Securing the Electronics Value Chain

The Blind Spot in the European Union's Defence Agenda?





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IPC is a non-profit, member-driven organization and leading source for industry standards, training, industry intelligence and public policy advocacy. IPC is the global association that helps OEMs, EMS, PCB manufacturers and suppliers build electronics better. IPC is dedicated to furthering the competitive excellence of its more than 3,200 member companies, including more than 500 in Europe. They represent all facets of the electronics industry, including design, printed board manufacturing, electronics assembly, advanced packaging and testing. While the membership includes many multinational companies, the majority are small and medium-sized enterprises. In support of its mission, IPC works collaboratively with the electronics industry to develop technical standards and workforce credentialing programmes, in addition to a policy agenda that aims to cultivate a favorable environment for manufacturing, research and development and environmental stewardship. www.ipc.org



Founded in 1991, DECISION is an independent strategy consulting firm renowned for its expertise in strategic analyses and studies across three highly innovative sectors: Electronic Components & Systems, Aerospace – Defence & Security, and Industry 4.0 & Electrics. Thanks to its core team of economists and its international network of industrial experts, DECISION has become a recognized European authority in market research within the electronics field. The firm produces regular market figures, analyses, and forecasts for Europe and other world regions, alongside in-depth analyses of major trends and key players. DECISION provides comprehensive studies and strategic consulting services to a diverse clientele, including industrial groups, innovative small and medium-sized enterprises, start-ups, financial institutions, investment funds, professional trade associations, national and local governments, and the European Commission. www.decision.eu





Foreword

Electronics are the foundation of modern industry, enabling everything from consumer goods to advanced defence systems. Though often hidden from view, these technologies depend on a complex and interdependent manufacturing ecosystem. The resilience of this ecosystem is crucial—especially in an era of geopolitical uncertainty, where disruptions to supply chains can have profound economic and security consequences.

For Europe, maintaining a robust electronics industrial base is a strategic imperative. Over the years, critical segments of the European electronics value chain have lost ground, while other regions have strengthened their market positions. This erosion poses a direct challenge to Europe's ability to maintain technological leadership, strategic autonomy, and regional security.

Recognizing this urgency, IPC has partnered with DECISION Études & Conseil on a series of reports assessing the state of the European electronics manufacturing sector. In 2024, our joint study with DECISION and in4MA, *Securing the European Union's Electronics Ecosystem*, exposed the decline of Europe's share in critical areas such as printed circuit boards (PCBs), IC substrates, and advanced packaging. The findings underscored the pressing need for a comprehensive industrial strategy to reverse this trend.

Also in 2024, European electronics manufacturers united in a *Call to Action* for a holistic, EU-level strategy to rebuild industrial capacity, reduce strategic dependencies, and position Europe's electronics sector for the future. This call remains urgent.

This report takes a focused look at the role of electronics manufacturing in European defence. The ability to produce trusted, secure, and advanced electronics is essential to Europe's defence capabilities and, by extension, to its sovereignty and security. As the European Union moves forward in shaping the future of European defence, integrating electronics into key strategic initiatives must be a priority.

The time for action is now. A thriving, resilient European electronics ecosystem will be indispensable to securing a safe and prosperous future. IPC urges continued and immediate engagement between industry leaders, policymakers, and stakeholders to develop the policy framework and industrial strategy necessary to safeguard Europe's technological and defence capabilities.

Sanjay Huprikar IPC President, Europe





Executive Summary

I) From Fragmentation to Unity: The 2035 European Defence Agenda

The European Defence Agenda represents a fundamental shift from a fragmented defence landscape to a more unified and strategically coordinated approach. The European Defence Industrial Strategy (EDIS) (2024) establishes procurement and industrial resilience targets for 2030 and 2035. The European Defence Industry Programme (EDIP) (2025-2027) introduces a €1.5 billion programme to enhance industrial readiness, joint procurement, and supply chain security.

Following the Munich Security Conference (MSC) held from February 14 to 16, 2025, the European Commission published the **REARM Europe Plan** on March 4, aiming at enabling Europe to be in charge of its own defence by mobilizing nearly **€800 billion** in defence expenditure. The EU Council endorsed this plan in its conclusions following a special meeting on March 6, 2025.

The next EU **Multiannual Financial Framework (2028-2034)** will further embed defence as a core EU priority, ensuring long-term investment in a more integrated and resilient European defence industry.

II) Future of Defence: No Capabilities Without Electronics Manufacturing

Electronics manufacturing encompasses the design and production of electronic systems, including Printed Circuit Boards (PCBs), modules, and strategic components, which are built from substrates and raw materials and packaged accordingly.

The European Defence Agenda should address priorities outlined in the **Capability Development Priorities** (2023) and the **Defence Investment Gap Analysis (2022)**, both of which highlight the growing dependence of defence systems on electronics manufacturing.

The electronic content of defence equipment has grown from 10% in 2000 to 17% in 2023, with projections reaching 25% by 2035-2040, according to DECISION Études & Conseil. Platform modernization is now primarily driven by electronics, as illustrated by the Eurofighter Typhoon, which integrates AESA radars, infrared tracking, electronic warfare suites, and advanced mission computers.

Operational feedback further highlights how electronics innovations are reshaping modern warfare. Drones and counter-drone systems are revolutionizing tactical operations through real-time reconnaissance and precision strikes, while Low Earth Orbit (LEO) satellite networks -such as Starlink- provide secure, real-time observation and communication capabilities.





III) The European Defence Electronic Value Chain, Weakened by Strategic Dependencies

The **European Union (EU) boasts one of the world's strongest defence ecosystems**, spanning military space and airborne systems, military communications, ground and naval detection systems, and missiles.

However, the sector suffers from a lack of support from Member States, with 78% of defence procurement spending directed toward non-EU suppliers, including 63% to US-based companies alone¹.

Compounding this issue, the EU's electronics manufacturing base has sharply declined over the past two decades, with its global production share falling from 18.6% in 2000 to just 11.6% in 2023. This downward trend undermines the EU's ability to meet its own defence requirements. While the EU still accounts for 20.6% of the manufacturing of electronics systems for Defence in 2023, in the long run, a robust general-purpose electronics manufacturing base is essential to develop components and systems tailored to defence needs.

The continued erosion of this industrial base has severe consequences:

- 1. Longer Lead Times Short production cycles are critical in wartime, yet the limited scale of EU-based manufacturing and reliance on offshore production often extend lead times beyond one year for certain defence electronics.
- 2. **Rising Costs** The lack of domestic manufacturing facilities reduces economies of scale, driving up operational expenses.
- 3. **Security of Supply Risks** Dependence on foreign manufacturers exposes critical defence supply chains to potential disruptions, especially in times of crisis.
- 4. **Cybersecurity & Trust Concerns** Outsourcing production entails disclosing sensitive system designs to foreign entities, heightening the risks of technology leakage and the insertion of security vulnerabilities into critical systems. This risk is particularly significant for strategic components such as PCBs which are product-specific and contain highly valuable intellectual property (IP).
- 5. Loss of Strategic Know-How The decline of the European electronics sector has led to the erosion of technical expertise, further weakening the EU's defence industrial base.
- 6. Weakening of the Supply Chain: The decline in electronics manufacturing impacts the entire associated supply chain, including suppliers of materials, chemicals, and equipment.

This situation has exposed the EU to **vulnerabilities and strategic dependencies** in key areas of the defence electronics value chain. While 20.6% of defence electronics systems are still produced within the EU, three critical levels of the value chain are particularly at risk:

- Advanced packaging, with only 8% of global defence-related production occurring in the EU.
- Printed Circuit Boards (PCBs), with just 6% of global defence-related PCBs manufactured in the EU.
- IC substrates, with only 4% of global defence-related production taking place in the EU.

The European Chips Act was mostly focused on semiconductor Front-end manufacturing and high-end chips. It did not specifically address the vulnerabilities in packaging, PCB and IC substrates which are the focus of this report.

The European PCB industry, in particular, is at a critical juncture, facing an unprecedented decline in production capacity and the risk of disappearing entirely from Europe. Today, only 12% of PCB companies that were operating in the EU in the mid-1980s remain active, underscoring the urgent need for emergency measures.

¹ The impact of the war in Ukraine on the European Defence Market, Maulny, 2023





Meanwhile, in January 2025, **advanced PCBs and packaging** were explicitly listed among the semiconductor technologies subject to outbound investment reviews under the **EC Recommendation on reviewing outbound investments in technology areas critical to the EU's economic security**².

Building **'ever-warm' capacities** in defence, as outlined in the EDIP, requires establishing and maintaining 'everwarm' capacities throughout the electronics value chain within the EU.

IV) Policy Recommendations to Secure the Defence Electronics Value Chain

A. Act Urgently to Bridge Vulnerabilities in the Electronics Value Chain

The European electronics industry is facing prolonged headwinds, exacerbated by the ongoing crisis in the Printed Circuit Board (PCB) industry and low capacities in the packaging, and IC substrate industries.

In addition to a long-term support plan by 2035, there is an urgent need to act now to bridge vulnerabilities by increasing manufacturing capabilities at these steps of the electronics value chain, as critical components of the defence sector³.

IPC calls for a multipronged emergency programme, making use of all available funding options. This short-term initiative should focus on immediately bolstering domestic production, enhancing supply chain resilience, and revitalizing the sector's technical expertise.

This emergency programme will serve as a foundation to reverse the decline of the EU electronics industry, strengthen defence capabilities, and reduce strategic dependencies on non-EU suppliers. It is structured around the following key pillars:

1/ Assess Immediate Capacity Needs in the EU Defence Electronics Industry

The EU and European defence agencies should map the companies that make up the defence electronics industrial base for PCBs, IC substrates, and advanced packaging and assess their capacities.

This strategic assessment can be achieved by the Observatory of Critical Technologies, under the EDIP Security of Supply Regime, and in coordination with the European Defence Industrial Readiness Board (DIRB).

It should be completed within 180 days and should:

- Identify critical gaps
- Define the manufacturing capacities required within the next three years
- Ensure full coverage of PCBs, IC substrates, and advanced packaging

2/ Invest in Strategic Domestic Manufacturing

A Resilience Fund should be created to provide direct financial incentives for establishing and modernizing key electronics manufacturing facilities over the next three years.

This should pursue the same goal as the FAST (Framework for Act in Support of Ammunition Production) programme under EDIP, expanding its scope beyond ammunition and missiles to include critical electronics manufacturing.

³ In 2024, the European electronics industry issued a <u>Call to Action</u> for an industrial strategy to strengthen the European electronics ecosystem.





² COMMISSION RECOMMENDATION (EU) 2025/63 of 15 January 2025.

B. Boost European Defence Production

1/ Establish a Mechanism to Track Progress Towards the EDIS Target on EU Content

The European Defence Industrial Strategy (EDIS) sets a key objective: By 2035, at least 60% of Member States' defence procurement budgets should be allocated to acquisitions from the European Defence Technological and Industrial Base (EDTIB).

Achieving this realistic target is crucial to translating Member States' demand into a significant expansion of European defence manufacturing capabilities.

The EU Council conclusions of its special meeting on March 6, 2025, call for an acceleration of the mobilisation of the necessary financing to reinforce the EU overall defence readiness. Building on this recommendation, the EU should aim for a more ambitious target than 60% by 2035.

However, the current version of the European Defence Industrial Programme (EDIP) does not include this target. It should be reaffirmed, and a structured mechanism must be implemented to track annual progress at the Member State level. Without such a tracking mechanism, the EU risks missing this goal.

2/ Incentivize the Europeanization of Defence Production

Member States should collaborate more closely with European defence Original Equipment Manufacturers (OEMs), to identify capability needs and provide targeted incentives for strengthening European industrial capacities. These capacities should be developed in cooperation with the EU supply chain to enhance resilience and reduce dependencies.

Additionally, recipients of defence funding should be entities established within the EU or associated countries.

3/ Ensure Environmental Regulations Do Not Hinder Production Ramp-Up

While environmental regulations such as PFAS restrictions and REACH are essential for sustainability, their implementation can create additional barriers to scaling up defence production. Requirements can impose higher costs, delay investments, and limit access to critical materials. A balanced approach is needed to ensure that environmental regulations do not hamper Europe's short-term need for a production ramp-up.

In this regard, the recent omnibus regulation, proposed by the European Commission on February 26, 2025, represents a step in the right direction. It introduces key adjustments to reduce administrative burden in sustainability reporting. Several of these measures are specifically designed to ease reporting burdens for SMEs, aimed at ensuring that regulatory requirements do not disproportionately hinder their operations.





C. Adopt a Defence Value Chain Approach

1/ Develop a Clear Understanding of the EDTIB's Value Chain

A competitive European industrial base is essential for securing defence supply. This requires a clear and comprehensive understanding of the European Defence Technological and Industrial Base (EDTIB) and its full value chain. Therefore, the EDTIB must formally encompass the entire defence supply chain, from Tier 1, 2, and 3 suppliers to those involved in electronics manufacturing, materials, and raw materials.

For the electronics manufacturing ecosystem, this broader approach implies recognizing the following players as integral to the EDTIB:

- Original Equipment Manufacturers (OEMs)
- Electronic Manufacturing Services (EMS)
- Printed Circuit Board (PCB) manufacturers
- Packaging and advanced packaging manufacturers

2/ Monitor Progress Towards the EDIS Target on EU Content Across Strategic Components

To secure the defence supply chain, it is essential to identify and monitor "**strategic components**" at each step of the value chain. These components are defined by their unique, critical know-how, which is indispensable to the functioning of defence equipment.

Compliance with the 60% EDIS target or preferably more ambitious targets which could be set should be measured not only at the defence platform level but also in terms of these strategic components. It is important to note that incentives are required to reach the 60% here. This is due to the fact that a defence supply chain is built on the highest of standards that each and every party and product needs to meet. To be qualified for defence purposes as a company or product a severe quality and security process is required.

Strategic components should include Printed Circuit Boards (PCB), advanced packaging and IC Substrates.

For example, based on the 60% target, achieving this goal would positively impact the manufacturing of Printed Circuit Boards (PCBs), advanced packaging, and IC substrates for defence in the EU. It would raise their production-to-demand ratio in defence to 58%, 36%, and 49% respectively.

Raising these ratios is crucial to building a secure and trusted defence supply chain.

3/ Assess the EU's Strength in Electronics Manufacturing Equipment to Secure Leadership in the Next Era

The EU should evaluate the strength of its electronics manufacturing equipment sector to determine its readiness to lead the next era of electronics production.

In the coming decade, AI-driven tools will be a key differentiator in manufacturing, enhancing competitiveness and reinforcing industrial leadership. As a result, manufacturing equipment is a critical area of strategic dependency and potential vulnerability.

4/ Involve Electronics Manufacturers in the High-level European Defence Industry Group

As a key supplier to the European defence industry, the electronics manufacturing ecosystem should be represented within the High-Level European Defence Industry Group, which will serve as an advisory body to the Defence Industrial Readiness Board (DIRB).





- Semiconductor manufacturers
- IC Substrate manufacturers
- Equipment suppliers

5/ Coordinate Defence Strategy with Key Related Value Chains

The defence ecosystem is closely interconnected with the raw materials and electronics manufacturing ecosystems and shares common challenges with other electronics end-user markets, such as automotive, industrial & robotics, health & care electronics or space.

A standing strategic dialogue between industries, European Commission and Member States should be established, progressing toward integrated governance for electronics across supply chains and verticals at the EU level⁴.

D.Improve Access to Financing

1/ Securing Private Investment requires sustained and durable commitment to public financing

To attract and secure private investment in the Defence sector, it is essential to implement a long-term strategy. Fluctuations in defence budgets during the past decades have eroded private investors' confidence due to perceived instability in public funding.

A sustained and durable commitment to public financing is therefore crucial to reassure, attract, and secure private investment. The conclusions of the special meeting of the EU Council on March 6, 2025, represent a step in the right direction. They emphasize "the importance of mobilising private financing for the defence industry" and invite "the Commission to consider measures in this regard, including by signalling to private investors the importance of the defence industry for Europe at large."

This reinforces the need for a stable financial framework to reduce uncertainties and demonstrate firm political will to strengthen European defence capabilities.

2/ Adapt Competition Policies for Defence Financing

As highlighted in the Draghi Report, simplifying competition rules to better support defence, as a strategic industry, would reduce the need for case-by-case justifications. By reducing ex-ante controls and approvals, this reform would streamline processes, ease administrative burdens, and accelerate investment timelines necessary to scale up production.

In the conclusions of its special meeting on March 6, 2025, the EU Council calls on "simplifying the legal and administrative framework, in particular for public procurement, industry cooperation, permitting and reporting requirements, in order to address all obstacles and bottlenecks hindering a rapid ramping up of the defence industry".

3/ Establish Funds Dedicated to SME Financing

European SMEs in the defence and electronics sectors face significant challenges in securing financing, particularly in areas such as PCB manufacturing, packaging, and IC substrates production. To address this, initiatives like the FAST (Fund to Accelerate Defence Supply Chain Transformation) -which could be established under the EDIP- are critical.

⁴ The Call for a standing dialogue was an industry recommendation in the 2023 Electronics Stakeholder Dialogue organized by European Commission DG GROW <u>https://emails.ipc.org/links/Electronics-Dialogue.pdf</u>





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I. From Fragmentation to Unity: The 2035 European Defence Agenda

The European Defence Agenda by 2035 includes 6 milestones, reflecting the path towards a more unified and centralized Defence, as illustrated on the timeline below:



A) The first-ever European Defence Industrial Strategy (EDIS) (2024)

The first European Defence Industrial Strategy (EDIS) was published on March 5th, 2024. It was prepared by the High Representative of the Union for Foreign Affairs and Security Policy Joseph Borrell, and then Commissioner for Internal Market, Thierry Breton. The strategy outlines a comprehensive vision for the EU's Defence industrial policy up to 2035, aiming to strengthen the European Defence Technological and Industrial Base (EDTIB).

The EDIS sets (non-binding) targets of:

- <u>Collaborative procurement</u>: Member States should procure at least 40 % of Defence equipment through cooperation by 2030 (the current level is 18 %, below the 35 % set in the EDA framework).
- <u>Intra-EU Defence Trade</u>: The value of intra-EU Defence trade should be 35 % or more of the EU Defence market's value by 2030 (it is currently 15 %).
- <u>EU-based procurement</u>: At least 50 % of member States Defence procurement budget should be devoted to procurement through the EDTIB by 2030, and 60 % by 2035.

<u>The EDIS defines "Resilience" as "a precondition of the EDTIB readiness and competitiveness"</u> and pledges for the systematic inclusion of the resiliency of the EU Defence industry as "an explicit strategic objective under future relevant EU programmes". This implies the "identification and monitoring of critical products" along the Defence supply chain.





The EDIS involves a set of recommendations that framed the EDIP.

B) The report "Strengthening Europe's Civilian and Military Preparedness and Readiness" (2024)

The report "<u>Strengthening Europe's Civilian and Military Preparedness and Readiness</u>", authored by former President of Finland Sauli Niinistö at the request of European Commission President Ursula von der Leyen, was published in October 2024.

The report underscores the importance of aligning civilian and military efforts, with a strong emphasis on dual-use capabilities and enhanced civil-military synergies. Key proposals include:

- Increasing EU defence, security and crisis preparedness funding to 20% of the Multiannual Financial Framework (MFF).
- Strengthening risk identification systems and early warning mechanisms.
- Fostering public-private partnerships to reinforce critical infrastructure.

Additionally, the report highlights the urgency of countering hybrid threats, such as cyberattacks and disinformation, while advocating for improved crisis response coordination across the EU.

By framing the need for targeted defence investments, cross-sectoral collaboration, and greater societal engagement, the report directly influenced future European Commission initiatives, including the European Defence Investment Programme (EDIP) and the next MFF.

C) The REARM Europe Plan (2025)

Following the Munich Security Conference (MSC) held from February 14 to 16, 2025, the European Commission published the REARM Europe Plan on March 4, aimed at enabling Europe to be in charge of its own defence. This plan is structured around five pillars:

- 1. A new financial EU instrument providing Member States with loans of up to EUR 150 billion, backed by the EU budget.
- 2. Activation of a national escape clause under the Stability and Growth Pact, allowing defence financing to be excluded from Member States' fiscal rules.
- 3. Incentivization of defence-related investments within the current EU budget.
- 4. Contribution by the European Investment Bank
- 5. Mobilization of private capital.

The EU Council's special meeting on March 6, 2025, endorsed this plan in its conclusions.





D) The White Paper on the Future of European Defence (2025)

The High Representative of the Union for Foreign Affairs and Security Policy Kaja Kallas and Commissioner for Defence and Space Andrius Kubilius will publish a White Paper on the Future of European Defence by March 2025. This White Paper will outline the strategic directions for the European Union's Defence policy under the incoming Commission's mandate. Its key building blocks include:

- **Military Support for Ukraine**: Enhancing EU assistance to Ukraine as a vital measure to counter Russian aggression and safeguard European security.
- **Ramping up Defence Industry Production**: Boosting industrial output to meet NATO capability targets by 2030 and address critical defence needs across the EU.
- **Defence Financing**: Developing robust funding mechanisms to strengthen defence preparedness, including increased budgets and engagement with the private sector.

E) The European Defence Industry Programme (EDIP) (2025-2027)

The European Defence Industry Programme (EDIP) is reviewed by the Council and Parliament since November 2024 and its adoption is expected by mid-2025. The EDIP involves:

1. A €1.5 billion Budget for 2025-2027

Fundings in the form of grants, prizes, procurement of financial instruments to:

- Increase investments in the EDTIB (European Defence Technological and Industrial Base), notably by the expansion of the scope of the Act in Support of Ammunition Production (ASAP), beyond ammunition and missiles.
- Support the industrialization of products derived from R&D funded by the European Defence Fund (EDF).
- Transform Defence supply chains, notably by the build-up of reserved surge manufacturing capacities (ever-warm facilities).

Eligible entities for EDIP funding must be established within the EU, or associated countries (Norway, Iceland, Liechtenstein), or Ukraine. The infrastructure, facilities, assets and resources of the recipients which are used for the purposes of the action shall be located on the territory of a Member State or of an associated country.

2. A New Legal Framework

EDIP involves the set-up of a new legal framework that includes:

- The establishment of the <u>SEAP (Structure for European Armament Programme)</u>, a permanent structure for member states to collaborate on armament procurement, with harmonized and simplified joint procurement rules and financial incentives (VAT exemptions for joint ownership of Defence equipment).
- The establishment of a *European Military Sales Mechanism*, including a single and centralized online catalogue, and the possibility of 'government-to-government' purchases.
- The establishment of the <u>FAST (Fund to Accelerate Defence Supply Chain Transformation)</u>, to facilitate access to debt and/or equity financing for SMEs and small mid-cap companies that





industrialize Defence technologies. FAST especially aims at de-risking the EU Defence valuechain.

- The establishment of a Union-wide <u>Security of Supply Regime</u> for Defence equipment to ensure consistent access to all necessary Defence products across Europe and provide an effective framework for responding to future supply crises. It includes:
 - Mapping critical products throughout the value chain, monitoring the EU's capacities for supplying these products, and identifying key market actors responsible for their supply.
 - A security-related supply crisis state, triggered by a mechanism to alert risks of significant disruptions in the value chain. This would enable the activation of a toolbox that includes measures such as the obligation from relevant companies to provide information, priority-rated orders, intra-EU transfers of Defence products, adjustments of civilian product lines to Defence applications, and simplification of the certifications of associated Defence-related products.
- The establishment of a dedicated mechanism to launch <u>IPCEIs tailored for Defence applications</u>.

3. The Setup of a Defence Industrial Readiness Board (DIRB)

- To provide strategic guidance and coherence in EU actions to increase Defence industrial readiness and assist and advise the EC in the implementation of the EDIP. This Board will involve the EC, Member States and the High Representative of the Union for Foreign Affairs and Security Policy.
- This board will come in addition to *the European Defence Board* (*EDB*) set up under the last Commission mandate to coordinate broad political and strategic Defence objectives.
- A High-level European Defence Industry Group would also be created to liaise with the DIRB.
 - 4. A Cooperation Programme with Ukraine

This programme aims to foster collaboration on the reconstruction, development, and modernization of Ukraine's defence industry, with a particular focus on joint procurement initiatives.

F) The next Multiannual Financial Framework (MFF) (2028-2034)

The Multiannual Financial Framework (MFF) currently in effect covers the period from **2021 to 2027**. The next major milestone will be the preparation and adoption of the **MFF for the 2028**-**2034 period**.

- In 2025, the European Commission is expected to initiate consultations and preparatory work for the next MFF, focusing on policy priorities and budgetary needs for the EU.
- In 2026, the Commission will present a formal proposal for the MFF 2028-2034, which will detail spending ceilings and allocations across various policy areas.
- In 2027, after negotiations with the Council of the European Union and the European Parliament, the MFF 2028-2034 will be formally adopted, ensuring it takes effect on January 1, 2028.

Defence will be one of the main topics of this incoming MFF.





II. The Future of Defence: No Capabilities Without Electronics Manufacturing

As recalled in the conclusions of the EU council special meeting on March 6, 2025, the European Defence agenda shall address the list of priority areas expressed in the two following key documents:

- <u>The Capability Development Priorities (2023)</u>, identifying the military capabilities that the EU member states need to develop to meet future security and technology challenges.
- <u>The Defence Investment Gap Analysis (2022)</u> (European Defence Agency), identifying shortfalls and deficiencies in Defence spending and investments among EU member states.

As reflected in these documents, while Defence systems become increasingly smart and connected, they all rely increasingly on electronics manufacturing.

A) Electronics Systems Are Increasingly Rising in Percentage of Defence Content

As illustrated in the figure below, the average electronic content of defence equipment has increased from just 10% in 2000 to 17% in 2023. This trend is expected to continue, with projections indicating a rise to 25% by 2035–2040. For example, the electronic content of a next-generation fighter aircraft can already account for up to one-third of its total value.

Electronics manufacturing, while largely hidden from view, is becoming a key enabling activity for Defence equipment. High-tech electronic systems are not solely defined by semiconductor chips, which have no functionality on their own. Their performance and reliability critically depend on Printed Circuit Boards (PCBs), which serve as the fundamental backbone of these systems, integrating and interconnecting all components. Unlike standard commodity products, high-value PCBs involve complex manufacturing processes with more than 100 distinct steps, spanning multiple advanced technologies. Components are placed by electronics assemblers on Printed Circuit Boards (PCB) to create systems. It takes all elements within the supply chain -from silicon to systems- to successfully produce electronic hardware products, as illustrated in the adjacent figure.







Figure 1: Electronics at the Heart of Next-Generation Defence Systems

Source: DECISION, global defence equipment⁵ expenditure based on SIPRI and NATO data.

B) Modernizing Defence Platforms Relies Mostly on Electronics

For example, the main modernizations of the Eurofighter Typhoon consisted in the integration of:

- The integration of AESA radar technology, replacing older systems to enhance detection range, multi-target tracking, and performance in contested environments.
- The PIRATE infrared search and track (IRST) system, replacing older systems to passively detect threats without revealing the aircraft's position. These sensors, combined with mission computers, fuse data into a coherent operational picture, improving situational awareness in multi-domain operations.
- An *electronic warfare suite* providing self-protection through radar warning receivers, jammers, and decoys, along with robust cybersecurity ensures resilience against digital threats.
- An *enhanced digital cockpit*, featuring modern displays and voice-command interfaces, reducing pilot workload.

⁵ NATO's Equipment expenditure definition includes expenditure on major equipment as well as on research and development devoted to major equipment: Missiles, nuclear weapons, aircrafts, artillery, combat vehicles, engineering equipment, weapons and small arms, transport vehicles, ships and harbor craft, and electronic and communications equipment.





Finally, **recent feedback from Ukrainian operations shows how innovations in electronics are transforming modern warfare** -particularly those originating from consumer applications. For instance, drones and drone countermeasures transform tactical operations with real-time reconnaissance and precision strikes, while Low Earth Orbit (LEO) satellite networks enable reliable, secure real-time observation and communication, as exemplified by Starlink.

Investment Gap Analysis The Defence modernizing recommends European capabilities, including on Emerging and Disruptive Technologies (EDTs), due to their potentially revolutionary impact on future military capabilities and operations. EDTs commonly include Artificial Intelligence (AI), big data, quantum technology, robotics. autonomous systems, new advanced materials, blockchain, hypersonic weapons systems and biotechnologies applied to human enhancement. Seven out of nine (7/9) of these technologies primarily rely on electronics manufacturing, with exceptions being some advanced materials and biotechnologies.

C) Electronics at the Heart of EU Defence Investment Gaps

In addition, the Defence Investment Gap Analysis identifies 19 areas across the 5 military domains where the EU needs to enhance its industrial capabilities. These 19 areas are listed below. Similarly, each of them relies heavily on electronics manufacturing.

Air domain (7/7)

• Modernization of fighter aircraft: Involves the integration of advanced avionics, radar and sensor suites, electronic warfare systems, flight control systems, communication systems, and mission computers for enhanced situational awareness, target acquisition, and weapon delivery. <image>

Active / logic components (Processor, memory) Passive discrete components (capacitors, resistors) Connectors (power, USB, ethernet)



PRINTED CIRCUIT BOARD (PCB)

Multi-layer plastic laminate w/solder mask Electrical connections - copper features and traces



Printed Circuit Board (PCB) Electrical Components Interconnect joining materials (solder, adhesive)

Air Defence-specific effector (long range radars / early warning, deployable tactical anti-missiles, hypersonic missiles, directed energy weapons...): Relies on radar systems with high-frequency precision, integrated command and control systems, sensor fusion capabilities, advanced power supply units, and electronic counter-countermeasures (ECCM).





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- Weaponized medium-sized drones: Incorporates advanced guidance and control electronics, GPS navigation, remote communication and data link systems, onboard sensors for targeting and surveillance, electronic payloads, and countermeasure systems.
- **C-UAS (countering drones)**: Utilizes electronic detection and jamming systems, radar and optical sensors, electronic countermeasure units, and command and control interfaces for identifying, tracking, and neutralizing hostile drones.
- Suppression/Destruction of Enemy Air Defence (SEAD/DEAD) capabilities: Involves specialized radar and electromagnetic detection systems, jamming pods, targeting sensors, electronic warfare suites, and precision-guided munitions integration.
- Air-to-Air Refueling capabilities: Involves boom and drogue control systems, automatic flight control systems, advanced communication systems between aircrafts, onboard sensing and lighting systems, and data transfer technologies to ensure precise fuel transfer.
- **Hypersonic weapon systems**: Relies on precision guidance systems, advanced radar and tracking sensors, telemetry systems, thermal protection systems with electronic monitoring, and propulsion control electronics.

Land domain (3/3)

- **Combat Support (notably Artillery and counter Artillery)**: Involves target acquisition and surveillance, communications and networked operations, fire control systems, and electronic countermeasures (ECM)
- Armored ground combat, including Main Battle Tank (MBT), anti- tanks weapons, wheeled and tracked vehicles: Utilizes electronic fire control systems, targeting and tracking sensors, communications systems, situational awareness displays, and integrated electronic defence suites (including reactive armor control systems).
- Digitalization of ground combat, manned/unmanned teaming in combined air support to ground: Relies on real-time data sharing systems, command and control interfaces, sensor networks, communication links, and electronic mission support systems for integrated combat operations.

Maritime domain (3/3)

- Multidimensional protection of naval forces (Anti-Aircraft Warfare (AAW), Anti-Surface Warfare (ASuW), Anti Subsurface Warfare (ASW), Maritime Mine Counter Measures (MMCM), Mine Warfare): Requires advanced sonar systems, radar arrays, electronic detection and guidance systems, mine detection and disposal sensors, navigation and control electronics, electronic countermeasure systems, and unmanned underwater vehicle (UUV) technologies.
- **ISR capabilities and the protection of sea lines of communication**: Integrates high-end interconnected ships, unmanned platforms for surface and underwater control, electronic warfare suites, sensor fusion electronics, communications and data sharing systems, and advanced control interfaces.
- Frigates, submarines and patrol class surface chips to ensure maritime security: Relies on sonar and radar systems, navigation and guidance electronics, integrated communication networks, onboard weapons control systems, and electronic warfare protection systems.





Cyberspace domain (3/3)

- Cyber capabilities (including Security Operation Centres): Utilizes intrusion detection systems, firewalls, encryption modules, advanced monitoring and analytics tools, secure communication systems, and electronic security management platforms.
- Resilient and interoperable Multi-Domain Command & Control (C2) capabilities: Relies on robust data processing units, communication and data fusion systems, cybersecurity modules, electronic interfaces for cross-domain operations, and advanced situational awareness platforms.
- Interoperable communications and information systems (CIS) Infrastructure.

Space domain (3/3)

ELECTRONICS

- Earth observation: Utilizes advanced imaging sensors, satellite-mounted cameras, onboard data processing units, communications relays, and electronic telemetry systems.
- Satellite communication, including quantum encryption: Involves transponders, advanced encryption modules, communication relays, high-frequency signal electronics, quantum key distribution systems, and ground station electronics.
- Space situational awareness (SSA): Relies on radar and optical sensors, space tracking systems, data analysis modules, communication networks, and electronic interfaces for monitoring and managing space objects.

D) Electronics at the Center of EU Capability Development Priorities (CDP)

Finally, 20 out of 22 of the Capability Development Priorities (CDP), defined by the European Defence Agency in 2023, primarily rely on electronics manufacturing and electronics innovation, with the exception of the topics of military mobility and cohesive training of militaries.



ETUDES & CONSEIL

III. The European Defence Electronic Value Chain, Weakened by Strategic Dependencies

A) Preserving the EU's role as a Major Defence Industry Leader...

The European Union (EU) benefits from one of the strongest Defence ecosystems in the World, with various companies spanning from military space and airborne systems to military communication, ground & naval detection systems and missiles. Several Member States are home to global industry leaders in this industry (France, Italy, Germany, Sweden...).

Figure 2: Military expenditure of European countries, and key manufacturers of electronics systems for Defence



Source: DECISION Études & Conseil

As an illustration of its strength, the EU is the second-largest exporter of major weapons globally, behind the United States⁶.

However, despite substantial military expenditures by Member States -amounting to €302 billion in 2023, trailing only the U.S. (\$836 billion), but ahead of China (€294 billion)⁷- the EU defence faces challenges. A disproportionately small share of public procurement from Member States is

⁶ Source: SIPRI.

⁷ Source: <u>SIPRI Military Expenditure Database</u>





allocated to this sector and especially to the European industrial base. Coupled with the decline of the EU electronics manufacturing base since the early 2000s, this situation puts the resilience of the EU defence industry at risk.

B) ...A Dead end without Public Procurement for Europe's Defence Industry

While there has been a modest stabilization and even a slight increase in the EU's share of global military expenditures since the mid-2010s, it remains well below levels seen in previous decades. Furthermore, a substantial portion of the investments today is directed toward non-EU solutions and particularly from the United States, Israel, South Korea, and other international players.

Between June 2022 and June 2023, EU Member States spent approximately €75 billion on defence procurement. However, 78% of this procurement spending was directed toward non-EU suppliers, with 63% going to US-based companies alone⁸. This is indicative of a growing reliance on international defence players. The US Foreign Military Sales (FMS) programme in Europe saw a 89% increase in sales between 2021 and 2022, reflecting the significant flow of EU defence expenditures toward American suppliers. At the same time, the US defence market remains largely inaccessible to European companies, exacerbating the imbalance.

This dependency on non-EU suppliers for defence equipment is exacerbated by another critical issue: the long-term decline of the EU's overall electronics industry.

⁸ The impact of the war in Ukraine on the European Defence Market, Maulny, 2023





C) ... A Dead end without Adequate Electronics Manufacturing Capabilities

The manufacturing of electronic systems for the defence industry within the EU has so far been largely maintained, thanks to targeted support from industrial policies.

However, over the past two decades, the European Union's share in global electronics manufacturing has experienced a significant decline, dropping from 18.6% in 2000 to just 11.6% in 2023.

This downward trend is today hampering the EU's ability to meet defence requirements. Indeed, on the long run, a strong general-purpose electronics manufacturing base is crucial to sustain the development of components and systems tailored to Defence needs.



Figure 2: Share of the EU as a percentage of the World in Electronics Manufacturing

The erosion of this electronics manufacturing base has had two major consequences:

- 1. **Increased Dependency on Foreign Manufacturing Along the Value Chain**: As EU electronics manufacturing declined, the region has grown more dependent on external suppliers for both general-purpose and defence-specific electronic components. This dependency heightens risks related to supply chain disruptions, access to sensitive technologies, and the insertion of security-breaches in critical systems.
- 2. Loss of Technical Capacities: The decline of the electronics sector has resulted in the loss of technical expertise and manufacturing capacities that could have supported the EU defence industry. These capacities, such as advanced packaging, high-performance PCBs, and specialized substrates, were economically unsustainable to maintain within the EU when serving only the low volume defence market. As a result, such capabilities either decreased or relocated to regions with stronger industrial bases.





D) Specific Strategic Dependencies to be Bridged across the Electronics Value Chain

Although DECISION forecasts steady growth in the EU's electronic systems manufacturing for the Defence industry (4.3% CAGR from 2023 to 2035), the sector remains affected by the long-term decline of the EU's electronics manufacturing base over recent decades.

Moreover, global Defence electronics production is projected to grow at a slightly faster pace (4.9% CAGR from 2023 to 2035), driven by rising defence budgets and export-oriented strategies in the United States and several Asian countries. The US continues to dominate military space and airborne systems, while initiatives such as the FCAS/NGWS fighter programme and the increase military in EU spending over the past few years have bolstered its production.

As a result, the EU's share of global Defence electronic systems manufacturing is expected to decline to 19.1% of world production by 2035, representing a loss of 1.5 percentage points compared to 2023.

This situation has exposed the EU to weaknesses and strategic dependencies⁹ in key areas of the Defence electronics value chain, particularly in Printed Circuit Boards (PCB), advanced packaging, and IC substrates.

Meanwhile, in January 2025, advanced Printed Circuit Boards (PCB) and packaging were explicitly mentioned among the semiconductor technologies subject to outbound investment reviews under the EC Recommendation on reviewing outbound investments in technology areas critical for the EU's economic security¹⁰.



⁹ The EU faces a strategic dependency on China for PCBs, which also affects the defence sector. ¹⁰ <u>COMMISSION RECOMMENDATION (EU) 2025/63 of 15 January 2025</u>.





1. Printed Circuit Boards (PCB)

PCB¹¹ **Requirements for Defence Applications.** The Defence industry requires not only standard PCB technologies but also specialized PCBs to address its unique constraints, including thermal management, frequency performance, and power delivery:

- **Thermal management (managing heat dissipation):** High-power radar systems require PCBs with metal-core substrates and advanced thermal dissipation materials to manage heat buildup and ensure operational reliability in continuous-use scenarios.
- **Frequency performance (ensuring signal integrity):** Advanced radiofrequency (RF) and electronic warfare systems rely on low-loss PCB materials, such as PTFE-based laminates, to maintain signal integrity and minimize interference at high operating frequencies.
- **Power delivery (stable voltage and current):** Missile guidance and avionics electronics demand high-current carrying PCBs with embedded copper planes, ensuring stable power distribution under extreme environmental conditions and rapid maneuverability.

These specific constraints imply the mastering of specific PCB technologies to master in order to be able to serve the Defence industry.

- HDI and UHDI PCBs (High-Density and Ultra High-Density Interconnect): Modern Defence systems require compact, lightweight, and high-performance electronics to integrate more functionality in constrained spaces. HDI and UHDI PCBs enable higher component density, shorter interconnects, and improved signal integrity, which are critical for high-speed data transmission and reduced electromagnetic interference (EMI).
- **Ceramic substrates**¹²: Ceramic substrates offer low dielectric loss, superior thermal conductivity, and resistance to radiation exposure, making them ideal for military-grade RF and microwave circuits, as well as satellite electronics.
- Flexible PCBs: Defence equipment must often withstand mechanical stress, vibration, and harsh environmental conditions while maintaining reliable connectivity. Flexible PCBs enable durable, lightweight, and adaptable circuit designs, making them essential for wearable soldier systems, ruggedized avionics, and deployable communication modules.

In addition to these specific technologies required to serve the defence industry, PCB manufacturers are also driven by the needs for further **miniaturization** and for **more sustainable**

¹² Advanced dielectric materials such as PTFE (Teflon)-based substrates also provide low dielectric loss, high stability, and consistent signal propagation, ensuring optimal performance in high-frequency applications for Defence.





¹¹ Printed Circuit Board (PCB) are components necessary to connect all electronic components of a device and to provide the mechanical support. By using conductive tracks, vias, and signal traces on laminated, non-conductive substrates (e.g., silicon, ceramic, or woven glass-reinforced resins), PCBs enable efficient current flow while providing mechanical stability for high-performance devices. In defence systems, the choice of materials and the precision of PCB designs play a critical role in meeting demanding operational requirements.

products (Green PCBs), which use environmentally friendly materials and manufacturing processes to reduce hazardous emissions.

EU's Lack of Capacities to Meet Defence Industry Demands

Today, the EU represents only 6.2% of global PCB production for Defence applications, a share expected to decline to 5.2% by 2035 due to increasing competition from foreign manufacturers, particularly China.

These forecasts reflect a long-term downward trend, as the EU has experienced a sharp decline in its PCB manufacturing capacity for more than three decades¹³. Over the past years, this decline has only intensified, with no signs of reversal. Only 12% of PCB companies operating in the EU in the early 1985 remain active today¹⁴. With ongoing closures, the EU's PCB manufacturing base has reached a critical point, underscoring the urgency for strategic intervention. The European electronics industry issued a <u>Call to</u> <u>Action</u> for an industrial strategy to bolster the European electronics ecosystem.

The remaining EU ecosystem consists of only two large companies (Austria's AT&S and Germany's Würth Elektronik) followed by KSG-Group, Schweizer Electronic, Elvia-Group, Heidenhain-Microprint, Finmasi, Somacis and Eurocircuits¹³. Two large foreign



companies are implanted on EU soil: Mektec (Japan), and Unimicron (Taiwanese). The rest of the ecosystem is made up of SMEs, many of which primarily serve the Defence industry.

While the EU retains capabilities in HDI PCBs, it lags behind global leaders in critical areas such as track width and interconnect density. Advanced manufacturing technologies, including 20 μ m line/20 μ m gap capabilities, remain unavailable in Europe, limiting competitiveness in high-density applications.

Switzerland is home to five major PCB manufacturers with advanced technological expertise - such as GS Swiss PCB and Dyconex- which collectively account for approximately 10% of

¹⁴ Source: Data4PCB.





¹³ The downward trend was highlighted in an IPC-curated Stakeholder Dialogue organized by European Commission DG GROW in 2023 with industry recommendations to bolster the European electronics manufacturing ecosystem (Report and Recommendations).

The 2024 study IPC/DECISION/In4MA study <u>Securing Europe's Electronics Ecosystem</u> studies the trajectory of electronics manufacturing and dependencies for critical industries including defence.

Europe's PCB manufacturing capacity. Given this, it is important to consider including Switzerland in the list of associated countries to the EDIP.

Finally, the EU remains heavily dependent on non-EU suppliers for raw materials such as laminates, prepreg, and fiberglass, which are primarily sourced from the United States, China, and Japan. This dependency heightens supply chain vulnerabilities, exacerbating the risk of supply chain disruptions.

The European PCB industry is at a critical juncture, facing an unprecedented decline in production capacity and the risk of disappearing entirely from Europe. Urgent emergency measures are needed to address this crisis.

2. Advanced Packaging

Currently, the EU accounts for only 7.7% of global production of advanced packaging for defence applications. This share is projected to decline further to 3.6% by 2035, driven by growing competition from foreign manufacturers, particularly China.

Advanced Packaging plays a critical role in addressing the specific needs of the defence industry, where performance, reliability, and resilience to harsh environments are some of the main requirements.

System-in-Package (SiP) is an advanced packaging technology that enables higher integration and improved efficiency compared to traditional packaging solutions. SiP enables the combination of multiple functions -digital, analog, and power components- along with passive components into a single package with high electrical and thermal performance. This reduces the need for separate nanotechnology improvements, optimizing both cost and performance, and allows defence systems to benefit from miniaturization without compromising on functionality. Furthermore, SiP technology facilitates control over intellectual property (IP), making it an economically viable and secure choice for defence applications.



Advanced Packaging has also been recognized as a key area of development by the European Defence Agency (EDA). Under the CapTech TCM initiative, it is included as a priority within Technology Building Block 12 (TBB12), alongside PCBs and thermal management technologies¹⁵.

¹⁵ <u>https://eda.europa.eu/what-we-do/all-activities/activities-search/captech-components</u>





Despite these advantages, challenges such as the development of specific interconnection technologies (e.g., Flip Chip and Wafer-Level Packaging), remain pressing issues. Limited European players serve the defence market, and there is a heavy dependence on Asian manufacturers.

EU's Lack of Capacities to Meet Defence Industry Demands

The EU faces a significant gap in its ability to meet the advanced packaging needs of its defence sector, and its electronics industry overall. This lack of capacity has led to an increased reliance on foreign components and packaging manufacturers.

For instance, while some research capabilities in interconnection technologies like Through-Silicon Vias (TSVs) and Wafer-Level Packaging (WLP) exist through organizations like STMicroelectronics, Fraunhofer, and CEA Leti, they are often not viable for low-volume defence applications. Flip Chip manufacturing, on the other hand, is almost entirely outsourced to Asia, with limited capacity among EU companies such as Lynred, which only have enough capacity for its internal needs.

Looking at the recent investments in the semiconductor industry in the EU, the sidelining of the back end in favor of the front-end is still applied today. Within more than \in 80 billion invested since 2020, there is only one investment for \in 3.2 billion in advanced packaging, from the Singaporean company Silicon Box investing for the automotive sector in Italy.

This dependency is particularly problematic for advanced defence applications, where specifications, testing data, and design must remain secure. Sharing such sensitive information with untrusted external partners is a breach to the EU's defence electronics industry resiliency. Addressing this issue requires expanding interconnection technology capabilities.

Advanced Packaging as a Solution for EU Defence Industry Needs

Advanced Packaging, particularly through System-in-Package (SiP) technology, represents a strategic and viable solution to address both the technical and security demands of the EU defence industry while reducing reliance on foreign suppliers.

According to DECISION Etudes & Conseil, one innovative approach to mitigating security risks and ensuring the integrity of critical systems involves leveraging SiP technology for a mix of EUmanufactured and third-country components. For example, chips providing critical functions could be manufactured within EU foundries at existing technology nodes (e.g., 28 nm), while more advanced processing chips could be sourced from external suppliers operating at the most advanced nodes. By assembling these components into a single SiP package within the EU, this method would enable comprehensive security checks on foreign-manufactured semiconductors during the assembly phase, reducing the risk of hardware vulnerabilities such as "Trojan" insertions.





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This approach offers various benefits:

- Enhanced European Capacities: While the EU currently lacks advanced SiP capabilities tailored to defence applications, it possesses basic packaging expertise. Investing in SiP technology would not only diversify sources, but also bolster European capabilities in materials, design, and production.
- **Increased Independence and Security**: The EU could strengthen its independence, secure its supply chains, and safeguard sensitive information.
- **Cross-Sector Synergies**: SiP technology should serve not only military markets but also highdemand civilian markets such as automotive and healthcare to be economically viable, ensuring competitiveness and innovation in the face of significant investments by global competitors like the USA (e.g., DARPA ERI, DoD partnerships with Intel, SkyWater, and Qorvo).
- Efficiency and Flexibility: SiP technology enables the integration of multiple functionalities into a compact and cohesive system. By combining components within a single package, SiP reduces design complexity, enhances performance, and improves reliability compared to traditional PCB-level integration, where separate components may introduce inefficiencies or compatibility challenges.
- Adoption of Leading Technologies: SiP enables the combination of cutting-edge technologies (e.g., 5 nm nodes) with more mature, application-specific technologies, ensuring the EU can utilize the latest advancements while maintaining control over critical functions.
- **Broader Applications**: Beyond defence, SiP could drive innovation in areas such as mobility, quantum technologies, and more.
- **Existing Opportunities for Development**: Europe already has potential infrastructure to support SiP technology development. For example, STMicroelectronics' facility in Rennes, France, could serve as a hub for this technology with modest additional investment.

3. IC Substrates

IC substrates are critical in the defence industry as they provide the foundation for highperformance microelectronics, often used in conjunction with advanced packaging. They enable efficient signal transmission, power distribution, and thermal management, ensuring reliable operation in harsh environments like extreme temperatures, vibrations, and electromagnetic interference. Compared to the standard advanced IC substrate business, the IC substrates used in the defence industry are based on materials such as ceramics or silicon-based substrates which are tailored for high-frequency and high-power applications.





The integration of IC substrates within advanced packaging solutions enhances the functionality and performance of systems such as FPGAs and active discrete components for power (e.g., MOSFETs, HEMTs).

While some European players, such as Serma Microelectronics (formerly HCM.SYSTREL), have made developments in specific substrate technologies (e.g., ceramic substrates for FPGAs), these efforts remain limited in scale. Serma Microelectronics, in partnership with ATMEL and RUAG, has developed a process for ceramic column attach technology, showcasing Europe's potential to innovate in substrate manufacturing. However, this capacity is insufficient to address broader European demand, particularly for substrates required in advanced packaging solutions. Therefore, the EU electronic industry for defence is dependent on foreign suppliers of substrates, especially from Asia, towards companies like Kyocera, a main supplier of ceramic substrates.

With only a few IC Substrates facilities on its soil, the EU only represent 3.9% of the world production of IC substrates in 2023. In addition, the situation is expected to worsen within the next decades as foreign countries

are investing in this segment, and the only major investment noted in the EU is that of AT&S in Leoben this year which will be a R&D center for advanced IC substrates for application in computer, phones and server markets.

Substrate facilities in the EU

| Company | Location | Type of Substrates | Details of the products |
|---------------------------|---------------------|---------------------|---|
| AT&S | Leoben, Austria | Advanced substrates | Advanced substrates (ABF and substrates for modules), substrates for embedded die, substrates for Power |
| Schweizer | Schramberg, Germany | Advanced substrates | Substrates for embedded die, substrates for Power |
| Würth Elektronik | Germany | Advanced substrates | Substrates for embedded die |
| KSG Group | Gornsdorf, Germany | Legacy substrates | |
| Somacis | Italy | Legacy substrates | |
| Micro systems engineering | Berg, Germany | Legacy substrates | Ceramic substrates (LTCC and thick film) |
| Serma Microelectronics | Perigny, France | Legacy substrates | Ceramic substrates (thick and thin film) and organic substrates |
| Selmic Oy | Turku, Finland | Legacy substrates | Ceramic substrates (thick film, LTCC) |

Source: DECISION Études & Conseil







IV. Policy Recommendations

The EU's electronics manufacturing base has sharply declined over the past two decades, with its global production share falling from 18.6% in 2000 to just 11.6% in 2023. This downward trend undermines the EU's ability to meet its own defence requirements.

The continued erosion of this industrial base has severe consequences:

- 1. Longer Lead Times Short production cycles are critical in wartime, yet the limited scale of EU-based manufacturing and reliance on offshore production often extend lead times beyond one year for certain defence electronics.
- 2. **Rising Costs** The lack of domestic manufacturing facilities reduces economies of scale, driving up operational expenses.
- 3. **Security of Supply Risks** Dependence on foreign manufacturers exposes critical defence supply chains to potential disruptions, especially in times of crisis.
- Cybersecurity & Trust Concerns Outsourcing production entails disclosing sensitive system designs to foreign entities, heightening the risks of technology leakage and the insertion of security vulnerabilities into critical systems. This risk is particularly significant for strategic components such as PCBs which are product-specific and contain highly valuable intellectual property (IP).
- 5. Loss of Strategic Know-How The decline of the European electronics sector has led to the erosion of technical expertise, further weakening the EU's defence industrial base.
- 6. Weakening of the Supply Chain: The decline in electronics manufacturing impacts the entire associated supply chain, including suppliers of materials, chemicals, and equipment.

This situation has exposed the EU to **vulnerabilities and strategic dependencies**¹⁶ in key areas of the defence electronics value chain. Three critical levels of the value chain are particularly at risk:

- Advanced packaging, with only 8% of global defence-related production occurring in the EU.
- **Printed Circuit Boards (PCBs)**, with just 6% of global defence-related PCBs manufactured in the EU.
- IC substrates, with only 4% of global defence-related production taking place in the EU.

The European PCB industry, in particular, is at a critical juncture, facing an unprecedented decline in production capacity and the risk of disappearing entirely from Europe. Today, only 12% of PCB companies that were operating in the EU in the mid-1980s remain active, underscoring the urgent need for emergency measures.

¹⁶ The EU faces a strategic dependency on China for PCBs, which also affects the defence sector.





Meanwhile, in January 2025, **advanced PCBs and packaging** were explicitly listed among the semiconductor technologies subject to outbound investment reviews under the **EC Recommendation on reviewing outbound investments in technology areas critical to the EU's economic security**¹⁷.

Building 'ever-warm' capacities in defence, as outlined in the EDIP, requires establishing and maintaining 'ever-warm' capacities throughout the electronics value chain within the EU.

A) Act Urgently to Bridge Vulnerabilities in the Electronics Value Chain

The European electronics industry is facing prolonged headwinds, exacerbated by the ongoing crisis in the Printed Circuit Board (PCB) industry and low capacities in the packaging, and IC substrate industries.

In addition to a long-term support plan by 2035, there is an urgent need to act now to bridge vulnerabilities by increasing manufacturing capabilities at these steps of the electronics value chain, as critical components of the defence sector.

IPC calls for a multipronged emergency programme, making use of all available funding options. This short-term initiative should focus on immediately bolstering domestic production, enhancing supply chain resilience, and revitalizing the sector's technical expertise.

This emergency programme will serve as a foundation to reverse the decline of the EU electronics industry, strengthen defence capabilities, and reduce strategic dependencies on non-EU suppliers. It is structured around the following key pillars:

1. Assess Immediate Capacity Needs in the EU Defence Electronics Industry

The EU and European defence agencies should map the companies that make up the defence electronics industrial base for PCBs, IC substrates, and advanced packaging and assess their capacities.

This strategic assessment can be achieved by the Observatory of Critical Technologies, under the EDIP Security of Supply Regime, and in coordination with the European Defence Industrial Readiness Board (DIRB).

It should be completed within 180 days and should:

- Identify critical gaps
- Define the manufacturing capacities required within the next three years
- Ensure full coverage of PCBs, IC substrates, and advanced packaging

¹⁷ <u>COMMISSION RECOMMENDATION (EU) 2025/63 of 15 January 2025</u>.





2. Invest in Strategic Domestic Manufacturing

A Resilience Fund should be created to provide direct financial incentives for establishing and modernizing key electronics manufacturing facilities over the next three years.

This should pursue the same goal as the FAST (Framework for Act in Support of Ammunition Production) programme under EDIP, expanding its scope beyond ammunition and missiles to include critical electronics manufacturing.

B) Boost European Defence Production

1. Establish a Mechanism to Track Progress Towards the EDIS Target on EU Content

The European Defence Industrial Strategy (EDIS) sets a key objective: By 2035, at least 60% of Member States' defence procurement budgets should be allocated to acquisitions from the European Defence Technological and Industrial Base (EDTIB).

Achieving this realistic target is crucial to translating Member States' demand into a significant expansion of European defence manufacturing capabilities.

The EU Council conclusions of its special meeting on March 6, 2025, call for an acceleration of the mobilisation of the necessary financing to reinforce the EU overall defence readiness. Building on this recommendation, the EU should aim for a more ambitious target than 60% by 2035.

However, the current version of the European Defence Industrial Programme (EDIP) does not include this target. It should be reaffirmed, and a structured mechanism must be implemented to track annual progress at the Member State level.

Without such a tracking mechanism, the EU risks missing this goal.

2. Incentivize the Europeanization of Defence Production

Member States should collaborate more closely with European defence Original Equipment Manufacturers (OEMs), to identify capability needs and **provide targeted incentives for strengthening European industrial capacities**. These capacities should be developed in cooperation with the EU supply chain to enhance resilience and reduce dependencies.

Additionally, recipients of defence funding should be **entities established within the EU or associated countries.**

3. Ensure Environmental Regulations Do Not Hinder Production Ramp-Up

While environmental regulations such as PFAS restrictions and REACH are essential for sustainability, their implementation can create additional barriers to scaling up defence production. Requirements can impose higher costs, delay investments, and limit access to critical materials. A balanced approach with sufficient lead times is needed to ensure that environmental regulations do not hamper Europe's short-term need for a production ramp-up.

In this regard, the recent omnibus regulation, proposed by the European Commission on February 26, 2025, represents a step in the right direction. It introduces key adjustments to reduce administrative burden in sustainability reporting. Several of these measures are specifically





designed to ease reporting burdens for SMEs, aimed at ensuring that regulatory requirements do not disproportionately hinder their operations.

In the conclusions of its special meeting on March 6, 2025, the EU Council invites the Commission to prioritise a defence-specific simplification omnibus.

C) Adopt a Defence Value Chain Approach

This second set of recommendations aims at adopting a value chain approach in the design and enforcement of the EU Defence strategy, considering not only Defence systems manufacturers, but the entire value chain, including the electronics manufacturing ecosystem.

The report **"Strengthening Europe's Civilian and Military Preparedness and Readiness"**, states: "as the EU moves forward with de-risking and supply chain diversification [...] by forging new partnerships on the energy, defence and raw materials value chains [...] there is scope to cooperate further". Establishing coordination between the defence sector and other industries is undoubtedly crucial. This should include the electronics sector and go even further by adopting a value-chain-based approach to defining defence.

1. Develop a Clear Understanding of the EDTIB's Value Chain

A competitive European industrial base is essential for securing defence supply. This requires a clear and comprehensive understanding of the European Defence Technological and Industrial Base (EDTIB) and its full value chain. Therefore, the EDTIB must formally encompass the entire defence supply chain, from Tier 1, 2, and 3 suppliers to those involved in electronics manufacturing, materials, and raw materials.

For the electronics manufacturing ecosystem, this broader approach implies recognizing the following players as integral to the EDTIB:

- Original Equipment Manufacturers (OEMs).
- Electronic Manufacturing Services (EMS).
- Printed Circuit Board (PCB) manufacturers.
- Semiconductor manufacturers.
- IC Substrate manufacturers.
- Packaging and advanced packaging manufacturers.
- Equipment suppliers.

2. Monitor Progress Towards the EDIS Target on EU Content Across Strategic Components

To secure the defence supply chain, it is essential to **identify and monitor "strategic components" at each step of the value chain**. These components are defined by their **unique, critical know-how**, which is indispensable to the functioning of defence equipment.

Compliance with the 60% EDIS target or preferably more ambitious targets which could be set should be measured not only at the defence platform level but also in terms of these strategic components. It is important to note that incentives are required to reach the 60% here. This is





due to the fact that a defence supply chain is built on the highest of standards that each and every party and product needs to meet. To be qualified for defence purposes as a company or product a severe quality and security process is required.

Strategic components should include:

- Printed Circuit Boards (PCB)
- Advanced packaging
- IC Substrates

For example, based on the 60% target, achieving this goal would positively impact the manufacturing of Printed Circuit Boards (PCBs), advanced packaging, and IC substrates for defence in the EU. It would raise their production-to-demand ratio in defence to 58%, 36%, and 49% respectively, as illustrated in the figure below.

Raising these ratios is crucial to **building a secure and trusted defence supply chain**.



Source: DECISION Etudes & Conseil

In light of the REARM Europe proposal and Council Conclusions of 6th March the figures should rise with European investments foreseen.

3. Assess the EU's Strength in Electronics Manufacturing Equipment to Secure Leadership in the Next Era

The EU should evaluate the strength of its electronics manufacturing equipment sector to determine its readiness to lead the next era of electronics production.

In the coming decade, AI-driven tools will be a key differentiator in manufacturing, enhancing competitiveness and reinforcing industrial leadership. As a result, manufacturing equipment is a critical area of strategic dependency and potential vulnerability.





4. Involve Electronics Manufacturers in the High-level European Defence Industry Group

As key suppliers to the European defence industry, **the electronics manufacturing ecosystem should be represented within the High-Level European Defence Industry Group**, which will serve as an advisory body to the Defence Industrial Readiness Board (DIRB).

5. Coordinate Defence Strategy with Key Related Value Chains

The defence ecosystem is deeply interconnected with the Raw Materials ecosystem: Serving as a crucial supplier in the value chain, raw materials are indispensable for defence production. The EU has been actively expanding initiatives to secure its raw material supply chains, such as the European Raw Materials Alliance and the Raw Materials Information System (RMIS). Cooperation between the European Defence Strategy and these initiatives is essential to prevent misalignment. For example, securing the supply of copper-clad laminates or glass fiber -both critical for electronics manufacturing- remains a key challenge with significant implications for the EDTIB.

The European Defence Strategy must also account for other End-User Electronics Industries. Defence is just one of many markets for electronics manufacturing. Key European industries, including automotive, industrial & robotics, health & care, and home appliances, rely on the same supply chain. Prominent European companies such as Bosch, Siemens, Valeo, ABB, and Philips are leaders in these sectors. Strategies to secure the European electronics manufacturing base for the EDTIB should be aligned with support measures for other markets -such as automotive- to foster a self-sustaining and resilient market ecosystem. For instance, the automotive, defence, and space industries share some overlapping electronics manufacturing needs that could be addressed through common EU-based suppliers.

Securing electronics manufacturing in Europe requires market opportunities beyond the defence sector. Defence alone does not offer a sufficient market potential to fully scale up Europe's electronics manufacturing industry without support from civilian markets. This is why aligning value chains within an ecosystem-based approach is essential.

The European Commission's directorates should enhance coordination on cross-cutting issues such as semiconductors, defence, automotive, and raw materials. Greater synergy between these areas is vital for strategic alignment and industrial growth.

A standing strategic dialogue between industries, European Commission and Member States should be established, progressing toward integrated governance for electronics across supply chains and verticals at the EU level¹⁸.

¹⁸ The Call for a standing dialogue was an industry recommendation in the 2023 Electronics Stakeholder Dialogue organized by European Commission DG GROW: <u>https://emails.ipc.org/links/Electronics-Dialogue.pdf</u>





D) Improve Access to Financing

1. Securing Private Investment requires sustained and durable commitment to public financing

To attract and secure private investment in the defence sector, it is essential to implement a strategy over the long term. Fluctuations in defence budgets during the past decades have eroded private investors' confidence due to perceived instability in public funding.

A sustained and durable commitment to public financing is therefore crucial to reassure, attract and secure private investment.

This approach would reduce uncertainties associated with fluctuating budgetary policies and demonstrate a firm political will to strengthen European defence capabilities.

The conclusions of the special meeting of the EU Council on March 6, 2025, represent a step in the right direction. They emphasize "the importance of mobilising private financing for the defence industry" and invite "the Commission to consider measures in this regard, including by signalling to private investors the importance of the defence industry for Europe at large."

2. Adapt Competition Policies for Defence Financing

Currently, under EU market competition rules, subsidies for defence manufacturing in the EU can only be granted under three legal bases:

- Article 346 TFEU: Allows for subsidies specifically for defence purposes, provided they are deemed necessary to protect essential security interests.
- Article 107(b) TFEU: Permits aid for Important Projects of Common European Interest (IPCEI), enabling cross-border cooperation on strategically significant projects.
- Article 107(b) TFEU: Is also applicable to projects addressing serious disturbance in the economy of a Member State, such as a disruption in its value chain, provided such aid is proportional and necessary to restore stability.

Each of these frameworks requires case-by-case justification through a detailed administrative file and approval from the Directorate-General for Competition (DG COMP).

As highlighted in the Draghi Report, simplifying competition rules to better support defence, as a strategic industry, would reduce the need for case-by-case justifications. By reducing ex-ante controls and approvals, this reform would streamline processes, ease administrative burdens, and accelerate investment timelines necessary to scale up production.

In the conclusions of its special meeting on March 6, 2025, the EU Council calls on "simplifying the legal and administrative framework, in particular for public procurement, industry cooperation, permitting and reporting requirements, in order to address all obstacles and bottlenecks hindering a rapid ramping up of the defence industry".





3. Establish Funds Dedicated to SME Financing

European SMEs, whether in the defence or electronics sectors, often face significant challenges in securing financing. To address this, initiatives like the FAST (Fund to Accelerate Defence Supply Chain Transformation), that could be established under the EDIP, are critical.

The FAST fund is specifically designed to provide debt and equity financing to SMEs and small mid-cap companies involved in defence industrialization, helping to accelerate supply chain transformation and enhance their financial access.

In the electronics sector, particularly in Printed Circuit Board (PCB) manufacturing, packaging or substrate production, many SMEs play a key role in expanding manufacturing capacity. However, their growth is often hindered by a lack of adequate financing. It is therefore crucial to support not only innovation but also the expansion of industrial infrastructure to ensure continuous reliability and security in European electronics production. Dedicated financing would help structure a strong regional base capable of responding swiftly to evolving market developments and strategic needs.









