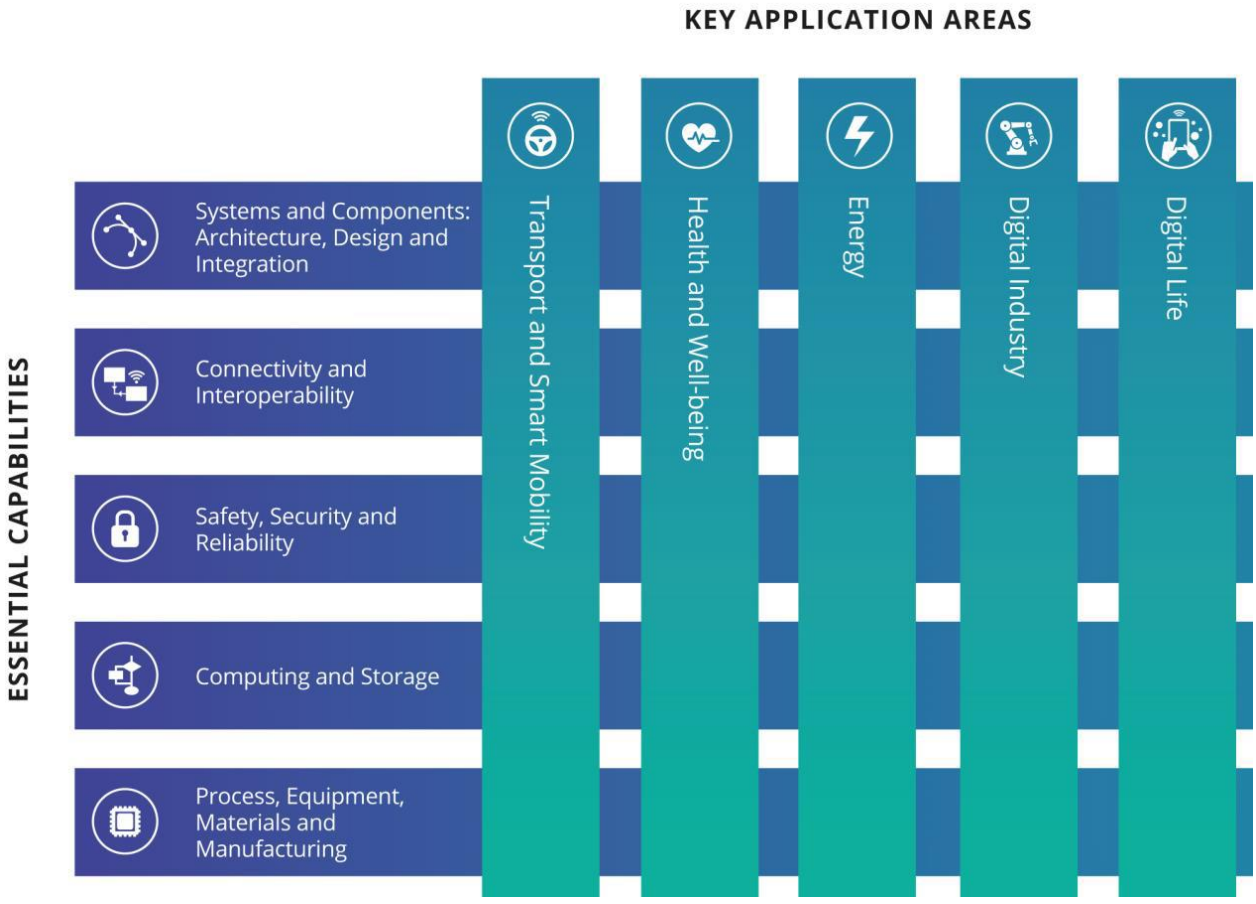
# Electronic Components and Systems for European Leadership (ECSEL) - JOINT UNDERTAKING

The "Electronics Components and Systems for European Leadership" Joint Undertaking (ECSEL JU) has the mission to contribute towards keeping Europe at the forefront of the technology development addressing capabilities of essential systemic and strategic importance for each citizen, company and nation in the contemporary world and even more in the future world. The information and communication technology and its applications run on this fabric: no industrial product or system is conceivable today without extensive usage of electronic components and systems (ECS), and the trend will become stronger in the future.

The ECSEL JU will contribute to the above industrial ambition of value creation in Europe and the objectives in its basic act by establishing a programme through a **two-dimensional matrix of 5 key applications and 5 essential technology capabilities**, altogether the ECSEL **Focus Areas** (see figure below). The Key Applications are strongly connected to the Societal Challenges identified under Horizon 2020, and can be summarized under the umbrella of 'Smart Everything Everywhere', riding the next Internet wave (i.e. Internet of Things [IoT]) by integrating networked electronic components and systems in any type of product, artefact or goods. In this context, the Key applications are enabled by Essential capabilities in technologies.

On top of the matrix structure, **long-term vision** on both key applications and essential technologies is supported.



In 2019, ECSEL launched 3 Calls for proposals for **1) Innovation Actions (IA)**, **2) Research and Innovation Actions (RIA)**, 3) CSA to support the Health.E lighthouse initiative.

This document summarises the IA and RIA calls, open from February 6th 2019. The deadlines are:
**Project Outline (PO) phase: 07/05/2019**
**Full Project Proposal (FPP) phase: 18/09/2019**

**Funding:**
ECSEL projects will be funded by 1) **the EU** and by 2) **national public authorities** (MIUR or MISE, depending on the action).

**1: EU funds**
The total EU budget is: 92.5 M€ for IAs; 65.8 M€ for the regular RIA call; 15 M€ for the special RIA calls (see below). The EU funding rates are:

| Type of beneficiary | IA | RIA |
|---|---|---|
| Large enterprise | 20% | 25% |
| SME | 25% | 30% |
| University/other (not for profit) | 35% | 35% |

**2: Italian funds**
The **Italian public authorities' budgets, special eligibility rules and funding rates are detailed in the related websites and in the 2019 WP**.

All Italian participants must upload a set of additional information and national documents on national public authorities' (MIUR or MISE) platforms. These documents must be **submitted by the same deadline of the Full Project Proposal (FPP) phase** of the ECSEL call.

**NOTE**: apart from the exception described below, **participants can choose any of the topics by applying either to the RIA or the IA call**. The essential differences between the two actions are the addressed Technology Readiness Level (TRL) (RIA – TRL 3 - 4; IA – TRL 5 - 8) and the funding rates. For more details on the difference between the two actions in ECSEL, see Multi-Annual Strategic Plan (MASP) – Chapter 3.

**NOTE**: two special RIA calls have been opened for the following topics:
- **Special topic 1: Architectures, components, and systems for validation/simulation of connected automated vehicles.**
- **Special topic 2: Edge computing**.

**NOTE**: differently from other JU or H2020 calls, the topics (specific challenge, scope and expected impacts) are not described in the Research Participant Portal but in the related sections of the Multi-Annual Strategic Plan (MASP).

**NOTE**: in the **Project Outline (PO) phase**, the limits of the three proposal's chapters are: Excellence: 60 pages; Impact: 60 pages; Implementation: 60 pages.
in the **Full Project Proposal (FPP) phase**, the limits of the three proposal's chapters are: Excellence: 60 pages; Impact: 100 pages; Implementation: 100 pages

All open topics, grouped by Focus Area are listed in the following pages.

## Key Application Areas

| | | |
|---|---|---|
| **Transport & Smart Mobility** | | |
| RIA | Developing clean, affordable and sustainable propulsion | IA |
| | Ensuring secure connected, cooperative and automated mobility and transportation | |
| | Managing interaction between humans and vehicle | |
| | Implementing infrastructure and services for smart personal mobility and logistics | |
| **Health and Well-Being** | | |
| RIA | Moving healthcare from hospitals into our homes and daily life enabling preventive and patient centric care | IA |
| | Restructuring healthcare delivery systems, from supply-driven to patient-oriented | |
| | Engaging individuals more actively in their own health and well-being | |
| | Ensuring affordable healthcare for the growing amount of chronic, lifestyle related diseases and an ageing population | |
| | Developing platforms for wearables/implants, data analytics, artificial intelligence for precision medicine and personalized healthcare and well-being | |
| **Energy** | | |
| RIA | Ensuring sustainable power generation and energy conversion | IA |
| | Achieving efficient community energy management | |
| | Reducing energy consumption | |
| **Digital Industry** | | |
| RIA | Developing Digital twins, simulation models for the evaluation of industrial assets at all factory levels and over system or product life-cycles | IA |
| | Implementing AI and machine learning, to detect anomalies or similarities and to optimize parameters | |
| | Generalizing conditions monitoring, to pre-damage warning on-line decision-making support and standardisation of communication scenarios to enable big data across huge (remote) sites | |
| | Developing digital platforms, application development frameworks that integrate sensors and systems | |
| **Digital Life** | | |
| RIA | Ensuring safe and secure spaces | IA |
| | Ensuring healthy and comfortable spaces | |
| | Ensuring anticipating spaces | |
| | Ensuring sustainable spaces | |

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RIA: Research and Innovation Action
IA: Innovation Action

## Essential Technology Capabilities

| | | |
|---|---|---|
| **Systems and Components: Architecture, Design and Integration** | | |
| RIA | Managing critical, autonomous, cooperating, evolvable systems | IA |
| | Managing Complexity | |
| | Managing Diversity | |
| | Managing Multiple Constraints | |
| | Integrating features of various technologies and materials into miniaturized smart components | |
| | Effectively integrating modules for highly demanding environments | |
| | Increasing compactness and capabilities by functional and physical systems integration | |
| **Connectivity and Interoperability** | | |
| RIA | Meeting future connectivity requirements leveraging heterogeneous technologies | IA |
| | Enabling nearly lossless interoperability across protocols, encodings and semantics | |
| | Ensuring Secure Connectivity and Interoperability | |
| **Safety, Security and Reliability** | | |
| RIA | Ensuring safety, security and privacy by design | IA |
| | Ensuring Reliability and Functional Safety | |
| | Secure, safe and trustable connectivity and infrastructure | |
| | Privacy, data protection and human interaction | |
| **Computing and Storage** | | |
| RIA | Increasing performance at acceptable costs | IA |
| | Making computing systems more integrated with the real world | |
| | Making "intelligent" machines | |
| | Developing new disruptive technologies | |
| **Process technology, equipment, materials and manufacturing for electronic components & systems** | | |
| RIA | Developing advanced logic and memory technology for nanoscale integration and application-driven performance | IA |
| | Developing technology for Heterogeneous System-on-Chip (SoC) Integration | |
| | Developing technology for Advanced Packaging and Heterogeneous System-in-Package (SiP) integration | |
| | Extending world leadership in Semiconductor Equipment, Materials and Manufacturing solutions | |

## Long term vision

| | | |
|---|---|---|
| RIA | New computing paradigms (Beyond CMOS) | IA |
| | Process technology, equipment and materials | |
| | Systems and components, architecture, design and integration | |
| | Health & Wellbeing | |
| | Energy | |
| | Digital industry | |
| | Transport and smart mobility | |
| | Connectivity and interoperability | |
| | Data science and Artifical intelligence | |

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