

“Europe will not be made all at once, or according to a single plan. It will be built through concrete achievements which first create a de facto solidarity.”

Robert Schuman

WORKSHOP ON PHOTONICS

Yves GIGASE
Head of Programmes
30 March 2022



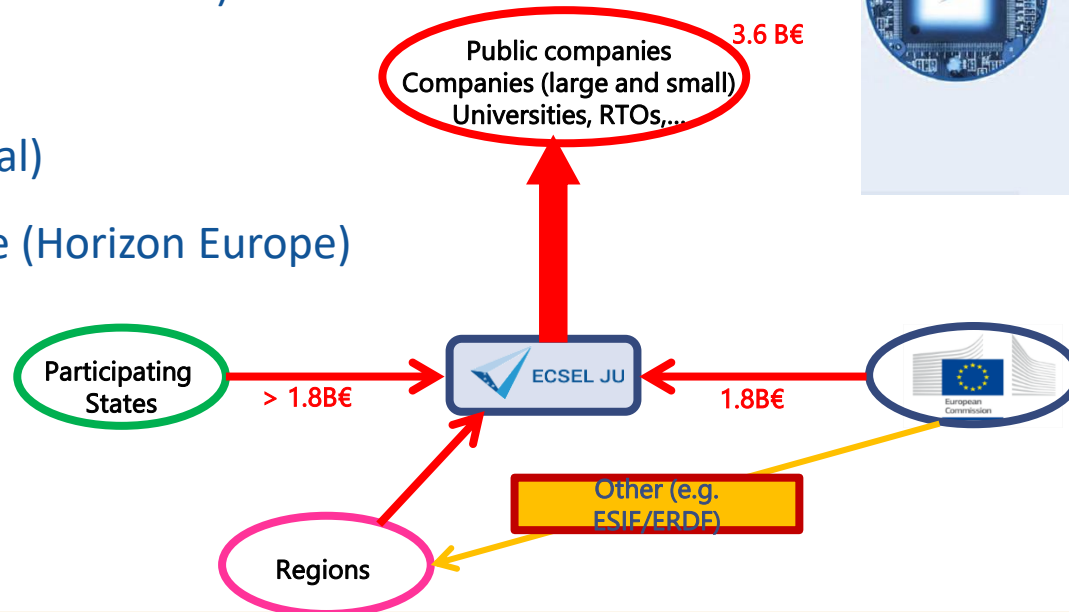
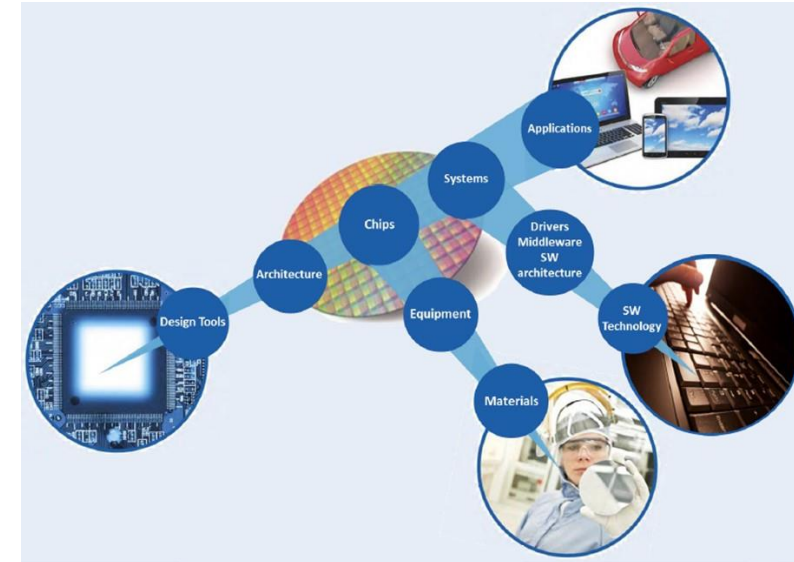
KDT JU

KEY DIGITAL
TECHNOLOGIES
JOINT UNDERTAKING



KDT JU 2021-2027

- Third generation JU
- KDT JU = Key Digital Technology Joint Undertaking
- Tripartite: Commission - Participating states – Industry associations
- Associations: AENEAS, INSIDE, EPoSS
- Started : 30 November 2021 (ECSEL JU -> KDT JU)
- Budget ambition : 6B€
funded by 1,8 B€ (EU)+1,8 B€ (national)
- Based on new framework programme (Horizon Europe)

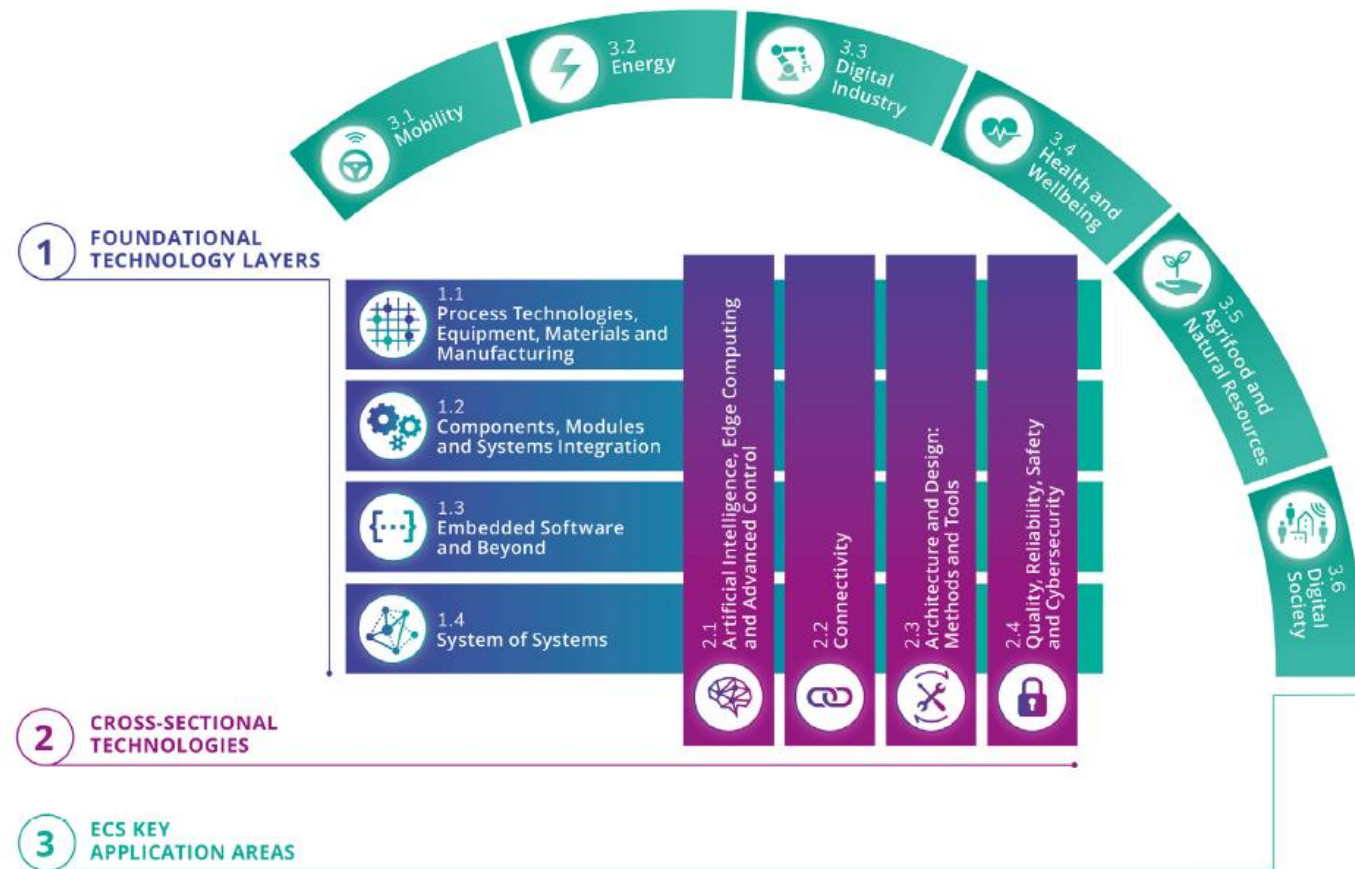


ECS SRIA

- Boost **industrial competitiveness** through **interdisciplinary** technology innovations.
- Ensure/reinforce **EU strategic autonomy** through secure, safe and reliable ECS supporting key European application domains.

BUT

- Horizon Europe stresses the importance of cooperation. There are clear potential synergies with the Photonics PPP that need to be explored.



UPCOMING CALLS

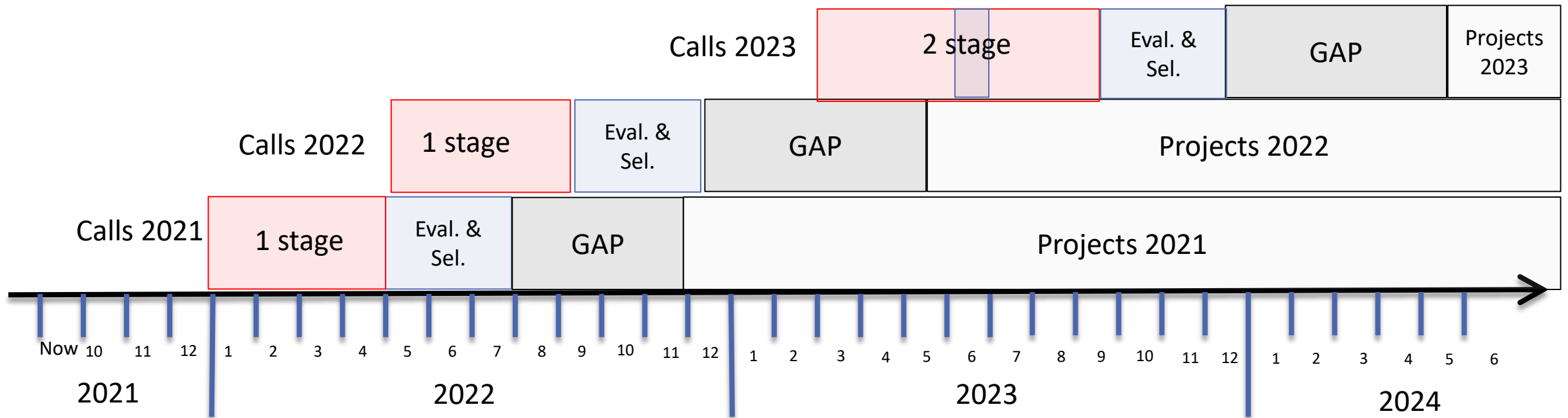
Caveat: no decisions yet for calls 2022 and calls 2023

Call 2022: UNDER PREPARATION

- Call RIA general and 1 Focus Topic (Green ECS)
- Call IA general and 2 Focus Topics (Photonics Line and RISC V)

Check out our website and call webpage

<https://www.kdt-ju.europa.eu/current-call>



CALL 2022 FOCUS TOPIC UNDER PREPARATION

- Focus topic = Top down approach
- Title (tentatively): Industrial supply chain for silicon photonics (IA)
- Type: IA = higher TRLs = towards industrialization at end of project is 8 for the industrial pilot line and TRL 6-7 for the other outcomes

Introduction:

- **need for agile wafer-scale technologies** for the **heterogeneous integration of chiplets** or materials that **leverage** the current **silicon photonics legacy**
- European RTOs have developed state of the art pilot lines for this technology and are capable of low volume manufacturing. But **industrial capacity is largely missing**.
- Bringing this technology to industrial scale is a **challenge** but there is **urgency** and it befits the objective of the KDT JU to reinforce the Union's strategic autonomy in electronic components by supporting the **fast transfer of technologies from the research to the industrial environment**.
- Proposals should also lay the **groundwork for future exploitation and further enhancements**.
- The efforts should **accelerate the transfer from low volume manufacturing to large volume** manufacturing and **render it accessible to a wider community**. If successful, those could be **supported by future calls** within KDT and/or other programs.

CALL 2022 FOCUS TOPIC UNDER PREPARATION: INTRO

Expected outcomes:

- **Industrial manufacturing capability** for current and **next generation** silicon photonic integrated circuits (**PICs**).
- **Industrial value chains** for products that address major global challenges in e.g. mobility, health, digital communication, computing and environmental sensing. This includes **specialized equipment** (e.g. metrology, epitaxy, packaging), **innovative processes, advances in packaging** for Systems in Package that contain photonic components. Development of **supply chains for heterogeneous silicon photonics**, reinforcing Europe's innovation potential, boosting its competitiveness, and **ensuring technological sovereignty** in this field.
- Develop **agile heterogeneous PIC platforms** of separately manufactured components or CMOS-uncommon materials onto silicon photonics wafers (wafer-level heterogeneous integration) that provide enhanced functionality and improved performance for a **wide range of functionalities** and **high-value markets** geared to higher TRLs and **prepared for transfer to the industrial platforms**.
- **Photonic Design Automation software of industrial grade** based on Process Design Kits (PDK) for PICs.

CALL 2022 FOCUS TOPIC UNDER PREPARATION

Scope

- **establish** a (eventually distributed) industrially based **pilot line** for a **silicon manufacturing platform** covering **front and back end, integration and packaging (SiP)** as well as wafer-level-test, chip testing, device testing to **industrial standards**.
- **enable** breakthroughs in **silicon PIC platforms**, overcoming their current limitations, by wafer-level heterogeneous integration of CMOS-uncommon materials or processed chiplets and prepare the transfer to the industrial silicon manufacturing platform.
- **At least two demonstrators** should be built including PICs made on the pilot line covering **distinctive high volume applications** such as LIDAR technology, consumer medical applications, etc.

CALL 2022 FOCUS TOPIC UNDER PREPARATION

This pilot line shall include innovations such as:

- develop **innovative approaches to manufacturing techniques** for heterogeneous integration, considering judicious choices with respect to scaling, performance, alignment accuracy, agility, reliability, non-recurring engineering costs (NREs), market potential.
- develop **associated photonic process design kits (PDKs)** of industrial grade and **make a start to automated photonics ICs design tools**
- develop **innovative solutions to packaging and system in package** appropriate to PICs

CALL 2022 FOCUS TOPIC UNDER PREPARATION

Proposals are encouraged:

- to allocate tasks to **cohesion activities** (if relevant) with the projects selected under the call HORIZON-CL4-2021-DIGITAL-EMERGING-01-07: Advanced Photonic Integrated Circuits (RIA)
- organise activities **promoting the cooperation** between the KDT JU and the European partnership for photonics,
- to develop a **service-offer that will allow SMEs** and other interested organizations to prototype and manufacture PICs