

EDRIN

European Defence
Research and Innovation Network

EDRIN's contribution to strong collaborative R&I for a more competitive EU defence industry

1. EDRIN PRESENTATION

1.1. EDRIN'S MISSION

The European Defence Research and Innovation Network (EDRIN) is the group of independent solution-driven not-for-profit European applied Research and Technology Organisations (RTOs) with a substantial role in defence research and development (R&D) within a broader innovation portfolio.

Our mission is to:

- Act as the coordinated voice of RTOs in defence R&D and cooperation.
- Offer a one-stop-shop for political and industrial stakeholders to access defence R&D expertise thanks to our key role in the innovation ecosystem, in-depth experience in national, bilateral and multinational collaborative projects, large networks of excellent researchers and unique test facilities.
- Provide strategic guidance and consolidated long-term roadmaps for R&D priorities.
- Act as the bridging link between academia, applied research, defence industry (including SMEs and start-ups), and end-users in both traditional defence domains and as an interface to civilian technologies and applications.

1.2. OUR OFFER

EDRIN is the focal point in the value chain of European defence R&D and cooperation. Members bring decades of experience in working for Ministries of Defence, Armed Forces, and multinational defence organisations such as EDA and NATO.

1.3. OUR ADDED VALUE

EDRIN proactively engages with all relevant stakeholders to foster the competitiveness and innovation capacity of the European Defence Technological and Industrial Base (EDTIB), including through maximizing the successful implementation of the European Defence Fund (EDF).

1.4. WHO WE ARE

As of 2025, EDRIN has nine members from eight EU countries:

- Baltijos pažangių technologijų institutas (BPTI), Lithuania
- Commissariat à l'énergie atomique et aux énergies alternatives (CEA), France
- Fraunhofer-Gesellschaft, Germany
- Instituto de Engenharia de Sistemas e Computadores Inovação (INOV), Portugal
- Ινστιτούτο Τεχνολογιών Πληροφορικής και Επικοινωνιών (ITI), Greece
- Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek (TNO), The Netherlands
- Office national d'études et de recherches aérospatiales (ONERA), France
- Teknologian tutkimuskeskus (VTT), Finland
- Totalförsvarets forskningsinstitut (FOI), Sweden

2. INTRODUCTION

Anticipating the new commission, several reports were issued in 2024, among them the Draghi and Niinistö reports. Specifically, the latter underlines the need for an ambitious new approach to the EU's preparedness and readiness. Among other recommendations, it calls for a greater involvement of all European citizens, a better integration of European armies, national industrial & defence bases and intelligence services, an enhanced deterrence against cyberattacks and hybrid warfare, and pleas for a strengthened European industrial policy.

Echoing these statements, the geopolitical context stresses dramatically the need for Europe to bring concrete and lasting answers to challenges of its security and defence. For these need more than ever an ambitious response to strengthen synergies between all the stakeholders shaping the European defence and security of our citizens, from research organisations, industry, decision makers and of course the armed forces. As there could be no strategic autonomy without Europe being at the forefront of defence innovation.

EDRIN, as the leading group of not-for-profit European RTOs active in the defence sector as well as in the civilian one, anticipates the publication of the White Paper on the Future of European Defence and put forward the following contribution to contribute to the discussion around the improvement of European defence & industrial capabilities, to "spend better, spend European," with a particular focus on defence R&I.

3. EDRIN's concrete recommendations for a sustainable European Defence Technological & Industrial Base (EDTIB)

3.1. Favouring European public procurements for the defence sector

As a key player in European defence R&I, EDRIN emphasises the critical role of cutting-edge scientific and technological innovation in strengthening Europe's strategic autonomy. Strong, coordinated investment in research and innovation is needed in all areas of defence.

EDRIN favours an ambitious policy towards European public procurement for the defence sector, especially in terms of research and innovation (R&I), as well as the creation of an "EU DARPA" kind of initiative.

Public procurement has proved to be key in the emergence of new technologies in the United States during the past decades. It is one of the reasons for the success of ARPAs programs since public procurement contributes to provide the necessary use-cases and funding for the technologies developed within such programs.

Significant and stable investments in disruptive and emerging technologies enable them to find their way into the market. These investments are a strong incentive for industrial actors, especially SMEs, and research organization and then, they ultimately become part of the new European defence architecture.

Furthermore, since banks in the EU have remained reluctant to invest in defence for ESG reasons, weakening Europe's ability to maintain technological parity with global competitors and leaving critical

capabilities underfunded, the EU must now take a more proactive approach. A real “EU DARPA”, embracing the inherent risks associated with capital deployment, could serve as a model to demonstrate the EU’s willingness to take risks. This agency should not only focus on funding but also on fostering a culture of rapid experimentation, risk-taking, and agile development cycles, mirroring the success of its U.S. counterpart while adapting the EU contingencies.

Public procurements are also key to incentivizing spin-in and spin-out applications, reinforcing Europe’s technological sovereignty in defence.

3.2. Reinforce the European defence supply chain with relevant sub-components and sub-systems

Defence needs to focus on military capabilities, in order to enable the Armed Forces to perform their mission with high efficiency and a high level of interoperability. However, the strength of high-end military equipment and systems relies on a strong and strategically autonomous European value chain. In addition, this encompasses both major industrials and myriads of midcaps and SMEs.

As High Representative of the EU for Foreign Affairs and Security Policy Kaja Kallas stated, the Union does not need a single Army, but requires 27 Armed Forces able to work together and interoperate.

Thus, EDRIN advocates for a novel approach focusing more on sub-components and sub-systems, in order to better feed into different military capabilities, and take full advantage of technologies with dual-use potential. This would lead to a rebalancing of the future EDF program toward a stronger European value chain, enabling SMEs, midcaps and RTOs to have a more targeted impact for a more competitive European Defence industry.

For example, investing more in enabling technologies and sub-systems for resilient PNT (Positioning, Navigation, Timing), GNSS (Global Navigation Satellite System) , AI trustable powered systems, deep precision strike systems, infrared sensors, encrypted telecommunication tools and software defined defence (SDD) will help to improve more than one capability domain, and more than one product. This approach should also improve interoperability between systems and reduce the fragmentation among actors. It should also certainly ease the consolidation of a European single market for defence. Besides, such a strong value chain could also improve Europe’s capacity to export its products.

In this frame, the benefit of engaging RTOs lies in the development of enabling technologies that can be then transferred to industry and incorporated in multiple ground-based, airborne, space-based, or seaborne solutions.

3.3. Key military capabilities: towards a Defence IPCEI (Important Project of Common European Interest)?

If EDRIN called for a rebalancing of the EDF toward enhancing the European defence value chain, we of course do not underestimate the need for improving production and increasing stockpiling of capacities.

Thus, EDRIN recommends launching “IPCEIs-like” programs to develop in parallel the key and strategic military capabilities European Armed Forces need. This could consolidate further the efforts

of major industrials, without harming national interests or already existing cooperation between Member States.

As outlined in the Draghi report, under a new Competitiveness IPCEI framework, its scope should be extended to all forms of innovation that could effectively push Europe at the frontier in strategically important sectors such as defence.

With this two-stage approach – EDF competitive calls on components and subsystems, followed by “IPCEI-like” programs for major capabilities – EDRIN believes that Europe could find a better return on investment, and an increasing pace for industrial operations.

3.4. Making efforts simpler and faster

To ensure the long-term viability of the massive investments which are to be decided in the near future for our defence, the EU should establish clear and predictable funding mechanisms, while simplifying and reducing bureaucratic hurdles that slow down innovation adoption.

Thus, EDRIN strongly supports the idea of simplifying rules and procedures in defence (particularly the EDF successor programme). EDRIN suggests establishing EU-wide guidelines and regulations that simplify and unify the defence and space actions and activities at EU level.

EDRIN members usually have different national regulations in defence and space domains (for example, in regulations on restricted and secret data), thus EU-level cooperation typically faces a wide range of regulations stemming from individual EU member states. Such regulatory difficulties are counterproductive to EU-wide cooperation.

EDRIN supports the Commission in working closely with Member States to encourage them to harmonize their respective framework conditions, particularly as they relate to cross-border R&I.

3.5. Spend better ... for defence R&I

If some regular incentives for the Member States to invest more on defence are clearly expressed by now, the share of any defence budget dedicated to R&I is often not sufficiently mentioned. However, it is clearly assessed now that R&D efforts on defence are underestimated, stagnating, and mostly fragmented or duplicated.

We believe that EDA’s recommendation of 2% of national defence budgets attributed to defence R&I is an important objective, without which the future of the EDTIB could be jeopardized.

R&I is an integral part of a future-oriented industrial policy, as underlined in the Political Guidelines for the Next European Commission (2024-2029), vowing to put R&I at the heart of the economy. However, the current situation shows that R&I efforts are fragmented (often not going beyond national borders) and at risk of unnecessary duplication under a business-as-usual scenario. Added to this is the challenge of stable, continuous R&I investment at national and EU level. This lack of coordination weakens Europe’s ability to develop truly disruptive technologies and undermines the efficiency of its defence ecosystem. Greater harmonisation of priorities and funding mechanisms across member states is essential to maximize impact.

At the same time, programs such as the EDF offer the benefit of cross-border cooperation that could not be unlocked at national level alone. The support of bottom-up initiatives, e.g. through open calls for proposals, is also an essential part of the EDF. This allows solutions to be introduced that might have been overlooked by a top-down approach alone. The networking of players from policy, industry, and R&I in the defence sector, and with players from civilian sectors (who are interested in spin-in activities, for example) also represents considerable benefit. These activities need to be consistently built upon in the future to sustainably reinforce the added value of cross-border cooperation.

Thus, EDRIN calls for an enhanced defence R&I window in the successor programme to the EDF, supported by an EU budget (MFF) focused on the long-term significance and stability of defence R&I investment. Firmly embedding a larger R&I window in the programme will bolster efforts towards a more competitive EDTIB and enhance the EU's wider competitive edge beyond immediate technology needs.

3.6. Retaining and attracting talent: a key pillar for Europe's Defence Innovation and Sovereignty

A key challenge for European defence R&I is the ability to attract, develop and retain top talent in strategic technology areas. Without competitive career opportunities, many highly skilled engineers, researchers, and entrepreneurs have turned to positions outside Europe, particularly in the United States and China, where funding, industrial ecosystems, and innovation incentives seemed often more attractive. **To counter this brain drain the EU must invest in dedicated programmes to support young researchers, strengthen academic industry partnerships, and offer long-term career prospects in defence innovation.** This includes increased funding for PhD and postdoctoral positions, mobility grants within Europe, and dedicated initiatives to facilitate the transition from research to industrial applications. By ensuring that, Europe remains a hub for cutting-edge defence and dual-use technologies, the EU can secure its technological sovereignty and remain a strong EDTIB.

4. Strengthening a sustainable EDTIB: RTOs contribution to increased resilience and reduced dependencies

RTOs play a crucial role in enhancing the competitiveness of the EDTIB. Important strides toward this goal have been made under the EDF. EDRIN members have so far participated 140 times across 81 projects, in seven of those as the project lead. EDRIN has also actively contributed to the interim evaluation of the EDF. Looking to the future, the aim is to unlock additional efficiency gains.

EDRIN is committed to providing continuous insights to further bolster the EDTIB.

4.1. Anticipate and assess tomorrow's defence systems to support European superiority

EDRIN's participation in EDF programs demonstrates how RTOs take a very complementary role of the industry when it comes to strengthening the European defence industry. Indeed, EDRIN members take part either in development as in research projects, in all EDF categories, including of course the disruptive ones.

Among the emerging systems concepts in which EDRIN members are already positioned alongside industrials to support the EDTIB, some already shape the future of defence systems such as UAV concepts, smart collaborative combat systems, space surveillance and communication systems, anti-missile defence systems, high energy weapons, hypersonic vehicles, resilient detection and tracking systems, ground combat vehicles, or future naval systems, including underwater, and medical countermeasures. In this last example, RTOs also prove their ability to federate a complete ecosystem, as neutral players.

Besides this role in contributing to systems, EDRIN members also support industry through their R&D in enabling technologies, which will influence the future of defence, taking roots in their dual development. Looking only at EDF commitments, our members play a preeminent role in energy resilience, new materials, electronic components and sensors, and most of the digital transformation AI based technologies, quantum sensors and communication or cyber defence.

With such a track record, based on a large portfolio, a strong sense of cross-border collaboration, and an enhanced technological prospective, **EDRIN advocates for a novel approach focusing on future defence system assessment taking into account emerging and disruptive technologies and concepts, in order to better support the superiority of the European EDTIB. This approach also praises for a central place for RTOs in the framework, in order to benefit more strongly from what they can contribute to the European strategic autonomy.**

4.2 Maintaining intellectual property in Europe

EDRIN members are all major European research and technology organizations. Thus, they are at the forefront of research and innovation, and bridge the gap between industrial players (both SME and large companies) and academic actors. They contribute to the European defence supply chain, often technologies with dual-use potential, with constant innovation and through keeping the intellectual property inside the Union.

Indeed, whatever might happen to a company producing military capabilities products with key technologies developed by RTOs, the IP stays among public, or semi-public, not-for-profit organizations. This way, developments could be restarted with another actor, ensuring continuity and long-lasting support. In doing so, RTOs can ensure the sustainability of strategic industries, among them the EDTIB.

EDRIN supports a strong European IP approach for a future-oriented EDTIB. This will clearly contribute to reducing dependencies toward non-European actors.

4.3 Bringing innovative processes to defence industry

Moreover, RTOs are the spearhead of innovative industry, poised to contribute to a stronger defence industry, as it is time to produce more, regularly, and sustainably. In fact, EDRIN members have been active in the fourth industrial revolution (also called Industry 4.0) from the start, combining robotics, artificial intelligence, 3D printing and digitalization to improve efficiency and sustainability within the industry. In the aerospace and defence sectors, significant efforts have also been made to integrate RTOs' AI-driven autonomous systems, advanced aerodynamics, and digital twin technologies to enhance both performance and predictive maintenance capabilities. In addition, RTOs are deeply involved in circular economy and industry, promoting the reuse of materials, reduced use of raw

materials and substitution of the latter by innovative materials with a reduced energy or waste footprint. For instance, research on next-generation composite materials and high-performance alloys aims to develop more durable and recyclable components for both air and land defence systems, reducing reliance on critical raw materials.

The rapid advancement of green defence technologies is essential for not only addressing climate change but also for ensuring that European defence systems are energy-efficient, thereby reducing vulnerabilities in supply chains and operations. By bringing all these new technological enhancements and processes to industry, RTOs contribute to the EDTIB's increased resilience and reduce its dependencies whenever possible.

EDRIN recommends that future programs for Defence industries include more circular approaches, not only for obvious climate transition matters, but also for the sake of European strategic autonomy and operational resilience.

4.4 Federating ecosystems

In addition, RTOs have the ability to federate global ecosystems. Once a need is identified, RTOs can involve both academic and industrial actors, including SMEs and start-ups, and swiftly mobilise public and private funding to bring solutions to life. This ability has proved to be very successful in the civilian sector but remains under-exploited in the defence sector. This kind of approach could also be powerful in a dual perspective, including through a productive cross-fertilization between civilian and defence industrial sectors.

4.5 Strengthening enabling technologies as a way to harness the EU's dual-use and civil-military potential across all relevant domains

To strengthen even further their impact, RTOs could focus on key « enabling technologies » for defence. Such technologies have already been identified by the European Commission in the *list of critical technologies* established in the COM 2023/6689 annexe; and by NATO in the list of *emerging and disruptive technologies* (EDT). These two top-tier organizations have identified the following technologies as having potentially dual applications: advanced semiconductors, artificial intelligence, quantum technologies, digital technologies, advanced connectivity and navigation, advanced sensors, space and propulsion technologies, energy technologies, advanced materials, additive manufacturing, robotics, and autonomous systems technologies. These technologies, essential for the future of warfare systems, are at the core of RTOs research and innovation.

EDRIN believes that sub-systems based on key enabling technologies shared and developed by RTOs (having an extended track record of collaboration with each other and with industry) would guarantee optimal interoperability, not only between EU armed forces, but also with NATO systems.

The outlined technologies could benefit to a larger spectrum of strategic industries, such as the space industry, for example.

R&I in the successor programs to Horizon Europe and EDF could, for example, be more focused on technology and less on products, allowing greater innovation while offering precise use-cases in both civilian and military fields. Thus, EDRIN recommends that the leveraging of technologies with dual use potential should be assessed and strongly backed in the programmes, through the next MFF.

EDRIN advocates the need to link up with schemes launched as part of the Strategic Compass and implemented by DG DEFIS and the European Defence Agency, the latter having developed some very interesting skills as interface between civilian and military European policies, particularly in dual research.

4.6 Providing unique test and evaluation facilities: a complementary way to harness technologies with dual-use potential across all relevant domains

Finally, EDRIN would like to highlight one of the major RTOs' asset, not sufficiently addressed today in the support for the EDTIB: technological platforms. Research, testing, evaluation and pilot-line infrastructures play a vital role in technological innovation. These include for instance advanced experimental facilities, digital and hardware in the loop simulation facilities and so many other technological capacities and equipments all of which are essential to support the development and validation of next-generation technologies.

Indeed, attention is drawn to the better use of these world-class and unique technological platforms and facilities by defence actors, where a larger opening toward military use-cases should be sought (for example, through specific calls).

With their key role in bridging academic research and industrial development, EDRIN members provide and operate these unique capabilities. Supported by government funding, the former provide a significant contribution to assess the operational benefits of new concepts and define the technologies needed for their deployment, in terms of maturity, availability, criticality and measures to be taken.

Such facilities, mostly operated by RTOs as EDRIN members, might benefit a wider range of industrial actors, including SMEs and start-ups, to validate upstream the potential for innovation of technologies both for civilian and military industries. However, the defence sector does not yet derive significant value from these facilities within the current system though they could really help to anticipate the strengthening of the supply chain in current and future defence systems.

5. EDITORIAL NOTE

This white paper has been approved by all EDRIN member organizations. The main authors are:

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