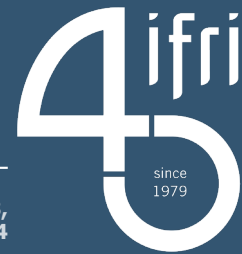




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## EUDIS, HEDI, DIANA

# What's Behind Three Defense Innovation Acronyms?

Johanna MÖHRING

### ► Key Takeaways

- EUDIS, HEDI and DIANA are three recent policy instruments meant to encourage defense innovation in Europe, and beyond. Fielded by the European Commission, the European Defence Agency (EDA) and the North Atlantic Treaty Organization (NATO), respectively, these seemingly comparable defense investment instruments underline key challenges confronting European defense.
- They stand for competing national visions: European supranational, intergovernmental, as well as transatlantic defense perspectives in differing and diverging combinations.
- EUDIS, HEDI and DIANA highlight the persistent gap with European defense objectives set 20 years ago, most notably the divide between stated ambitions and actual means invested.

## Introduction

In Europe, with Russia's war of aggression against Ukraine showing little sign of abating, a persistent gap remains between security needs and defense spending. According to a 2006 commitment enshrined at the 2014 Wales NATO summit, the North Atlantic Treaty Organization (NATO) members should disburse no less than 2% of their national gross domestic product (GDP) on defense, out of which 20% is to be spent on equipment and research and development. In 2024, only 23 Allies out of 32 are expected to meet or exceed this target, though a significant improvement from only three in 2014. This total includes the United States (US) devoting 3.38% of its GDP to defense, constituting almost 70% of all NATO member defense spending combined.<sup>1</sup>

Despite innovation's key importance to national security in an international context marked by heightened technology-driven systemic competition, there is one category of European military expenditure that fares especially poorly: defense research and development (R&D), and its sub-category, defense research and technology (R&T). While R&D covers any programs up to the point where expenditure for the production of equipment starts to be incurred, R&T is a subset of R&D, comprising expenditure for basic research, applied research and technology demonstration for defense purposes.

During the Cold War, European NATO Allies routinely spent more than 3% of GDP on average on defense, with variations over time. In its aftermath, western countries not only drastically reduced their defense expenditure, but they also cut military R&D by 25% or more. From 2005 to 2017, European R&D expenditures fell from 5% to 3.5% of total defense spending. In 2022, as per Europe Defence Agency figures, R&D had increased to 3.9%, or €9.5 billion, out of total European Union (EU) defense spending of €240 billion. Yet despite this recent uptick in overall defense expenditure, as well as in defense R&D, investment in defense R&T has not benefitted as it should. In 2022, EU member states spent €3.5 billion, or 1.5% of their total defense expenditure on defense R&T, up from 1.1% in 2011 but down by 0.2% compared to 2021. This is well below the goal established in the framework of the European Union's Permanent Structured Cooperation (PESCO) in the area of security and defense launched in 2017, to invest at least 2% of overall defense expenditure in Research and Technology. Only two EU member states currently meet the 2% goal, which had first been agreed at the EDA's Ministerial Steering Board in November 2007. Led by France, they account for more than 80% of all EU defense R&T expenditure.

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1. In 2014, just the United States, Greece and the United Kingdom lived up to their promises. This number did not budge until 2022, when Estonia, Latvia, Lithuania and Poland stepped up as well. In 2024, the seven are to be joined by Finland, Denmark, Romania, North Macedonia, Norway, Bulgaria, Sweden, Germany, Hungary, Czechia, Turkey, France, Netherlands, Albania, Montenegro, and the Slovak Republic. The remaining bad students are Croatia, Portugal, Italy, Canada, Belgium, Luxembourg, Slovenia and Spain.

In the last two decades, the US has not only outspent its European allies in defense roughly by a factor of 2.5 in GDP share and by a factor of 4 in volume. In 2016, the European Parliament estimated that the US devoted approximately €45 billion more per year to R&D and €6.5 billion more per year on defense R&T than EU countries. In 2022, the US allotted 14% of its overall defense budget of €794 billion, close to €111 billion, on R&D, test and evaluation (RDT&E), a percentage to rise to almost 17% in 2025. This is not taking into account the increasing role played by the private sector, especially the tech sector, in US defense innovation.

Faced with a deteriorating security environment, sparse funds and limited industrial capacity, European defense cooperation would seem essential to achieve lower costs, higher production rates and agreed-on defense capabilities. Yet the results of two decades of European defense industrial policy promoting a Single Market for defense equipment and a European Defence Technological and Industrial Base (EDTIB) have been modest. In 2007, EU member states committed to a joint defense investment of 35%, as well as to devoting 20% of total defense R&T to collaborative projects. As for the former, in 2021, only 18% of all capacity developments/defense equipment spending was undertaken jointly. As for the latter, since its creation in 2004, the EDA has only managed some 250 R&T projects worth a bit more than €1 billion.

First regulation was tried, notably the 2009 EU directives for procurement and intra-EU transfers of defense products (“Defence Package”), as well as efforts from 2016 onwards encouraging European defense research, culminating in the establishment of the European Defence Fund (EDF) in 2021. Then financial incentives were tested: Next to the EDF investing €8 billion in joint defense innovation and prototyping until 2027, there currently is the 2022 “European Defence Industry Reinforcement Through Common Procurement Act” (EDIRPA), which earmarks €300 million for joint weapons purchases until 2024, as well as the “Act in Support of Ammunition Production” (ASAP), which sets aside €500 million for procuring ammunition. Presently, a mix of the two prevails. The 2024 European Defence Industrial Strategy stipulates that by 2030, at least 50% of member states’ procurement budget (60% by 2035) should go to EU-based suppliers, and at least 40% of defense equipment should be jointly procured. Intra-EU defense trade should account for at least one-third of the value of the EU defense market. However, discussions on establishing the corresponding European Defence Industry Programme (EDIP) are stalling, pushing its implementation into 2025. EDIP should mobilize €1.5 billion of the EU budget over the period of 2025-2027, redeployed from the European Defence Fund. Currently, the focus is on plugging the most urgent capability gaps, with almost 80% of expenditure spent on non-European, mostly US equipment. Since February 2022, only 22% of European defense acquisitions have come from the EU.

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## Defense innovation with EUDIS, HEDI and DIANA

The EU Defence Innovation Scheme (EUDIS) was created in 2022 to improve access to the European Commission's European Defence Fund (EDF), the EU's defense Research and Development program overseen by the Directorate-General for Defence Industry and Space (DEFIS). The Hub for Defence Innovation (HEDI), launched in 2022 and managed by the intergovernmental European Defence Agency, is supposed to inspire and promote innovation at the EU level, focusing on agreed EU priorities for capability development. Lastly, the Defence Innovation Accelerator for the North Atlantic (DIANA), which was approved by NATO in 2022, is targeting emerging and disruptive technologies and wants to foster a transatlantic defense ecosystem.

### ***Competing visions: supranational, intergovernmental, and transatlantic approaches***

These three instruments highlight different visions, two European and one transatlantic, as to who and what should drive European defense, and defense innovation in particular. On the European side, a supranational approach, EUDIS, steered by the European Commission, confronts an intergovernmental approach, with EU member countries in the driving seat of EDA's HEDI. Both have to position themselves *vis-à-vis* NATO's DIANA, which is multilateral/intergovernmental in nature, and which includes Europe's protector and technological competitor, the US.

EUDIS, HEDI and DIANA have not only in common that they were all launched in 2022. All three try to remediate certain flaws of instruments fielded prior to increasing European defense capabilities. These are, for example, limited funds available, as during EU budget negotiations for the 2021 to 2027 period, the European Defence Fund was cut from €13 to 8 billion. They also try to remediate an insufficient focus on emerging and developing technologies (EDTs), as well as investment risk adversity. While 4% to 8% of the EDF's annual budget is set aside for such technologies, the 2021 and 2022 "rounds" were able to only allocate about half of the earmarked sums. They also recognize the importance of small- and medium-sized enterprises (SMEs), as well as the private sector in general, both in terms of financing and as a driver of innovation. Lastly, they acknowledge the difficulty of guiding investment towards European capability priorities.

The Commission's EUDIS, a supranational instrument, has earmarked €2 billion until 2027 to foster innovative entrepreneurs, start-ups, and SMEs, helping their projects mature, scale up, demonstrate their interest, grow and successfully enter the market. This sum is composed of €1.46 billion from the EDF and €400-500 million from other public and private sources. In 2024, the European Commission and the European Investment Fund, a separate EU agency targeting SMEs, launched the Defence Equity Facility (DEF),

with €175 million to invest in the 2024 to 2027 period, with the aim of “leveraging in” additional sums to dispose of up to €500 million.

EUDIS finances initiatives such as defense hackathons<sup>2</sup> throughout Europe, support for setting up innovation test hubs and application of civil research for the military. It supports the EU’s 2021 Action Plan on synergies between civil, defense and space industries. Technologies used in “defense applications” such as microelectronics, high-performance, quantum and cloud computing, artificial intelligence, cybersecurity, robotics, 5G and advanced connectivity should also be eligible for funding under the Commission’s new Strategic Technologies for Europe Platform, dubbed “STEP”. EUDIS also encourages business coaching and partnership “match-making”. EDF’s National Focal Points (NFPs) in EU countries and associated Norway support and facilitate the implementation of EUDIS by reaching out to stakeholders or providing advice to potential applicants or beneficiaries of the EDF program.

EDA’s HEDI, an intergovernmental lever enshrined in the EU’s 2022 Strategic Compass, has the (difficult) task of increasing and coordinating member state cooperation in the field of defense innovation and improving synergies with both EUDIS and NATO’s DIANA. It provides at least theoretically an organizational link to both EU capability goals (Capability Development Plan), defense research (Overarching Strategic Research Agenda), industrial capabilities (Key Strategic Activities) as well as NATO’s Standardisation Agreements (STANAGS). Even though its main contribution to defense innovation is expected to come from identifying ideas and innovators, as well as from communicating innovative solutions, HEDI also has a hands-on element. It funds, for example, defense innovation prizes, proof-of-concept of innovative ideas, European Defense Innovation Shows, as well as Innovation Challenges, a specific R&T methodology to move from proof-of-principle to minimum viable product in a short period of time. While HEDI officially has not been allotted any particular funding, the EDA’s 2023 budget increase might be used to financially equip this instrument of defense innovation.

NATO’s DIANA, openly inspired by the US Defence Advanced Research Project Agency (DARPA) with headquarters in the United Kingdom (UK) and Estonia, is meant to develop, test and apply emerging and disruptive technologies (EDTs) for defense purposes, with a heavy focus on dual-use civilian technology. It constitutes a separate NATO entity with its own legal and financial framework overseen by a board with members from academia, the private sector or the government of each NATO member,

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2. A hackathon is a format to collaboratively develop solutions to a problem in a short period of time.

which decides on yearly focus areas. For example, in 2023, pilot challenger programs targeted energy resilience, secure information sharing, and sensing and surveillance.

**Table 1: “Who’s Who” Defence Innovation Instruments**

European Union			
Organizations	<i>European Commission</i>	<i>European Defence Agency</i>	North Atlantic Treaty Organization
Instruments	EU Defence Innovation Scheme (EUDIS)	Hub for EU Defence Innovation (HEDI)	Defence Innovation Accelerator for the North Atlantic (DIANA)
Governance	Supranational EU Commission, DG DEFIS	Intergovernmental EU member states	Intergovernmental NATO representatives from member states
Funds	<ul style="list-style-type: none"> <li>- European budget (2021-2027) via European Defence Fund (EDF)</li> <li>- Public and private investors</li> <li>- Member state contributions</li> </ul>	<ul style="list-style-type: none"> <li>- No dedicated funding</li> <li>- EDA Operational Budget, EDA <i>ad-hoc</i> projects/programs are used to finance HEDI activities</li> </ul>	<ul style="list-style-type: none"> <li>- Staff costs and operational budgets shared by NATO member states (via GDP-based contributions)</li> <li>- Voluntary contributions through the NATO Innovation Fund (NIF)</li> </ul>
Who can apply?	European and Norwegian SMEs and start-ups	<ul style="list-style-type: none"> <li>- Association Agreement start-ups and SMEs</li> <li>- prime contractors</li> </ul>	<ul style="list-style-type: none"> <li>- Companies headquartered in NATO member nations</li> <li>- Start-ups and SMEs are preferred</li> <li>- Collaborative proposals possible</li> </ul>
Budget per year	€286 million per year	€60,000 per year	€67 million per year

Sources: European Commission, European Defence Agency, NATO, 2024.

Like EUDIS, DIANA is providing financial and technical support, the latter both in terms of mentoring and in accessing specialized test centers and accelerators distributed across NATO countries. It also comes with a legally separate venture capital fund attached, namely the NATO Innovation Fund (NIF), into which governments can flexibly invest via their foreign or defense ministries. It is a separate governmental initiative aiming to raise €1 billion to be spent over an innovation-encouraging 15-year time span. Projects that cannot be commercialized will not be funded through DIANA or the NIF.

## ***The challenges of coordinating EUDIS, HEDI and DIANA***

Despite the need for coordination and interoperability, DIANA prioritizes slightly different EDTs for military applications than EUDIS: artificial intelligence (AI), data, autonomy, quantum-enabled technologies, biotechnology, hypersonic technologies, space, novel materials and manufacturing, and energy and propulsion.<sup>3</sup> Significantly, EU innovation instruments seem to be less focused on AI. Also, it is not clear how DIANA's aim to create a transatlantic innovation ecosystem bringing together innovators, investors and industry can be combined with the protection of European intellectual property,<sup>4</sup> as well as with strict rules governing the transfer of sensitive technologies developed with American funds.<sup>5</sup>

While EUDIS, HEDI and DIANA do seem to cover a rather similar defense innovation terrain, they differ in important aspects. DIANA, and to a lesser extent, HEDI, can work with members of the wider European and transatlantic defense community – EDA has concluded Administrative Agreements with Switzerland, Norway, Serbia, Ukraine, and the US.<sup>6</sup>

EUDIS, a European Commission instrument depending on the European Defence Fund, is *a priori* restricted to EU member countries, subject to carefully tailored exceptions.<sup>7</sup> The three could also distinguish themselves by their mode of operation, with EUDIS and HEDI possibly a bit less agile than their NATO counterpart. And last, but certainly not least, EUDIS and HEDI do provide a coherent regulatory investment environment, something that DIANA cannot.

For all three instruments, the need to establish, and/or to observe existing mechanisms for thorough cooperation and coordination, in order to avoid duplication, to foster much-needed capabilities and to establish a joint regulatory context is evident.

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## **Clash of National Defense Interests and European-transatlantic innovation**

At first glance, the simultaneous existence of EUDIS and HEDI on the EU, and DIANA on the transatlantic side constitutes something of a puzzle. On closer look, they represent institutional answers to long-standing European defense strategies, revealing persisting

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3. "Foster and Protect: NATO's Coherent Implementation Strategy on Emerging and Disruptive Technologies", NATO, 2021.

4. Protection of intellectual property rights differs from an EU to a NATO context.

5. See, for example, the US International Traffic in Arms Regulations and Export Administration Regulations.

6. See also Council Decision 2020/1639 on "third country" participation in PESCo.

7. "Third-country Participation in EU Defence", *EPRS*, April 1, 2022.

political fault lines in European defense. Next to the size, composition and geographic location of the national defense industry, these concern Europe's incarnation as a sovereign geopolitical entity, European defense sector governance preferences, conceptions regarding public subsidies, and lastly, national defense industrial strategy, especially with regards to the participation of "third countries" and exports. The last point particularly pertains to the relationship with the US defense industrial and technological base.

How do European countries with medium to large defense industries, namely Austria, the Czech Republic, France, Germany, Italy, the Netherlands, Norway, Poland, Spain, Sweden, the UK and in the future, Ukraine, fall along Europe's defense industrial fault lines? How could this shape national firms' perceptions of EUDIS, HEDI and DIANA?

The above could be divided into countries with "big" defense players: Within "old" and "former" EU, that would be France, Germany, Italy, Spain, and the UK, in the "new" and "future" EU, Poland and Ukraine. A second category would be countries with small and middle-sized defense players, such as Austria, Netherlands and Sweden, together with the associated Norway within "old" Europe, and the Czech Republic as part of the "new" EU. Apart from Austria still bound to military neutrality but exporting and importing defense goods to and from NATO/EU members, all countries assessed are part of the NATO Alliance. And apart from the UK, all are either EU members or associated. What concerns Ukraine, it is invited to partake in both EU and NATO defense innovation schemes in preparation for future membership.

**Table 2: Average defense R&D expenditure per year (in Euro)**

<b>US</b>	€100 billion
<b>European states</b>	€12 billion
<b>EU instruments</b>	€360 million
<b>NATO</b>	€60 million

Sources: United States government, European Commission, European Defence Agency, NATO, 2024.

### ***European autonomy vs. transatlantic alignment in defense innovation***

The discussion as to whether Europe/the European Union should strive to become an independent geopolitical pillar or "pole" in itself, or whether it should shelve such ambitions and closely align itself with the United States instead has so far not officially taken place. There is a preference to work on European capabilities to strengthen NATO, to become "a strategic enabler" of the Alliance. But stronger EU-NATO collaboration is, among others, hampered by tensions between Greece and Cyprus on the one hand and



with Turkey on the other. With perhaps the exception of France,<sup>8</sup> very few countries are setting their sights on a pure form of “strategic autonomy.”<sup>9</sup> Hence a sizable majority of countries and their SMEs and start-ups would make use of both European and transatlantic defense innovation instruments. Especially “ex”, “new,” and “future EU”, as well as Nordic countries, like the UK, Czechia, Poland, and Ukraine, together with Germany, the Netherlands, Norway and Sweden, are likely to invest in transatlantic instruments such as DIANA.<sup>10</sup>

Diverging National Defence Industrial Strategies in European countries also differ with regards to modes of governance in the field of defense, namely whether defense industry instruments should preferably have a supranational (e.g., EUDIS/European Commission) or an intergovernmental *modus operandi* (e.g., HEDI/EDA or DIANA/NATO). While big players such as France tend to prefer an intergovernmental approach, one could posit that smaller countries, or those with a strong portion of SMEs in their DTIB, could give preference to EUDIS, crediting this EU supranational instrument with more impartiality and fairness. This does not take into account the fact that questions are being raised regarding the neutrality of EU Commission defense experts, as well as the influence of big armament companies.<sup>11</sup>

How should defense innovation subsidies be allocated? Countries with big defense firms would likely favor a concentration of innovation funds to increase their market power and international competitiveness, *de facto* fostering European “champions”, according to the “best athlete” principle. In contrast, countries with middle-sized defense industries would be keen on nurturing their defense industrial complex by receiving a “fair share” of subsidies insisting on the notion of “geographical fair return”. It is informative in this respect to review country performance in EDF and PESCo calls. What concerns the EDF, dominant players are, in order of appearance, Italy, France, Spain, and Germany, followed by the Netherlands, Sweden, Belgium and Norway. For PESCo, adding together both participation and project leads, France, Italy, Spain and Germany are ahead, with Greece, Romania, Portugal, Poland, Netherlands and Belgium in the second tier. If only project leads are taken into account, France, Italy, Germany and Spain top the PESCo list. What stands out is the dominance of France, Italy, Spain and Germany, which gather other EU members and non-members around them.<sup>12</sup> Such clusters tend to form due to

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8. Who is also very aware of the need to strengthen NATO? See “Strategic Objective 5: France as an Exemplary Ally in the Euro-Atlantic Area”, *National Strategic Review 2022*.

9. For a classification of respective country attitudes, see the European Council on Foreign Relations report “Independence Play: Europe’s Pursuit of Strategic Autonomy”, ECFR, July 2019.

10. L. Béraud-Sudreau and S. B. H. Faure, “Émergence d’une autonomie stratégique sans le Royaume-Uni dans l’industrie de la défense”, *Les Champs de Mars*, 2021/2 (No. 37), pp. 121-151.


11. See, for example, “Small Group of Big Arms Producers Profit Most of EU Defence Funding,” *Investigate Europe*, March 28, 2022; “EU Ombudsman Launches Inquiry into Commission’s Defence Fund Selection Process”, Euractiv, November 15, 2023.

12. “Mapping EU Defence Collaboration. One Year on From the Versailles Declaration”, *Policy Paper 133/2023*, ELIAMEP.

preexisting defence cooperation, already integrated supply chains, geographic proximity, as well as compatible national strategic cultures, among others.<sup>13</sup>

What about industrial strategy? Given a strong “convergence” around “big” European actors, countries with small- and medium-sized defense industries are keenly interested in diversifying their partnerships. They also would like to keep their SMEs from becoming too dependent on single bigger European players. To achieve this goal, countries such as for example Sweden or Poland tend to follow a hedging strategy, playing off global against European competitors, thereby resisting European market integration.<sup>14</sup> This country category is pushing for access of “third countries” to European defense instruments, most notably regarding the US. In contrast, firms from countries like France with a strong, autonomous defense sector heavily relying on exports could steer away from transatlantic instruments like DIANA, fearing for their intellectual property, as well as for an American say in export decisions.

**Table 3: What defense innovation instrument to choose?**

						
	<b>EUDIS</b>		<b>HEDI</b>		<b>DIANA</b>	
<b>Start-up and SME training and counseling</b>	✓	yes	✓	yes	✓	yes
<b>Access to test centers</b>	✓	yes	✓	yes	✓	yes
<b>Link to defense investors</b>	✓	yes	✓	yes	✓	yes
<b>Available funds</b>	✓	yes	☒	<b>no</b>	✓	yes
<b>Governments in charge</b>	☒	<b>no</b>	✓	yes	✓	yes
<b>“Sovereign” European capabilities</b>	✓	yes	✓	yes	☒	<b>no</b>
<b>Matching priorities/interoperability</b>	✓	yes	✓	yes	✓	yes
<b>Easy accommodation of non-EU firms from UK/US</b>	☒	<b>no</b>	✓	yes	✓	yes
<b>Common regulatory framework</b>	✓	yes	✓	yes	☒	<b>no</b>

Sources: Johanna Möhring.

13. S. Blockmans and D. Macchiarini Crosson, “PESCO: A Force for Positive Integration in EU Defence”, *European Foreign Affairs Review*, 2021, 26, Issue SI, pp. 87-110.

14. A. Calcara and S. Luis, “Market Size and the Political Economy of European Defence”, *Security Studies*, Vol. 30, No. 5, 2021, pp. 860-892.

## What's in an acronym?

Will EUDIS, HEDI and DIANA be able to encourage much-needed defense innovation in Europe? As we have seen, politico-industrial fault lines that divide European countries remain, with European defense cooperation lagging behind goals set almost 20 years ago. The fact that prior EU instruments seem to have consolidated existing power within the European defense “market” poses the question as to whether subsidies can be useful to foster competition and innovation. In addition, both the EU Commission and NATO, and the EU Commission and EU member states have so far not excelled at coordinating their activities, highlighting the potential for duplication, as well as for continued capability and interoperability gaps. Also, Europeans and Americans are both allies and rivals. The most innovative ideas emerging in a European and transatlantic context could end up being developed by/in the US.

With the focus currently being on rebuilding depleted European militaries, innovation is happening elsewhere: for example, on Ukrainian battlefields.

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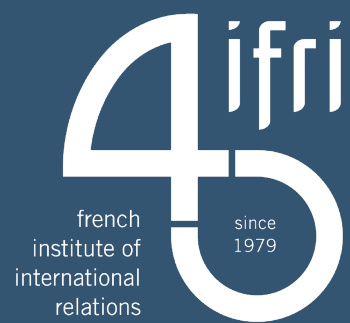
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