronic Components and Systems

Lifecycle-aware holistic design flows
"Closing the loop" – i.e. collecting relevant data in the operation phase, analysing it (using AI-based or other methods) and feeding it back into the development phase (using digital twins, for example) – is the focus of this research topic. It is closely related to the major challenges "Continuous integration and deployment" and "Lifecycle management" in Chapter 1.3, which examines the software part of ECS, and Major Challenges 1 and 2 in Chapter 2.4.

Closing the loop includes data collected during operation of the system on all levels of the hierarchy, from new forms of misuse and cyber-attacks or previously unknown use cases and scenarios at the system level, to malfunctions or erroneous behaviour of individual components or modules. Analysing this data leads to design optimisations and development of updates, eliminating such errors or implementing extended functionality to cover "unknowns" and "incidents".

Data on physical aspects of the ECS must also be collected and analysed. This includes design for optimised manufacturing and deployment, awareness of physical effects and interferences, consideration of end-of-life (EOL) of a product and recycling options within a circular economy.


All of these aspects must be supported by new approaches for multi-level modelling, analysis, verification and formalisation of ECS's operational reliability and service life (c.f. previous challenges), including a consequent

CROSS-REFERENCES

- Chapter icon
- Chapter number

X Cross-references indicate that the topic described in the main text is linked to the referenced Chapter.

Keywords index

 New index to quickly search key topics and simplify the SRIA “navigation” jumping directly to them.

A

abstraction	105
accelerators	465
access control as a service (ACaaS)	442
actuating	44

The SRIA - How to use it?



Example of a project proposal

- Infrastructure-based collision avoidance system
- Protecting all road users
- Sensors installed at crossroads
- Collision prediction based on trajectory, with self-learning capabilities
- Sending warning signals if danger is detected

How to argue for relevance?

Check for research issues?



3.1 - MOBILITY

Mobility is a basic human need and Europe's mobility industry is a key contributor to it, with a significant share in the global market in all mobility sectors (automotive, aerospace, maritime and rail). ECS take a fundamental role in mobility innovation for the final user, the society, the ecosystem and for European companies. The Green Deal and digitalisation are significantly influencing mobility, oriented to the reduction of CO₂ and other emissions (with electrification, alternative fuels but also more energy- and cost-efficient electronic and optoelectronic components, interconnected intelligent systems and AI-based embedded software), and to ensure an inclusive safe and secure mobility (e.g. with smart perception, affordable, safe and environmentally neutral light mobility, automated on- and off-road vehicles, and smart mobile machinery). The mobility market is increasing integration of automation functions, to evolve towards connected, cooperative and

2.1 - EDGE COMPUTING AND EMBEDDED ARTIFICIAL INTELLIGENCE

Hardware architectures and their implementation (Systems of Chips, Embedded architectures), for edge and "near the user" devices. Generic technologies for compute, storage and communication (generic embedded architectures) and technologies that are more focused towards edge computing. Technologies for devices using Artificial Intelligence at the edge.



3.1 MOBILITY

3.1.4.2 Major Challenge 2: enable affordable safe and environmentally neutral light mobility (bicycles, tricycles, wheelchairs, drones, etc) and mobile machinery (as smart farming)	296
3.1.4.3 Major Challenge 3: enable affordable, automated and connected mobility for passengers and freight on road, rail, air and water	298



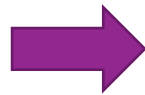
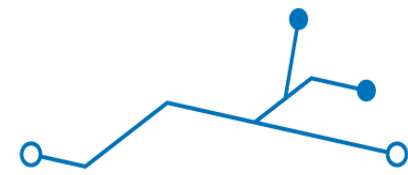
2.1 EDGE COMPUTING AND EMBEDDED ARTIFICIAL INTELLIGENCE



1.3 EMBEDDED SOFTWARE AND BEYOND

1.3.5.4 Major Challenge 4: embedding data analytics and artificial intelligence	111
---	-----

Using the keywords index



3.1.4.3.2 Key focus areas

The following research, development and innovations areas and their subtopics have been identified:

- ▶ Dependable and affordable environment perception and localisation sensors, and V2X communication. Attention should be paid to sensor interference, more in particular the **robustness of sensors to environmental conditions** to interference by other sensors and to **malicious interference**.



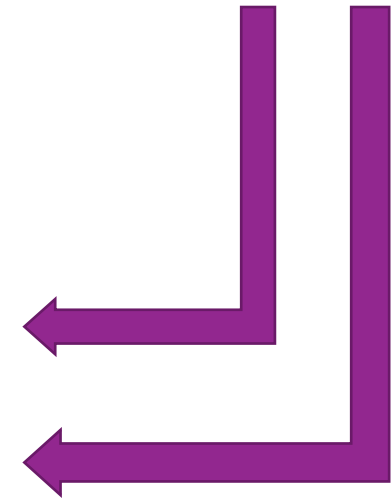
X Table of contents

1.1 PROCESS TECHNOLOGY, EQUIPMENT, MATERIALS AND MANUFACTURING

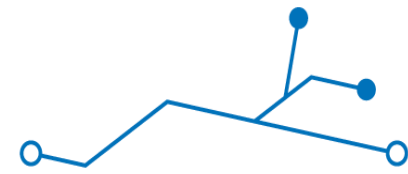
1.1.4.2 Major Challenge 2: novel devices and circuits that enable advanced functionality 44

2.4 QUALITY, RELIABILITY, SAFETY AND CYBERSECURITY

2.4.4.3 Major Challenge 3: ensuring cyber-security and privacy 269



Plain text search



 Road safety



In the mobility application area, the provision of improved, robust, secure and interoperable connectivity will support breakthroughs regarding:

Increasing **road safety** through the CCAM programme.

 Self-learning



Third, **self-learning** techniques (Federative learning, unsupervised learning, ...) will be necessary for fast and automatic adaptation.

In summary, the 2022 ECS SRIA...



-  Is the basis for Xecs Call 2
-  Covers the whole ECS value chain
-  Help you build your proposals
 - Identifying research topics
 - Identifying fit with global industry roadmap



Xeecs Σ

Aeneas

Σ eureka

For more information:

www.eureka-xecs.com

Follow us  