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From: Secretary-General of the European Commission,  
signed by Mr Jordi AYET PUIGARNAU, Director

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To: Mr Uwe CORSEPIUS, Secretary-General of the Council of the European  
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SUMMARY OF THE IMPACT ASSESSMENT Accompanying the  
document Proposal for a Council Regulation on the ECSEL Joint  
Undertaking

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**COMMISSION STAFF WORKING DOCUMENT**  
**EXECUTIVE SUMMARY OF THE IMPACT ASSESSMENT**

*Accompanying the document*

**Proposal for a Council Regulation**  
**on the ECSEL Joint Undertaking**

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# COMMISSION STAFF WORKING DOCUMENT

## EXECUTIVE SUMMARY OF THE IMPACT ASSESSMENT

### *Accompanying the document*

### **Proposal for a Council Regulation**

### **on the ECSEL Joint Undertaking**

## **INTRODUCTION**

This document describes the impact assessment for a Joint Technology Initiative (JTI) on electronic components and systems set up as a Joint Undertaking on the basis of Article 187 TFEU. It ties in with the EU Framework Programme for Research and Innovation Horizon 2020.

Under the Seventh Framework Programme, two Joint Undertakings (JUs) designated as ENIAC and ARTEMIS were established respectively in the fields of nanoelectronics and embedded computing systems. They sought to increase and leverage private and public investments in research and innovation in two complementary domains of high importance for the industrial fabric in Europe.

Building on the experience gained with ENIAC and ARTEMIS, the present initiative is based on a simplified single structure, a focused scope of actions reinforcing the synergies between the areas of electronic components and embedded systems, and a major simplification of the implementation modalities. The initiative is a central pillar of the EU's strategy for electronic components and systems in Europe.

The procedure that was followed is in accordance with the Commission's guidelines for ex-ante impact assessments.

## **1. PROBLEM DEFINITION**

### **1.1 Context**

Apart from being a significant industry with more than €1000 billion in turnover worldwide, electronic components and embedded systems are at the origin of most productivity improvements across the whole of the economy and play a key role in addressing societal challenges.

More specifically, Europe is facing two main challenges in electronic components and systems. One is to be in control of the key elements of the value chain (i.e. design, manufacturing and integration in final products), that are essential to ensure the sustainability of value creation from electronics in Europe including the competitiveness of many other European industrial sectors. The other is to bridge large gaps in Europe's innovation chains and better transform its research excellence into commercial successes.

In addressing the above challenges Europe must cope with fierce global competition, declining market shares of its industry, high costs of R&D&I and fast-paced technology development.

- The close relationship between the electronic components industry and the rest of the industrial fabric is of paramount importance for Europe. A weakening of its electronic manufacturing industry will likely lead to gradual disappearance of the rest of the value chain. This not only has an impact on the industry itself but will affect jobs and growth in a large part of our economy.
- The outlook for European embedded computing systems companies is more positive though challenges are faced here also, i.e. the core ICT platforms, at application and content level, mostly dominated by non-EU actors, and embedded systems increasingly networked and connected to the internet, leading to new business opportunities but also new players and threats from non-EU industries that dominate the web today.
- Growth of the electronic components and systems compounded market was higher than 6% per year over the last ten years and with equivalent projections for the next decade. Growth in the sector is fuelled by innovations with at least 15% of turnover spent on R&D. With the increasing costs of R&D and the important spill over effect across the economy, public-private partnerships become a must.
- Mastering increasing technology and production complexity is essential to be able to compete and requires heavy investments, in the range of billions of euros both in R&D&I and in production and design facilities. European investments have been insufficient and policies too fragmented so far, leading to a declining share of the worldwide semiconductor market for European players, presently below 10%. Member States have their own priorities in promoting their industry but the level of support needed for this industry is beyond their individual resources.

## **1.2 Problem drivers in implementation**

Both interim evaluations of the ENIAC and ARTEMIS JUs highlighted issues to be addressed in the setup of a new JU in order to strengthen and improve its relevance, effectiveness, efficiency, and research quality.

### **An integrated European strategy in electronic components and systems**

The second interim evaluation recommended that the JTIs need an overarching European research strategy. Such a strategy would avoid duplication of efforts, allow the development of a sustainable electronic components and systems industrial ecosystem, and provide an effective means for European stakeholders to keep pace with technology, to get access to advanced components and to consolidate leadership in electronic systems for key economic sectors.

### **Provide a legal base for a more efficient implementation**

Both interim evaluations recommended the implementation of the future JTI on a legal basis that is better attuned to the specificities of Public-Private Partnerships with a lighter administrative overhead and greater flexibility.

## **Improved governance and strategic planning**

Both interim evaluations observed that the Governing Board spends too much time on operational monitoring and too little time on discussing strategic issues. The administrative burden should be reduced in order to attract the participation from high-level industry representatives.

## **Strengthened commitment and alignment with priorities of Member States**

Both interim evaluations recommended that Member States should commit to a multi-annual funding system. This would allow for strategic agenda setting and allow stakeholders to plan ahead. The latter is essential considering the size of the investments and the need for a sustaining research over a longer period of time.

## **Harmonisation of conditions for participation**

The interim evaluations highlighted the need for harmonisation between national procedures and criteria among the participating Member States. Member State participation rules, funding rates and procedures should be harmonised and synchronised wherever possible.

## **Streamlined operations including better monitoring and evaluation**

Both interim evaluations recommended various recommendations as how to streamline operations and provide for a better monitoring and evaluation. In particular it is recommended that the evaluation and selection process should be reviewed to improve the match of the project portfolio with the overarching strategy.

## **2. ANALYSIS OF SUBSIDIARITY**

This European initiative is proposed in the context of the implementation of Horizon 2020:

*'Joint Undertakings established in FP7 under Article 187 of the Treaty, for which further support may be provided under the above conditions are: the Innovative Medicines Initiative (IMI), Clean Sky, Single European Sky ATM Research (SESAR), Fuel Cells and Hydrogen (FCH), and Embedded computing systems (ARTEMIS) and Nanoelectronics (ENIAC). The latter two may be combined into a single initiative.'*

It is clear that no single Member State hosts all the companies necessary to address the whole chain of any application industry that relies on electronic components and systems. By its collaborative nature, the initiative allows the creation of consortia with partners from across Europe in order to bring out the best in the European ecosystem and reduce fragmentation.

The current ARTEMIS and ENIAC JUs provided a major opportunity to cooperate across Europe, create critical mass and leverage investments. Their first and second interim evaluations strongly recommended continuing a similar initiative under Horizon 2020.

## **3. OBJECTIVES**

Europe must remain at the forefront of technology development and move more quickly towards exploitation in order to be competitive. The proposed initiative is the central pillar of an EU industrial strategy for electronics that aims at *reversing the current trend of declining*

*market share of production in Europe, creating in the next seven years an additional 250 000 jobs in the sector and drawing more than €100 billion of additional private investment in innovation and production in the field*<sup>1</sup>. In more detail, the goals of the present initiative are:

- to contribute to the development of a strong and globally competitive electronics components and systems industry in the Union;
- to ensure the availability of electronic components and systems for key markets and for addressing societal challenges, aiming at keeping Europe at the forefront of technology development, bridging the gap between research and exploitation, strengthening innovation capabilities and creating economic and employment growth in the Union;
- to align strategies with Member States to attract private investment and contribute to sound public finances by avoiding unnecessary duplication and fragmentation of efforts, and easing participation for actors involved in research and innovation;
- to maintain and grow semiconductor and smart system manufacturing capability in Europe, including leadership in manufacturing equipment and materials processing;
- to secure a commanding position in design and systems engineering including embedded technologies;
- to provide access for all stakeholders to a world-class infrastructure for the design and manufacture of electronic components and embedded and smart systems;
- to build a dynamic ecosystem involving innovative small and medium sized enterprises (SMEs), strengthening existing clusters and nurturing the creation of new clusters in promising new areas.

The initiative therefore aims (i) to create a critical mass of public and private investment at EU level, (ii) to bridge the gap of the so-called ‘valley of death’ from research to the market by facilitating multi-disciplinary research and technology development along the full innovation chain, covering Technology Readiness Levels 2 to 8, including pilot lines and large-scale application experiments, and (iii) to bring together the actors in the value and innovation chains, including users and SMEs, to address the inherent complexity in the design and manufacturing of electronic components and systems.

#### **4. POLICY OPTIONS**

Five options have been assessed for implementing the JTI on electronic components and systems:

- (a) Rely on the existing ENIAC and ARTEMIS initiatives by renewing and adapting their mandate in the new context of Horizon 2020;
- (b) Undertake the planned activities without a dedicated PPP using the standard practices applying to collaborative projects under Horizon 2020;

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<sup>1</sup> As announced by industry for the proposed partnership.

- Launch a single new PPP replacing the existing ENIAC and ARTEMIS, which could take the form of:
  - (c) A contractual PPP (without a dedicated legal entity);
  - (d) A bipartite institutional PPP (a dedicated legal entity without Member State participation);
  - (e) A tripartite institutional PPP (a dedicated legal entity with Member State participation).

Two options have been discarded: ‘no action at all’ (i.e. stopping all public support at EU level in the area), and ‘early winding-up of existing JTIs’ (i.e. stopping the ARTEMIS and ENIAC JUs before their normal end of life in 2017).

## **5. ASSESSMENT OF IMPACTS**

The economic impact covers:

- Competitiveness, trade and investment aspects – the leverage effect of the initiative on private and public funds, the scale of investment and critical mass, the potential for cooperation and bridging the gap from technology development to market;
- Research and innovation – synergy with industrial and national priorities, the extent to which the initiative will foster excellence, facilitating progress towards a European Research Area;
- Stakeholders – industry – technology providers and users including SMEs, RTOs and universities, the EU, Member States and regions, and the citizen/consumer who is to benefit from the initiative.

The societal impact examines:

- Employment – linked to the economic impact. The industrial sectors addressed by the initiative are a major direct employer of highly skilled technical people;
- Potential to address societal challenges in domains relevant to Europe’s citizens (e.g. transport, health, energy) – the development and deployment of electronic components and systems is crucial for those societal drivers.

The environmental impact mainly relates to reduction of energy consumption.

An EU contribution of €1.2 billion would leverage an overall investment programme of some €8 billion by 2020. This would be a significant part of the overall investment announced by industry. The administrative overhead for the EU would be in the range of 2% of its operational contribution.

## **6. COMPARISON OF OPTIONS**

Three interconnected levels of comparing options are presented.

The first level concerns the relative merits of the five options compared to the baseline option (a) along the three axes of effectiveness, efficiency and coherence.

	Objectives	Option (b)	Option (c)	Option (d)	Option (e)
Effectiveness	1.1 Boost competitiveness	-	+	+	+
	1.2 Cover innovation & value chain	-	+	+	+
	1.3 Solve societal challenges and create new markets	-	-	=	+
	3.1 Maintain and grow manufacturing in EU	-	-	-	+
	3.2 Leadership in E&M	-	-	-	=
	4.1 Availability of electronic components	-	-	=	+
	4.2 Leadership in system engineering	-	=	+	+
Efficiency	2.1 Structure and perform excellent multi-disciplinary research	=	=	+	+
	2.3 Mobilise and pool resources	-	-	-	+
	5.2 Efficient implementation of programme	+	=	+	+
	5.3 Synergies for exploitation of results and fostering SME growth	-	-	+	+
	5.4 Ease participation in projects with strong European dimension	+	+	+	=
	5.6 Cooperation and coordination of stakeholders	-	=	+	+
Coherence	2.2 Align strategies	-	=	=	+
	3.3 Support high TRLs	-	-	-	+
	5.1 Set strategic research and innovation agenda	-	=	+	+
	5.5 Access to design and manufacturing infrastructure	-	=	+	+
	5.7 Maintain human skills	=	=	=	=

The second concerns the criteria listed in the proposal for Horizon 2020 to identify PPPs:

- Options (a) and (e) offer most *added value of action at EU level* (most coherence);
- Option (e) has the strongest *scale of impact on industrial competitiveness, sustainable growth and socio-economic issues* (most effectiveness);
- Options (a) and (e) show the strongest *long-term commitment from all partners on a shared vision and clearly defined objectives* (most effectiveness and coherence);
- Option (e) is the strongest in the *scale of resources involved and the ability to leverage additional investments in research and innovation* (most efficiency);
- Options (c), (d) and (e) allow for a *clear definition of roles for each of the partners* (most efficiency and coherence).

The third level concerns the options in view of the improvements identified in the interim evaluations.

	Option (b)	Option (c)	Option (d)	Option (e)
An integrated European Strategy	-	-	+	+
Allow for a more efficient implementation	-	=	=	+
Improved governance and strategic planning	-	-	+	+
Strengthened commitment and alignment with priorities of Member States	-	-	-	=
Harmonisation of conditions of participation	=	+	+	=
Streamlined operations including better monitoring and evaluation	=	=	+	+

**In conclusion, the preferred option for achieving critical mass and a high return on investment is (e) ‘Implement a tripartite institutional Public-Private Partnership’, i.e. a partnership based on a roadmap for R&D&I with a scope from components to systems, pooling of resources to support a significant number of large-scale actions crossing the valley of death, and aligning of strategies and funding (regional, national and EU level).**



**Option (e) is to be implemented by setting up a new legal entity under Article 187 TFEU. It would take the form of a ‘PPP body’ following the model financial regulation for PPP bodies referred to in Article 209 of the Financial Rules, charged with indirect management according to Article 58.1(c)(iv). It would take over all rights and obligations of the current ARTEMIS and ENIAC JUs.**

## **7 EVALUATION AND MONITORING**

Three levels of evaluation and monitoring will be organised.

At the initiative level, the Commission will carry out a mid-term and final evaluation of the JU with the assistance of independent experts. These evaluations will look at the progress towards achieving the strategic objectives, the efficiency/effectiveness of the implementation and the commitment of the private members in and beyond projects. The Commission will notify the Council and the European Parliament of the conclusions.

At the level of projects, a mechanism will be put in place to measure the progress and the quality of each project. In addition, the use and dissemination of results will be monitored during and after the project lifetime, in accordance with the recommendations of the second interim evaluation panel. Progress towards the set of objectives of the JTI as identified above will be annually monitored against a set of Key Performance Indicators (KPI) as identified in the impact assessment.

The accounts of the JU will be examined annually by an independent audit body. The operational capability of the JU will also be assessed annually based on a report by the Executive Director, against some seven KPIs as identified in the impact assessment.

In addition, qualitative monitoring will be carried out on other important aspects such as:

- Openness and transparency of procedures;
- Coordination between the JTI, other EU initiatives, and national and regional actions;
- Avoidance of conflict of interest;
- Financial auditing;
- Monitoring of good governance.