ECS-SRIA 2025

Paolo Azzoni

Secretary General

INSIDE Industry Association

Chips JU 2025 Information Day, Rome, 01/04/2025

E C S

Strategic Research and Innovation Agenda 2025

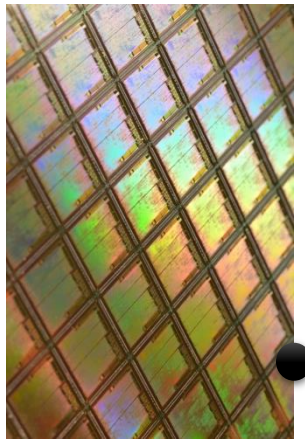
Aeneas

EPoSS. European Association on Smart Systems Integration

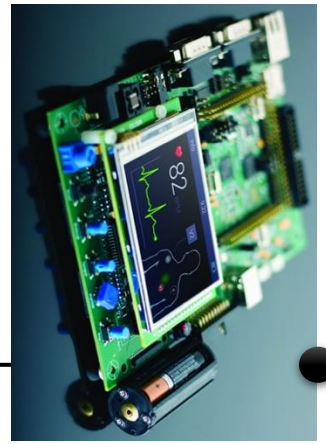
Inside Industry Association

The 2025 ECS SRIA – What ?

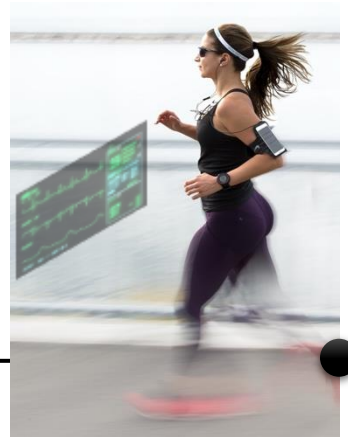
- Presenting **research topics** to be investigated over next 15 years
- To foster and accelerate our European **digital transformation** reflecting European values
- Covering the **whole value chain of Electronic Components & Systems (ECS)**



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



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

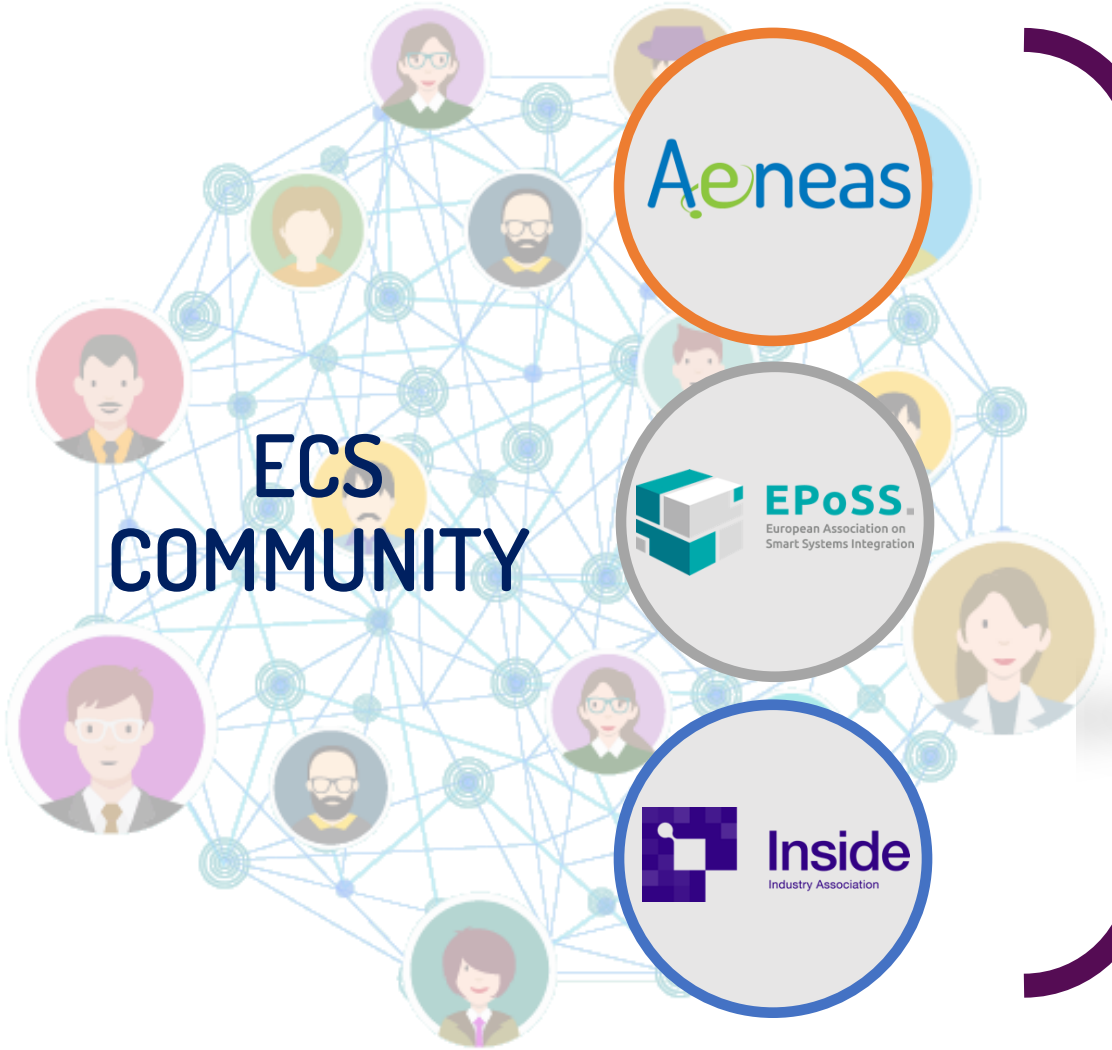


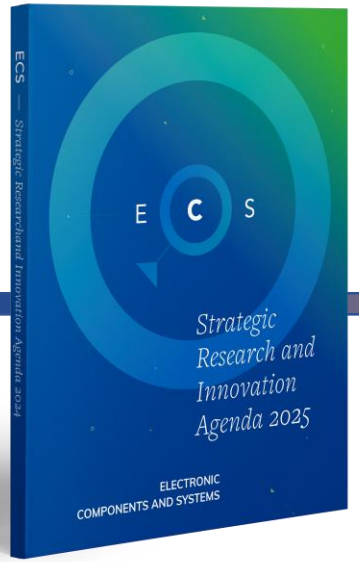
Systems and applications, value creation, societal goals, …

ECS engineering tools

ECS SRIA 2025 – Why?

Align and coordinate research policies across Europe





Chips JU

Xecs

The 2025 ECS SRIA – Who ?

Patrick Cogez
AENEAS
Chairman

Paolo Azzoni
INSIDE IA
Co-chairman

Matthias Küntzel
EPoSS
Co-chairman

Core Team

- Arco Krijgsman - ASML
- Christophe Wyon - CEA
- Jerker Delsing - Lulea University of Technology
- Jürgen Niehaus - SafeTRANS
- Patrick Pype - NXP
- Sven Rzepka - Fraunhofer
- Wolfgang Dettmann - Infineon Technologies AG

More than 280 European experts

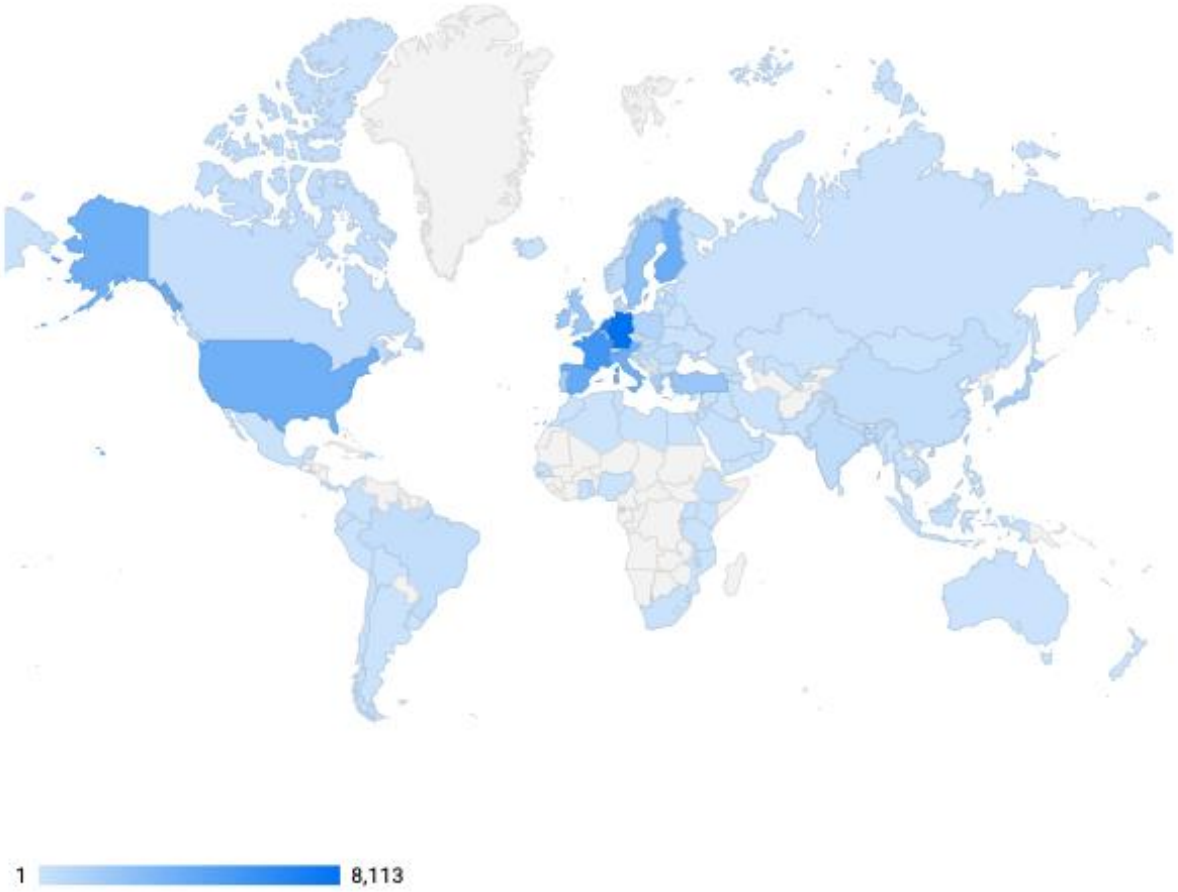
- Interdisciplinary
- Across the whole ECS value chain
- Representing industry, RTO and academia
- 24 countries

ECS SRIA 2025 is online

https://ecssria.eu/

- Native indexing and analytics
- More advanced functionalities for:
  - Topics search
  - Selective reading
- Increased visibility and accessibility
  - Attract new talents and experts

Global reach out



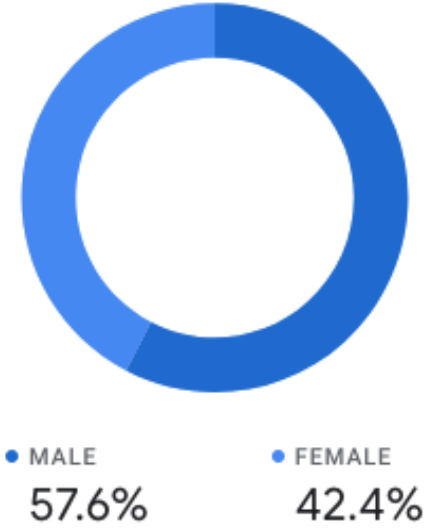
	Country	Views ▾
1.	Germany	8,113
2.	Netherlands	6,551
3.	France	5,476
4.	Spain	4,023
5.	Finland	3,875
6.	Italy	3,714
7.	United States	3,680
8.	Austria	3,601
9.	Belgium	3,026
10.	Sweden	2,291
11.	Türkiye	2,008
12.	United Kingdom	1,812
13.	Ireland	1,789
14.	Portugal	1,247
15.	Japan	1,244
16.	Greece	1,214
17.	Poland	992
18.	Switzerland	780
19.	Taiwan	721
20.	Norway	554
21.	India	498
22.	Hungary	461
23.	Latvia	444

Visited from
120 countries

Visits and engagement index

Page	Visits			Eng. Index
Website Home	8307			
ECS-SRIA Home	12003			23
Introduction	5974			67
Outline	2392			28
CHP 1.1	3505			80
CHP 1.2	2724	**Part 1**	9019	86
CHP 1.3	1523			74
CHP 1.4	1268			51
CHP 2.1	3141			73
CHP 2.2	874	**Part 2**	6773	63
CHP 2.3	1384			59
CHP 2.4	1374			70
CHP 3.1	1214			62
CHP 3.2	988			68
CHP 3.3	937	**Part 3**	5731	55
CHP 3.4	1098			82
CHP 3.5	845			91
CHP 3.6	649			40
CHP 4	909	**Part 4**	909	58
Appendix A	814			
Appendix B	529			
… Other pages	6391			
Total:	**58843**			

The engagement index provides a better indication of audience interest on chapters

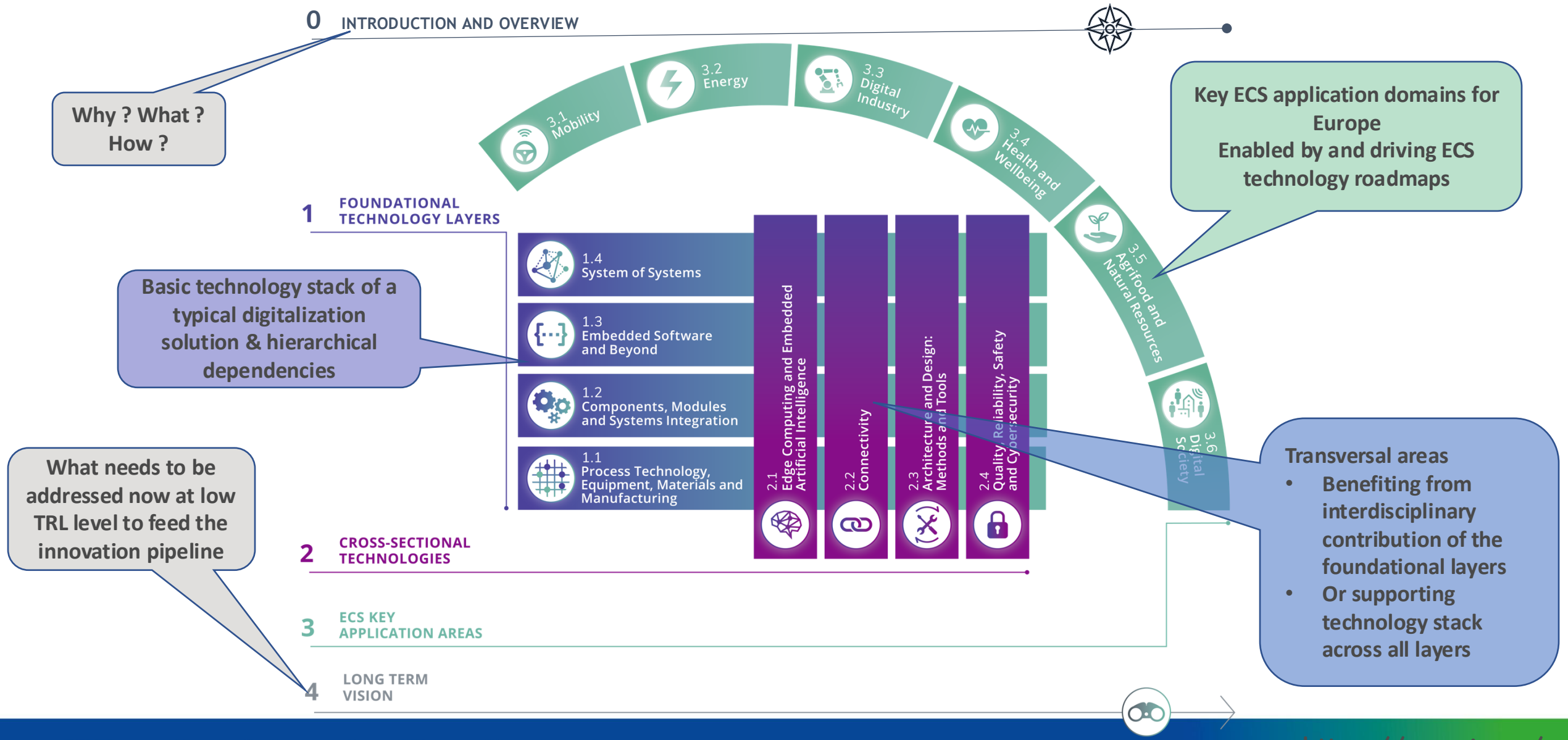


Nearly 60000 visits in 2024

Users' interests:

-Technology 51%
- Finance 38%
- Politics 32%
- Lifestyle 31%
- Sport 28%

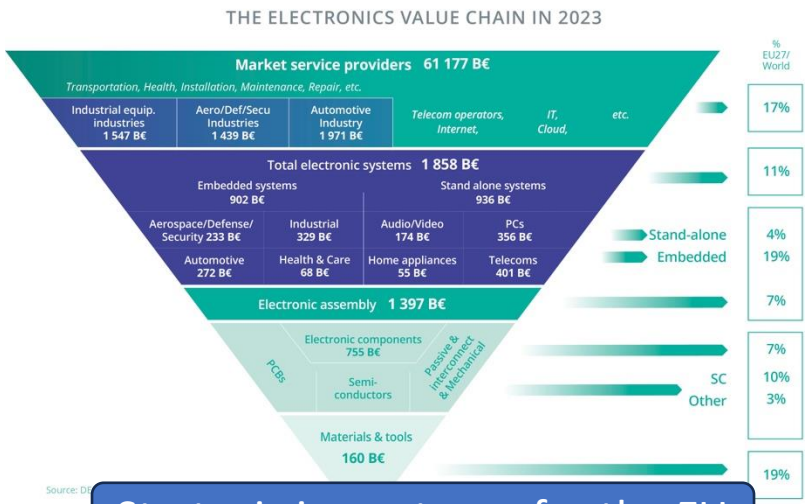
ECS-SRIA structure



ECS-SRIA 2025 updates

Ch. 0 - Restructured in Why / What / How

- Why ECS matter



Strategic importance for the EU

Addressing societal challenges

- What? SRIA content, including new and/or expanded cross-cutting themes

Chiplets

Open Source Hardware

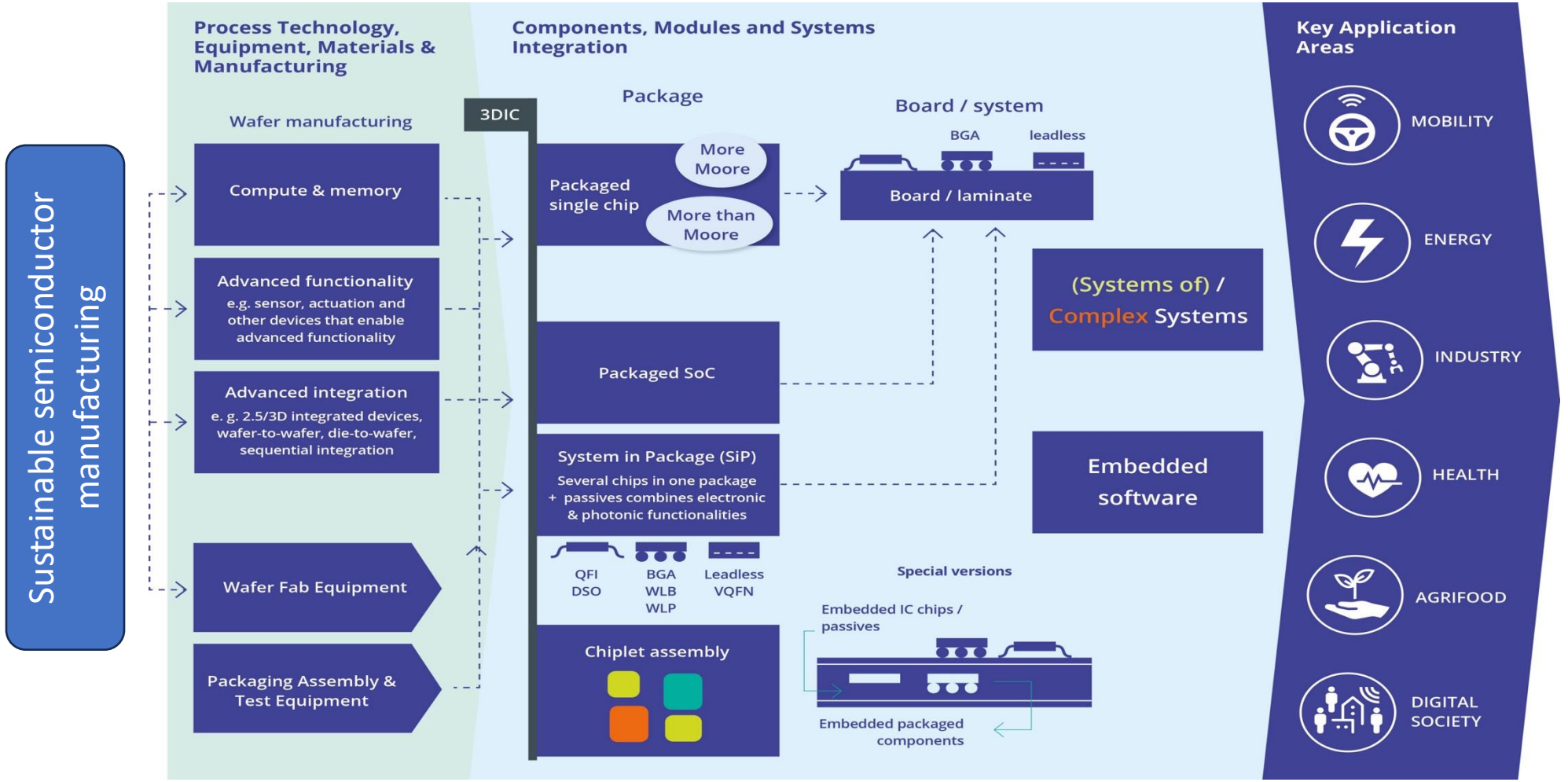
Quantum Technologies

AI

Silicon Photonics

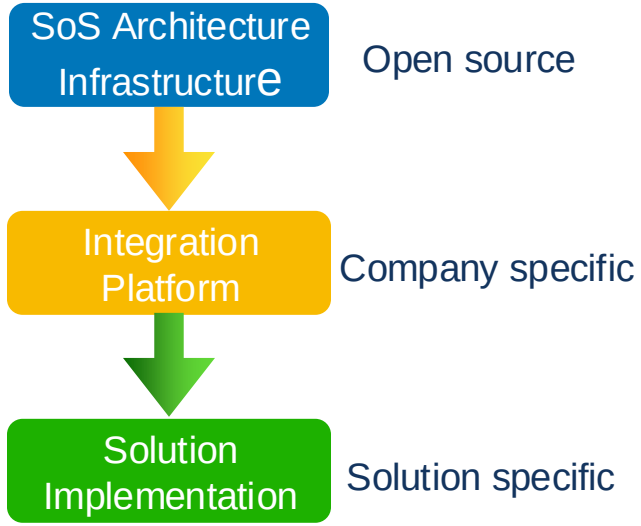
- How to make it happen
  - Link with Pilot Lines and the Design Platform

Ch. 1.1 - Process Technology, Equipment, Materials and Manufacturing & Ch. 1.2 – Components, Modules and Systems Integration



Ch. 1.3 – Embedded Software and Beyond
& Ch. 1.4 – System of Systems

- **Scale and complexity of System and SoS integration, monitoring and management over its life cycle**
  - Including sustainability dimension
- **Importance of engineering efficiency**
  - Embedded software
    - New programming languages (Rust)
    - Virtualisation and virtual prototypes
  - System of Systems
    - Model based engineering
    - Low code technologies
    - AI supported engineering tools
    - Automation of test, verification and validation processes



Key trends in embedded Software

- Quantum Computing
- Computing accelerators
- Artificial Intelligence

SoS infrastructure concept

- Enabling company and application specific platforms
- Enabling efficient engineering of solutions

Ch. 2.1 - Key trends

More and more convergence between edge computing and embedded (generative) AI, but ***still a lot of edge will be without AI***

Emergence of ***Gen-AI at the edge***

<u>New Recommendations:</u>

- A system becomes an ***orchestration of federated services, distributed or centralized*** (Software Defined X).
- Disaggregation of complex SoC into chiplet + interposers, but still no ecosystem of interoperable chiplets and overall architecture.
- ***Memory cost is crucial for generative AI at the edge***. New innovations required to avoid to waste RAM
- Emergence of (very) cheap Chinese Risc-V microcontrollers
- Further ***reducing standby power*** and fast on operation (stop and go for chips?)
- Still research required for ***new computing paradigms*** (neuromorphic, ***using physics to make computation*** – analog computing -, etc) and their ***validation*** in product ready solutions.

Ch. 2.2 – Connectivity

LAYER		DATA UNIT	FUNTION
HOST LAYERS	7. Application		Network process to application.
	6. Presentation	Data	Data representation, encryption and decryption, convert machine-dependent data to machine-independent data.
	5. Session		Interhost comunication, managing sessions between applications.
	4. Transport	Segments	Reliable delivery of segments between points on a network.
MEDIA LAYERS	3. Network	Packet/Datagram	Addressing, routing and (not necessarily reliable) delivery of datagrams between points on a network.
	2. Data link	Bit/Frame	A reliable direct point-to-point data connection.
	1. Physical	Bit	A (not necessariliy reliable) direct point-to-point data connection.

- Updates to the frequency scope of wireless connectivity
  - Downplaying significantly higher frequencies
- Support for efficient engineering of application solution connectivity
- Support to SoS integration and interoperability

Ch. 2.3 – Architecture and Design: Methods and Tools & Ch. 2.4 – Quality, Reliability, Safety and Cybersecurity

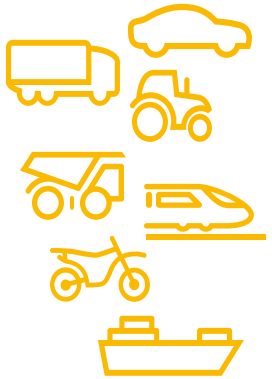
- **Architecture and Design**
  - Ever increasing functionality and complexity of ECS based systems comprising heterogeneous subsystems and components
  - Agile continuous development processes by using data collected during run-time (and production, maintenance,…)
  - AI a curse and a blessing
    - Increased use of AI in components and subsystems, with corresponding challenges for quality and safety assurance
    - Advanced productivity and cost-effectiveness by using AI in Development and Test
  - Need for sustainable design for sustainability

- **Quality, Reliability, Safety and Cybersecurity**
  - A degraded behaviour in any of these 4 dimensions or an incorrect integration among them, would affect vital properties of ECS and could cause serious damage
  - Rethink many “traditional” approaches and expected performances towards safety and security, exploiting AI and ML (machine learning)
  - New text on
    - Chiplet-based approach
    - AI innovation & safety and cybersecurity issues

Ch. 3.1 – Mobility

Mobility modes considered in chapter:

- **Automotive mobility** for passengers and goods: passenger cars, two/three wheelers, trucks
- **Maritime mobility**: ships
- **Aerospace mobility** for passengers and goods: airplanes, helicopters, drones
- **Mobility on rails**: trains
- **Mobility in smart farming and off-road machinery**: smart farming machinery, smart mining, …

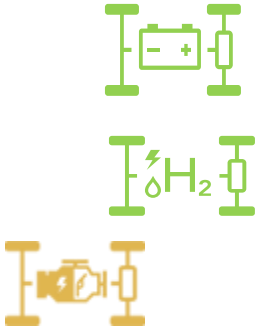


Automation level

- Vehicles supported by **ADAS** (advanced driver assistance systems)
- **Automated** and autonomous vehicles (AD)
- **Software defined vehicles** (in-vehicle stack, off-vehicle cloud stack) (Infotainment, cockpit, ADAS/AD, Body & chassis control)

Energy type

- **Battery electric** vehicles (trains, passenger cars, trucks, off-road machinery, airplanes)
- **Hydrogen** powered vehicles (trains, passenger cars, trucks, off-road machinery, airplanes)
- **Hybrid** vehicles



Areas for ECS

- **HPC HW** and **SW** for **Stacks** in mobility (e.g. SDV)
- **HW** and **SW** for **ADAS/AD sensors**
- **Automated driving** for various mobility modes
- **Fast** and **energy efficient** power converter chips (**SiC, GaN**)
- **AI** supported **engineering tools** and **toolchains** to significantly increase development efficiency in DevOps processes

Ch 3.1 - Major challenges in ECS for Mobility

- **Major challenge 1:** SDV hardware platforms: Modular, scalable, flexible, safe & secure
- **Major challenge 2**: SW Platforms for SDV of the future; Modular, scalable, re-usable, flexible, safe & secure, supporting edge2cloud applications
- **Major challenge 3:** Climate and energy neutral mobility: CO_2-neutral mobility
- **Major challenge 4:** Digitalisation: Affordable, automated, and connected mobility for passengers and freight
- **Major challenge 5:** Edge2cloud mobility applications: Added end-user value by cloud2cloud features
- **Major challenge 6:** Validation: Methods and tools using AI for validation and certification of safety, security, and comfort in mobility

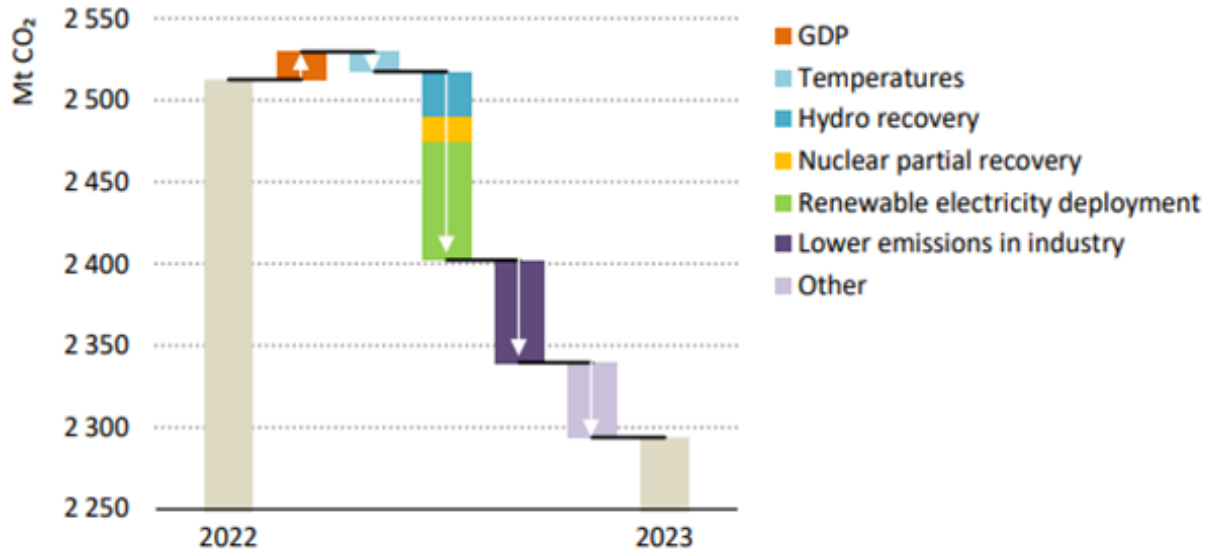
These 2 challenges were combined in one topic in SRIA 2024

- **Multimodal mobility** ⟹ **moved** to chapter "**Digital Society**" in SRIA 2025

Ch. 3.2 – Energy

Electronic components and systems (ECS) are key to future energy systems being optimised in both design and operation, for high efficiency, substitution to zero emission technologies, low CO2-emissions, cost, and security of supply.

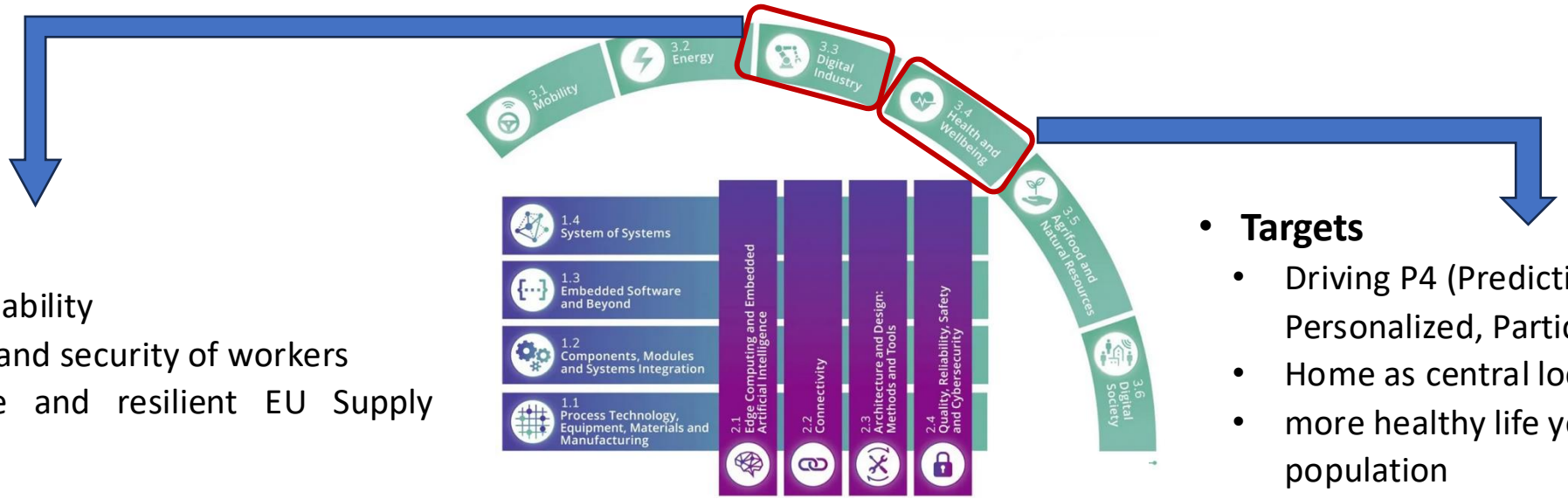
Figure 9: Change in total CO_2 emissions from combustion in the European Union by driver, 2022-2023



IEA (2024), CO2 Emissions in 2023, IEA, Paris https://www.iea.org/reports/co2-emissions-in-2023, Licence: CC BY 4.0

Ch. 3.3 - Digital industry & Ch. 3.4 – Health and Wellbeing

Impact of introduction of cutting-edge digital technologies



- **Targets**
  - Sustainability
  - Safety and security of workers
  - Flexible and resilient EU Supply Chains

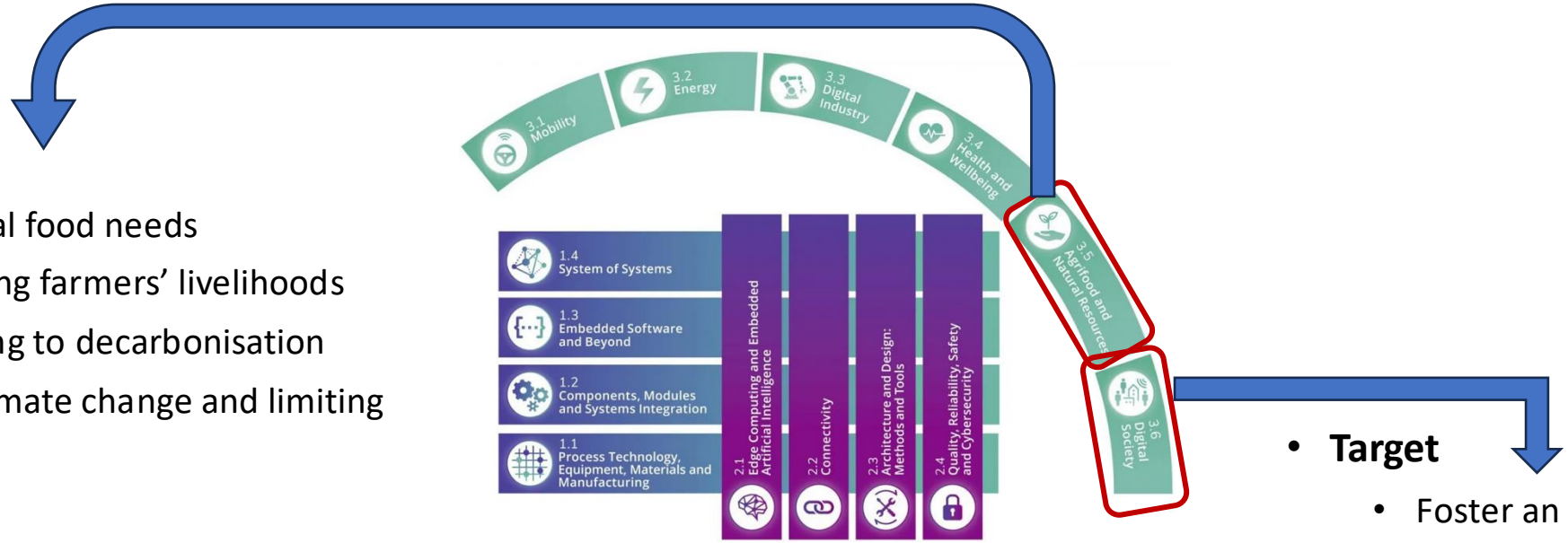
- **Targets**
  - Driving P4 (Predictive, Preventive, Personalized, Participatory) medicine
  - Home as central location of care
  - more healthy life years for an ageing population

- **Key ECS research threads**
  - Trustworthy, responsible AI, XR and robotics
  - Exploitation of next generation HW architectures and new chip design (e.g. RISC-V, PIC)

- **Key trends**
  - MedTech and Pharma moving towards comprehensive healthcare platforms using smart devices, remote monitoring, data analytics, and AI
  - Blurring the boundaries between Pharma, MedTech, and Chips companies, fostering cross-industry collaboration

Ch. 3.5 – Agrifood and natural resources & Ch. 3.6 – Digital Society

- **Targets**
  - Meet global food needs
  - Safeguarding farmers' livelihoods
  - Contributing to decarbonisation
  - Slowing climate change and limiting its impact



- **Target**
  - Foster an inclusive, sustainable, and resilient society

- **Accelerate the deployment of smart systems in agriculture, food production, natural resources and ecosystems**
  - Increase electrification and use of agrivoltaics solutions
  - Increase the development of agroforestry
  - Introduce IoT solutions based on AI
  - Provide education and agriculture-based services
  - Reducing food loss and waste

- **Trends**
  - Digitisation
  - Use of AI-based tools (such as ChatGPT, …)
  - Increasing need to protect against fake video and audio
  - Increasing importance of cybersecurity

Ch. 4 - Long Term Vision Chapter

Identify the research subjects that need to be addressed now at low TRL in order to feed the pipeline of innovation of the European ECS ecosystem in the longer term

- **Major topics:**
  - Sustainability
    - Energy, power, water in chemical processes
    - Recyclable devices
    - Environmental aspects
    - Innovative materials
  - Quantum technologies and enabling ECS
  - Distributed intelligence (includes "Distributed AI", "Embedded AI", etc.)
  - Connectivity (Information transfer, connectivity for system integration, security issues)
  - Non-conventional computing and storage devices
  - Advanced packaging and heterogeneous integration technologies and tools
  - Autonomous systems
  - Resilient (robotic) applications
  - Supply chain issues

ECS-SRIA 2026

ECS-SRIA 2026

- **ECS-SRIA 2026 Chaired by EPOSS**
  - **Elisabeth Steinmetz – vdivde-it**
  - **Christoph Hesse - vdivde-it**
- K.O. hold on 19/02/2025 – ECS Brokerage Event.

- **Confirmed the important role for our community, Chips JU and Xecs.**
- **High visibility and reputation / world-wide recognition.**
- EC estimates the high level of content but is **missing strategic guidance and priority setting** by the ECS-SRIA.
- The influence of the ECS SRIA as basis for the bottom-up calls in the Chips JU was reduced during the last years (more and more Focus Topic Calls and larger investments in the Chips 4 EU initiative).

Change request process overview

Open consultation

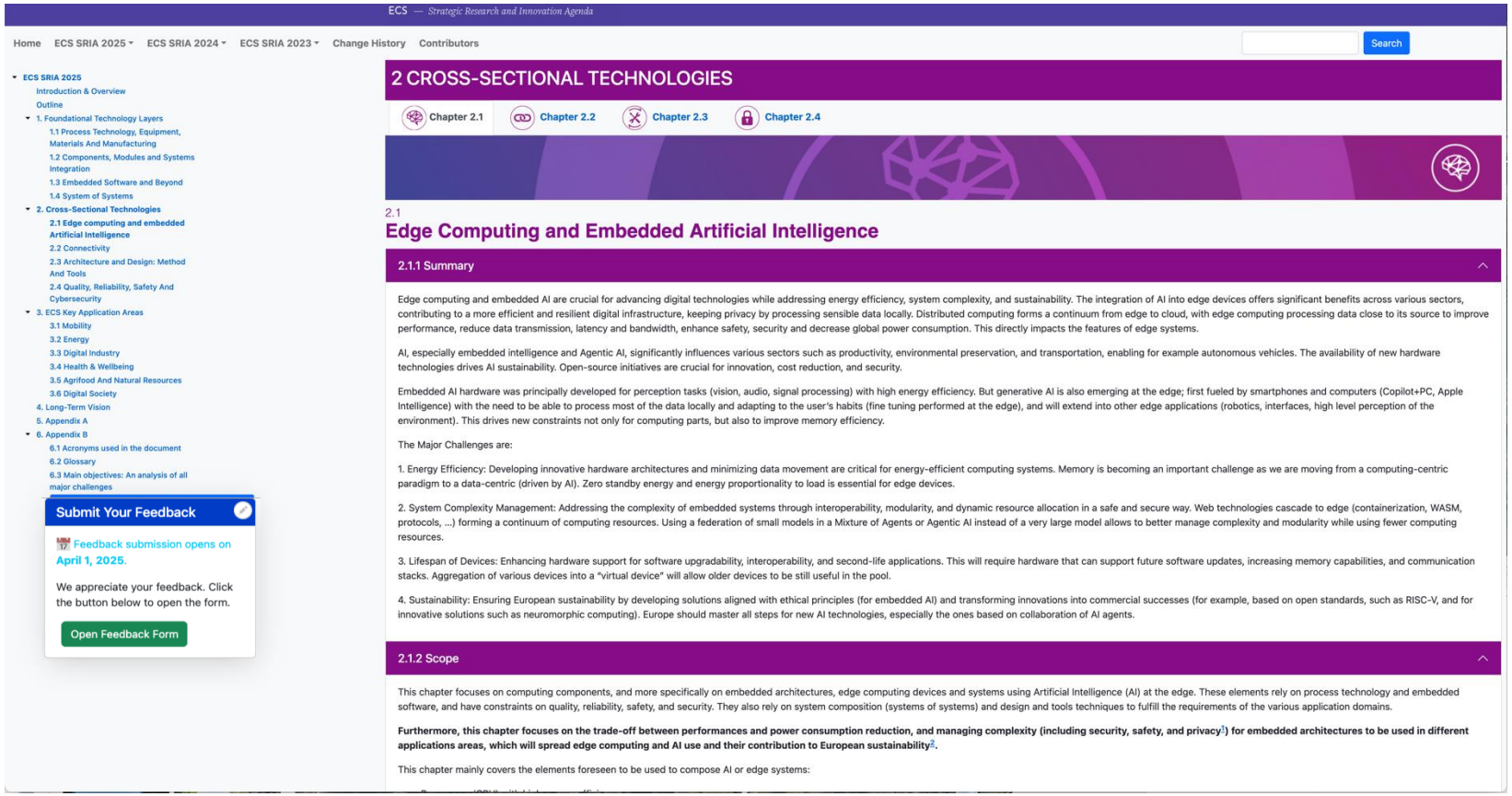
The community can submit change requests to the ECS-SRIA team through an online form during a consultation period (…)

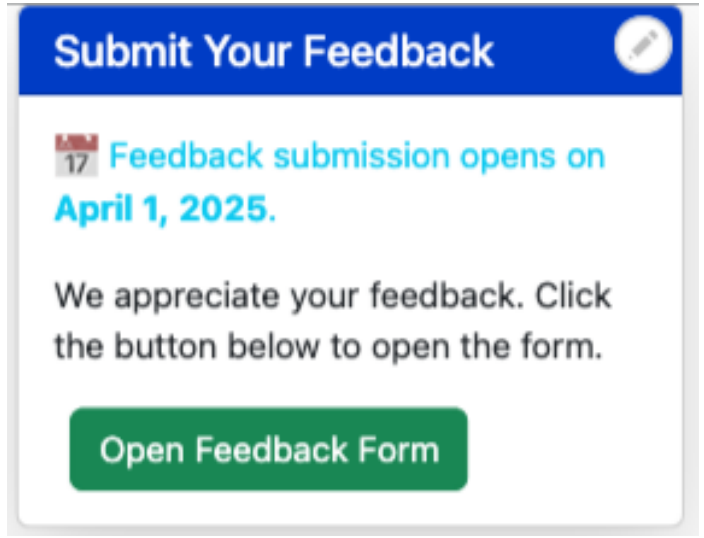
- All changes are collected in a tracking system
- Approval and implementation status is tracked
- Chapter teams and Core team use the request form as well
- After the consultation period, the changes are reviewed and aligned
- The rest of the yearly process remains similar to the previous years

The change request submission form

- Where to find it: In the ECS SRIA 2025 view
- What can be submitted:
  - Contact information
  - Formatted text including images
  - Sub-Chapter
  - Affected additional chapters
- Security check
- At each request, a new excel is created with all requests up to now.
- Email is sent to two chapter leaders

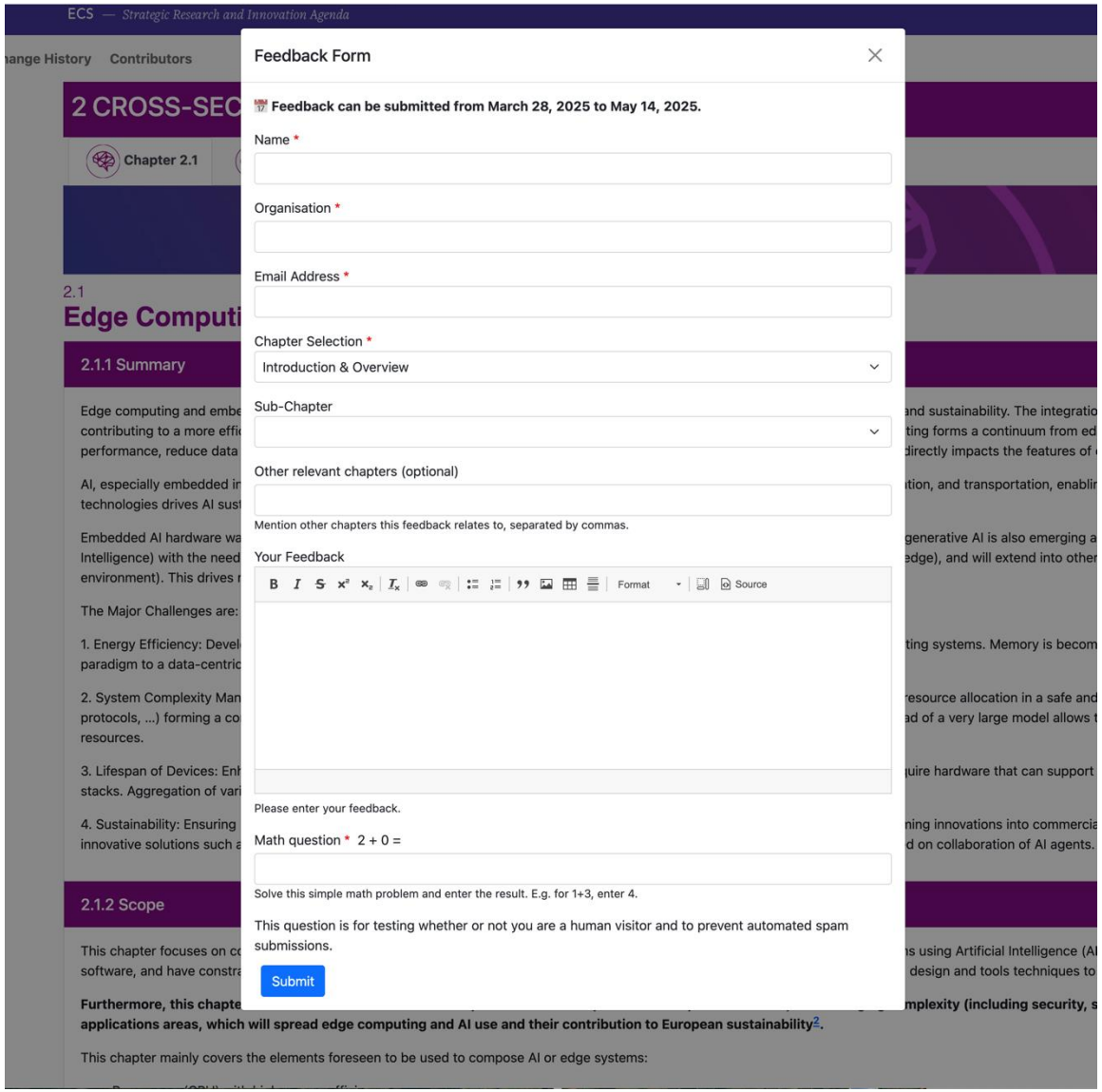
The change request submission form (2)





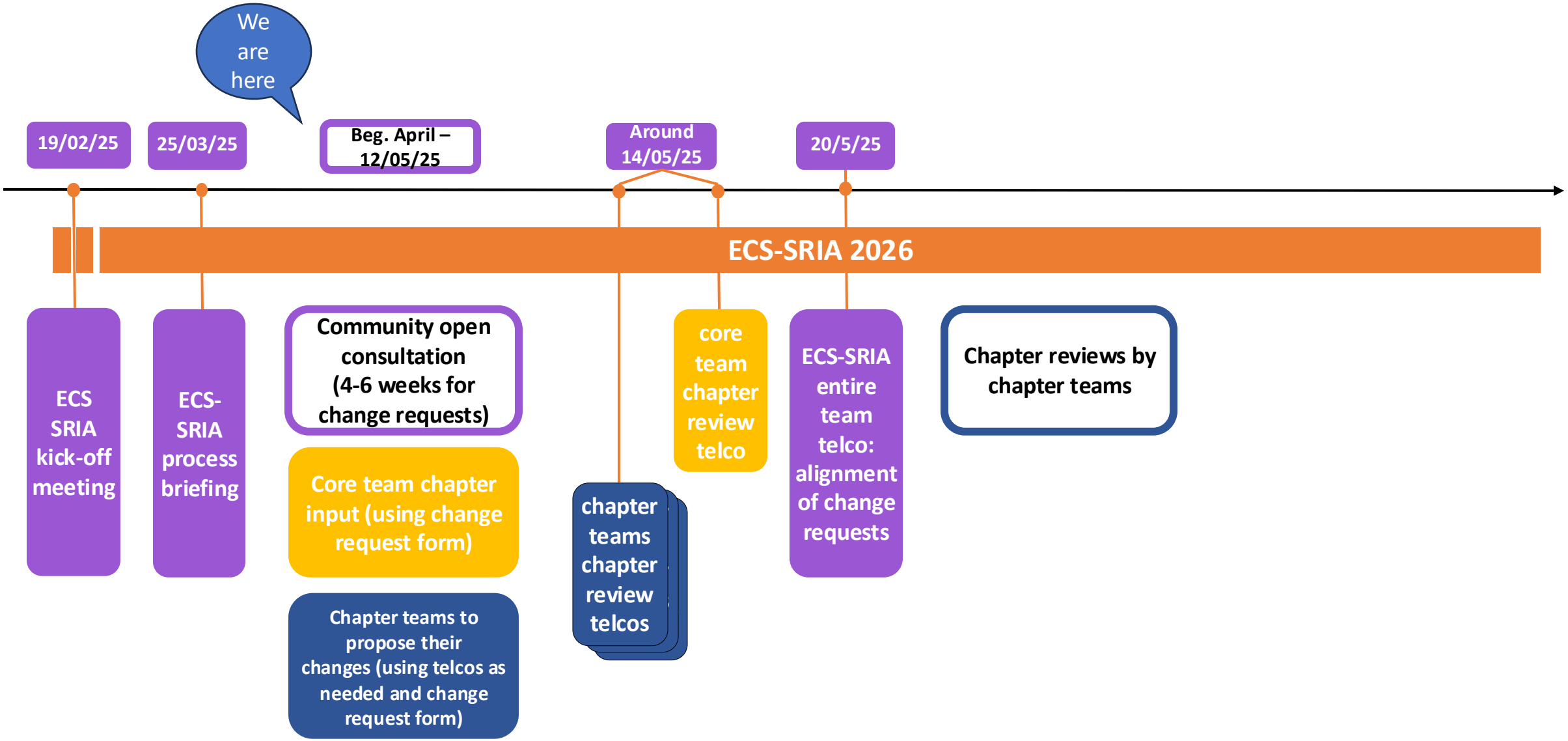
Open consultation start date to be confirmed!

The change request submission form (3)

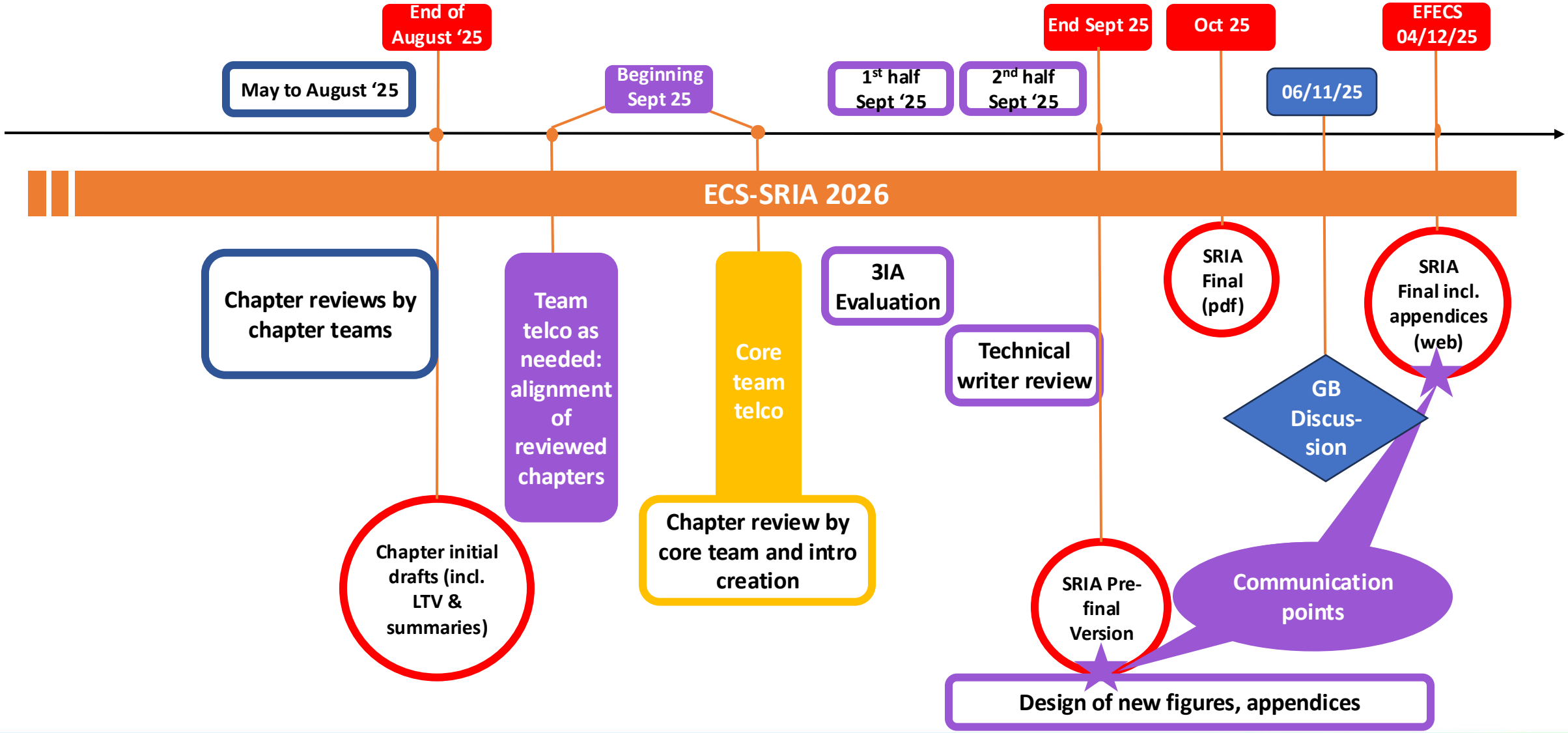


The feedback form includes a WYSIWYG editor, allowing to provide text in a rich format and include also images.

ECS SRIA 2026 Timeline - 1



ECS SRIA 2026 Timeline - 2 - preliminary



Thanks for you attention