



Vlaams Indicatorenboek 2025

WETENSCHAP – TECHNOLOGIE – INNOVATIE



Overzicht van de gemaakte selectie

Het Vlaams Indicatorenboek bevat een portfolio aan beleidsindicatoren die de ontwikkeling van het Vlaams potentieel inzake wetenschap, technologie en innovatie in kaart brengen.

Sinds 1999 wordt het boek om de twee jaar uitgegeven en vanaf 2017 wordt het Indicatorenboek een virtueel boek met een eigen website: <http://vlaamsindicatorenboek.be>. Het boek dat u nu in handen hebt is een selectie van hoofdstukken uit dit boek. Voor de volledige versie verwijzen we u graag naar de website.

Onderstaande delen werden geselecteerd:

Prelude

Dankwoord

Woord van de minister

Volledige inhoudsopgave

8 Dossiers

8.3 Flemish defence industry and innovation; participation of Flanders in the European Defence Fund

8.3.1 Introduction to the European Defence Fund

8.3.2 Data European Defence Fund

8.3.3 Participation of Flanders and Belgium in the European Defence Fund and its precursors PADR and EDIDP

8.3.4 International comparison of Belgium and Flanders' participation in the European Defence Fund 2021-2022

De website van het Indicatorenboek biedt u ook de mogelijkheid om een eigen selectie samen te stellen van hoofdstukken die voor u relevant zijn. Surf hiervoor naar: <http://vlaamsindicatorenboek.be/selectie>.

Wij wensen u alvast een informatieve zoektocht door het Vlaamse innovatielandschap!

Dankwoord

Wetenschap, technologie en innovatie zijn onmiskenbaar essentiële hefboomen tot welvaart en welzijn in onze maatschappij. De Vlaamse overheid heeft daarom veelvuldig en veelzijdig aandacht besteed aan de ontwikkeling van de kwaliteit en de slagkracht van het Vlaamse Wetenschaps-, Technologie- en Innovatiesysteem ter ondersteuning van economische en maatschappelijke impact. Het brede spectrum van wetenschappelijk en technologisch onderzoek aan de Vlaamse kennisinstellingen is daarbij vervolledigd met maatregelen en instrumenten om het innovatievermogen van de in Vlaanderen opererende ondernemingen te verhogen, en daarbij speciaal de kleine en middelgrote ondernemingen kansen tot professionalisering en groei te geven.

Het is dan ook nuttig en wenselijk om het geheel aan acties, en hun meetbare resultaten, in een coherent, regelmatig te verschijnen Indicatorenboek te bundelen. Het Vlaams Indicatorenboek Wetenschap, Technologie, Innovatie en hun Economische Impact, dat de tijdsreeksen uit de vorige Indicatorenboeken actualiseert en uitbreidt, draagt bij tot die ambitie. Zo is het mogelijk te komen tot een robuust en internationaal vergelijkbaar overzicht van de situatie in Vlaanderen qua bestedingen voor onderzoek, ontwikkeling en innovatie, en de resultaten ervan.

Het Indicatorenboek 2025 wordt net als de vorige editie uitsluitend in een interactieve bevragsingsmode elektronisch aangeboden.

Uiteraard boogt een Indicatorenboek op de inspanningen en de inzichten van veel enthousiaste medewerkers. De redactie en het schrijven van dit boek kwamen dan ook tot stand onder impuls van een redactiegroep van experts behorend tot de verschillende beleidsactoren uit het Vlaams Innovatiesysteem, die de staf van het Expertisecentrum O&O-monitoring (ECCOOM) van de Vlaamse overheid bijstonden in de opdracht dit Indicatorenboek te ontwikkelen. Elk van hen droeg bij tot de conceptie van dit werk. We willen hen van harte danken voor de constructieve samenwerking om onder de gebruikelijke tijdsdruk dit document af te werken:

- › *De Heer Maarten Lenaerts van het Kabinet van de minister-president van de Vlaamse Regering, Vlaams minister van Economie, Innovatie en Industrie, Buitenlandse Zaken, Digitalisering en Facilitair Management en tevens voorzitter van het Beheersorgaan van het Expertisecentrum O&O-Monitoring,*
- › *Mevrouw Wendy Smith van de Administratie Hoger Onderwijs,*
- › *De Heer Peter Viaene en de Heer Dries Maes van het Departement Werk, Economie, Wetenschap, Innovatie en Sociale Economie (WEWIS),*
- › *De Heer Maarten Sileghem en Mevrouw Elsie Declercq van het Vlaams Agentschap Innoveren en Ondernemen (VLAIO),*
- › *Mevrouw Danielle Gilliot, Aurora Geerts en Jo Breda van de Vlaamse Interuniversitaire Raad (VLIR),*
- › *Mevrouw Daniëlle Raspoet, Mevrouw Kristien Vercoutere en Mevrouw Annelies Wastyn van de Vlaamse Raad voor Innoveren en Ondernemen (VARIO),*
- › *De collega's Tim Engels, Eva Steenberghs, Wolfgang Glänzel, Thomas Standaert, Eline Vandewalle, Walter Ysebaert, Cathy Lecocq, Bart Thijs, Machteld Hoskens, Maikel Pellens, Laura Verheyden, Julie Callaert, Sarah Heeffe, Veronique Adriaenssens, Mariëtte Du Plessis, Caro Vereyen, Yannick Bormans, Jolien Roelandt, Petra Andries, Johanna Vanderstraeten en Hendrik Slabbinck, ondersteund door het ganse ECCOOM-team van Leuven dat de realisatie van deze digitale versie in goede banen heeft geleid.*

Samen hebben ze de nodige expert-inzichten en inbreng geleverd tot de Vlaamse gegevens en indicatoren voor het brede en snel evoluerende domein van Wetenschap, Technologie, Innovatie en Economische Impact.

Daarnaast danken we van harte alle auteurs die op basis van de inbreng van de redactiegroep de verschillende hoofdstukken en dossiers hebben uitgewerkt, geschreven en gedocumenteerd met relevant en betrouwbaar cijfermateriaal, resultaat van hun blijvende en vernieuwende onderzoeksinspanningen.

Zonder hun gezamenlijke inspanning was dit Vlaams Indicatorenboek WTIE nooit tot stand gekomen!

Van harte dank!

Prof. Koenraad Debackere en Prof. Bart Van Looy

Redacteurs Vlaams Indicatorenboek Wetenschap, Technologie en Innovatie - Leuven, september 2025

Woord van de minister

De geopolitieke verschuivingen beheersen dit jaar steevast een groot deel van de nieuwsverslaggeving. Trans-Atlantische relaties kwamen onder druk te staan door de onvoorspelbare handelstarieven van de Amerikaanse president Trump, verschillende wereldse conflicten woeden verder en een oorlog op het Europees vasteland heeft een blijvende impact op de defensie-uitgaven. Vlaanderen anticipeert op deze geopolitieke verschuivingen met een ambitieus Defensieplan en een strategische positionering van haar industrie. Tegelijkertijd staan alle regeringen voor een stevige besparingsoefening. In deze context blijft de competitiviteit van onze Vlaamse economie een prioriteit, met de Vlaamse Productiviteits- en Competitiviteitsagenda, de Vlaamse Versnelling, als leidraad en initiatieven zoals Regelrecht die administratieve lasten verlichten, overregulering aanpakken en rechtszekerheid bestendigen.

Ondanks de internationale onzekerheden blijft Vlaanderen een innovatieve aantrekkingspool. Met een O&O-intensiteit van 3,52% van het bbp bevinden we ons aan de Europese top. Vlaanderen koestert bovendien de ambitie om deze intensiteit op te trekken tot 5%, als hefboom voor duurzame groei en maatschappelijke vooruitgang. Concrete investeringen zoals de 700 miljoen euro via de Europese Chips Act in de Nano-IC pilootlijn van imec en de opmars van het Gents Wintercircus illustreren onze technologische slagkracht. Vlaamse biotechbedrijven dragen via circulaire innovatie bij aan de Europese strategische autonomie. Digitale soevereiniteit krijgt terecht steeds meer aandacht in ons beleid.

Het Vlaams Indicatorenboek Wetenschap, Technologie en Innovatie fungeert ook dit jaar als een essentiële referentie voor evidence-based beleid. Het biedt inzicht in de bestedingen, prestaties en internationale positionering van Vlaanderen op het vlak van O&O&I. In een tijd waarin beleidskeuzes meer dan ooit gestoeld moeten zijn op feiten en cijfers, blijft dit boek een onmisbare bron voor beleidsmakers, onderzoekers en stakeholders.

Matthias Diependaele

Vlaams minister van Economie, Innovatie en Industrie,
Buitenlandse Zaken, Digitalisering en Facilitair Management

Volledige inhoudsopgave

1 Innovatiehub Vlaanderen

2 De middelen voor O&O

2.1 Totale O&O-uitgaven: GERD

2.1.1 GERD per uitvoeringssector

2.1.2 O&O-intensiteit: GERD als percentage van het BBPR

2.1.3 Internationale vergelijking

2.1.4 Totale O&O-uitgaven per financieringssector

2.1.5 Conclusie

2.2 O&O-uitgaven van ondernemingen: BERD

2.2.1 Methodologie

2.2.2 Uitgaven voor interne O&O volgens sector

2.2.3 Uitgaven voor interne O&O volgens ondernemingsgrootte

2.2.4 Uitgaven voor interne O&O volgens types van O&O-actieve ondernemingen

2.2.5 O&O-intensiteit volgens sector

2.2.6 O&O-intensiteit volgens ondernemingsgrootte

2.2.7 Referenties

2.3 O&O-uitgaven binnen de non-profit

2.3.1 O&O-uitgaven

2.3.2 O&O-intensiteit

2.3.3 Internationale vergelijking

2.3.4 Organisaties in de non-profit

3 Het menselijk potentieel

3.1 Studenten in het Vlaamse hoger onderwijs

3.1.1 Instroom in het Vlaamse hoger onderwijs

3.1.2 Overzicht van de uitgereikte diploma's

3.2 Doctoreren aan een Vlaamse universiteit

3.2.1 Startende jonge onderzoekers

3.2.2 Financiering van junioronderzoekers

3.2.3 Slaagkansen doctoraat

3.2.4 Time to degree

3.2.5 Uitgereikte doctorstitels

3.2.6 Aantal doctoraathouders: internationale positie van Vlaanderen

3.3 Werken aan een Vlaamse universiteit

3.3.1 Evolutie van het aantal onderzoekers

3.3.2 Aantallen mannen en vrouwen aan de universiteit

3.3.3 Buitenlandse onderzoekers

3.3.4 Trends in het academisch carrièrepad

3.4 Totale O&O-personeel

3.4.1 Totale O&O-personeel volgens sector

3.4.2 Internationale vergelijking

3.5 O&O-personeel van ondernemingen

3.5.1 O&O-personeel volgens sector

3.5.2 O&O-personeel volgens ondernemingsgrootte

3.5.3 O&O-personeel volgens types van O&O-actieve ondernemingen

3.5.4 O&O-personeelsintensiteit volgens sector

3.5.5 O&O-personeelsintensiteit volgens ondernemingsgrootte

- 3.6 O&O-personeel binnen de non-profit
 - 3.6.1 O&O-personeel volgens sector
 - 3.6.2 Internationale vergelijking
 - 3.6.3 Organisaties in de non-profit

4 WT&I performantie

- 4.1 Bibliometrische analyse van levens-, natuur-, technische en sociale wetenschappen
 - 4.1.1 Bibliometrische studies en bibliografische gegevensbestanden
 - 4.1.2 Evolutie van publicaties
 - 4.1.3 Het Vlaams publicatieprofiel
 - 4.1.4 Citatie-impact
 - 4.1.5 Internationale samenwerking: profiel en impact
 - 4.1.6 Conclusie
 - 4.1.7 Referenties
- 4.2 Bibliometrische analyse van het Vlaamse universitaire onderzoek in de sociale en humane wetenschappen (2000-2023)
 - 4.2.1 Publicatietypes algemeen
 - 4.2.2 Web of Science
 - 4.2.3 Taal
 - 4.2.4 Samenwerking
- 4.3 De Vlaamse technologiepositie: analyse aan de hand van octrooien
 - 4.3.1 Octrooien in België en Vlaanderen: EPO, USPTO en PCT
 - 4.3.2 Technologieontwikkeling per organisatietype
 - 4.3.3 Samenwerkingspatronen
 - 4.3.4 Relatieve technologie-specialisatiepatronen
 - 4.3.5 Trademarks & Designs in België en Vlaanderen
 - 4.3.6 Conclusie
- 4.4 Innovatie-inspanningen van ondernemingen
 - 4.4.1 Product- en bedrijfsprocesinnovatie
 - 4.4.2 Onderzoek en ontwikkeling (O&O)
 - 4.4.3 Publieke financiering van product- en bedrijfsprocesinnovaties
 - 4.4.4 Actoren in het innovatieproces van de onderneming
 - 4.4.5 Samenwerkingspatronen voor product- of bedrijfsprocesinnovaties
 - 4.4.6 Internationale vergelijking
 - 4.4.7 Statistieken aansluitend bij het Regional Innovation Scoreboard
- 4.5 Economische relevantie van de Vlaamse Speerpuntclusters
 - 4.5.1 Economische indicatoren
 - 4.5.2 Decompositie van de leden
 - 4.5.3 Evolutie doorheen de tijd
- 4.6 Digitalisering van ondernemingen in Vlaanderen
 - 4.6.1 Artificiële intelligentie
 - 4.6.2 Cybersecurity

5 De internationale dimensie

- 5.1 De Europese Kaderprogramma's
 - 5.1.1 Algemene cijfers voor de Vlaamse deelname
 - 5.1.2 Deelname aan de kaderprogramma's per onderdeel
 - 5.1.3 Deelname volgens deelnemerscategorieën
 - 5.1.4 Vlaamse topdeelnemers
 - 5.1.5 Vlaanderen in de Europese rangschikking
 - 5.1.6 Vlaanderen binnen België
 - 5.1.7 Conclusie
- 5.2 Cofinanciering van internationale projecten
 - 5.2.1 Deelname aan internationale netwerken
 - 5.2.2 Overzicht steuntoekenning binnen internationale netwerken en hefboom EU-financiering

- 5.2.3 IPCEI (Important Projects of Common European Interest)
- 5.3 Vlaamse groeisectoren in internationaal perspectief
 - 5.3.1 Data en methodologie
 - 5.3.2 Resultaten
- 5.4 Buitenlands zeggenschap in de Vlaamse economie
 - 5.4.1 Data en methodologie
 - 5.4.2 Resultaten

6 De 20 VARIO Kernindicatoren

7 Ondernemerschap

- 7.1 Ondernemerscultuur en -activiteiten in Vlaanderen
 - 7.1.1 Maatschappelijke perceptie
 - 7.1.2 Individuele perceptie
 - 7.1.3 Startersactiviteiten
 - 7.1.4 Investering in starters
- 7.2 Studentondernemerschap in Vlaanderen
 - 7.2.1 Profilering van de steekproef van de studentenpopulatie aan universiteiten
 - 7.2.2 Universiteitsstudenten met zelfstandige ouders
 - 7.2.3 Beroepskeuze-intenties van universiteitsstudenten
 - 7.2.4 Deelname van universiteitsstudenten aan ondernemerschapsonderwijs
 - 7.2.5 Ondernemersstatus van universiteitsstudenten
 - 7.2.6 Profilering van de steekproef van de studentenpopulatie aan hogescholen
 - 7.2.7 Hogeschoolstudenten met zelfstandige ouders
 - 7.2.8 Beroepskeuze-intenties van hogeschoolstudenten
 - 7.2.9 Deelname van hogeschoolstudenten aan ondernemerschapsonderwijs
 - 7.2.10 Ondernemersstatus van hogeschoolstudenten
- 7.3 Duurzaam ondernemen in Vlaamse kmo's
 - 7.3.1 Ecologisch duurzaam gedrag
 - 7.3.2 Maatschappelijk duurzaam gedrag
 - 7.3.3 Uitgaven voor duurzame activiteiten
 - 7.3.4 Professionalisering van duurzame praktijken

8 Dossiers

- 8.1 Artistic research and the PhD in the arts
 - 8.1.1 Research between the Art School and academia
 - 8.1.2 Organizing artistic research
 - 8.1.3 Flemish PhDs in the arts since 2006
 - 8.1.4 Funding of PhD trajectories in the arts
 - 8.1.5 Analyzing and evaluating artistic research
 - 8.1.6 Further reading
- 8.2 Towards a framework for a responsible bibliometrics-aided research assessment
 - 8.2.1 Key framework dimensions for evaluative bibliometrics
 - 8.2.2 Criteria for building and using metrics in a responsible way
 - 8.2.3 An illustration of our framework – The Prism Model
 - 8.2.4 Some concluding words
 - 8.2.5 References
- 8.3 Flemish defence industry and innovation; participation of Flanders in the European Defence Fund
 - 8.3.1 Introduction to the European Defence Fund
 - 8.3.2 Data European Defence Fund
 - 8.3.3 Participation of Flanders and Belgium in the European Defence Fund and its precursors PADR and EDIDP
 - 8.3.4 International comparison of Belgium and Flanders' participation in the European Defence Fund 2021-2022
- 8.4 Tracking the evolution of Flemish co-authorship with neighbouring countries, and with the scientific powerhouses including China and the U.S.

- 8.4.1 Data
- 8.4.2 International collaboration in general - a growing trend
- 8.4.3 International collaboration with important partners
- 8.4.4 Relative intensity of collaboration (RIC)
- 8.4.5 Conclusion
- 8.4.6 References

8 Dossiers

In addition to the recurrent chapters, each edition of the Flemish Indicator Book also offers a number of specific dossiers that provide a summary of relevant figures and recent research into relevant themes. In this edition, there are four different files that deal with very different topics.

8.3 Flemish defence industry and innovation; participation of Flanders in the European Defence Fund

By Annelies Wastyn, Kristien Vercoetere and Danielle Raspoet (Flemish Advisory Council for Innovation and Entrepreneurship, VARIO)

In November 2024, VARIO published its advisory report '[opportunities and needs for the Flemish defence industry and innovation](#)'. This advisory report was formulated following a request from the former Minister for Innovation, Jo Brouns. This inquiry into the opportunities and needs for a broad Flemish defence industry and innovation framework is set against the backdrop of the changed geopolitical reality and an increase in the number of initiatives at the federal, European, and international levels.

VARIO analysed different sources with respect to the participation of Flanders in defence-related R&D&I-projects in the accompanying analysis report '[Mapping Flemish Defence Innovation Ecosystem and Changed Policy Frameworks](#)'; i.e. R&D-projects at the Flemish level, Defence-Related Research Action (DEFRA)-projects at the federal level and European Defence Fund (EDF)-projects at the European level. This chapter focuses on the Flemish participation in the European Defence Fund (EDF).

8.3.1 Introduction to the European Defence Fund

One of the three pillars of the European Defence Action Plan from 2016 was the establishment of a European Defence Fund (EDF)^[1] by the European Commission. This created another major research and innovation program alongside Horizon Europe. The EDF in its current form was preceded by two programs during a test period, namely the 'Preparatory Action on Defence Research' (PADR) and the 'European Defence Industrial Development Programme' (EDIDP), with the involvement of the European Defence Agency:

- PADR had a duration of 3 years (2017-2019) and funded 18 projects for a total budget of 90 million euro^[2]. The objectives were (1) demonstrate and assess added-value of EU supported defence R&T; (2) Foster cooperation between member states and between EU defence industries, RTOs and academia and (3) prepare the research window of the EDF from 2021 onwards.
- EDIDP had a duration of 2 years (2019-2020) with a budget of 500 million euro. The objectives were (1) to foster cooperation between undertakings and member states, in the development of defence products or technologies; (2) supporting the competitiveness of the European Defence industry on the internal market and the global marketplace; (3) to support and leverage cross-border cooperation between undertakings, including small- and medium-sized enterprises and middle capitalization companies throughout the union and (4) to foster better exploitation of the results of defence research and prepare the development window of the EDF from 2021 onwards.

After this test period, the European Defence Fund scaled up to nearly 8 billion euros for the period 2021-2027, managed by the new DG DEFIS. The EDF provides funding in the form of grants and financial support to consortia, with special attention to supporting disruptive defence technologies. The program's setup ensures participation from defence companies of all sizes, including small and medium-sized enterprises and mid-caps, as well as universities and research and innovation institutions across the EU. This strengthens and stimulates the opening of supply chains and enhances the competitiveness of the European defence industry. The program also aims to contribute to the delivery of advanced and interoperable defence technologies and equipment, in line with the needs of the member states.

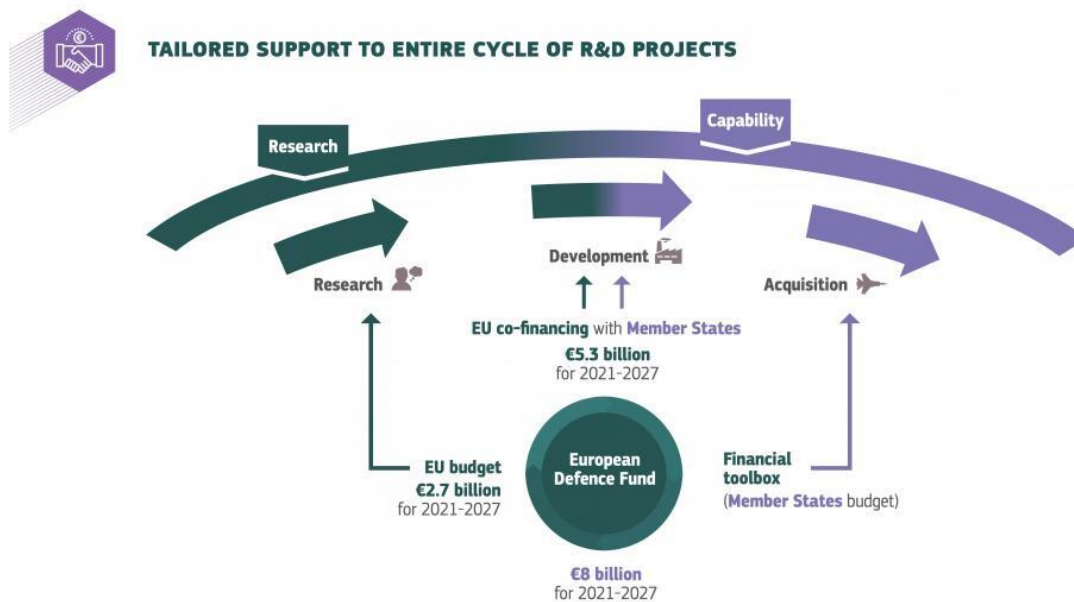
^[1] https://defence-industry-space.ec.europa.eu/eu-defence-industry/european-defence-fund-edf_en

^[2] And had a 2 million euro Norway contribution

EDF budget

The EDF consists of a research component and a capability component. For the period 2021-2027, a budget of 7,95 billion euros has been allocated, of which 2,7 billion euros for the financing of joint defence research and 5,3 billion euros for the financing of joint capability development projects, supplementing national contributions (because co-financing from the member state is required to be able to participate).

Figure 1: European Defence Fund – Research and Capability overview



Source: [European Defence Fund | EU Funding Overview](#)

EDF topics

The EDF is implemented through annual work programs structured according to 17 thematic and horizontal categories of actions. These categories are designed to cover all military areas and key technologies, namely^[1]:

- Medical response, CBRN & human factors
- Information superiority
- Sensors
- Cyber
- Space
- Digital transformation
- Energy resilience & environmental transition
- Materials and components
- Air combat
- Air and missile defence
- Ground combat
- Force protection and mobility
- Naval combat
- Underwater warfare
- Simulation and training
- Disruptive technologies (horizontal categories)
- Innovative defence technologies – SMEs (Horizontal categories)

^[1] [European Defence Fund | EU Funding Overview](#)

EDF modalities and funding

The extent to which an action is funded by the EDF depends, among other things, on the composition of the activities. Both companies and knowledge institutions can participate in the research component, and the EDF can support 100% of the total eligible costs. EDF support for a development action can vary from 20% to 100% of the total eligible costs, depending on the activities involved (e.g., design, prototyping, testing, qualification, certification) and a bonus system (involvement of SMEs and

mid-caps and linkage with a Permanent Structured Cooperation (PESCO) project). This capability component, which supports the higher TRLs (Technology Readiness Levels), is mainly aimed at companies. Co-financing from the member state is required to participate. For these actions, it must be demonstrated that the remaining costs are also covered.

8.3.2 Data European Defence Fund

In the analysis, two elements were explored in depth. For this, other data sources are used:

1. Participation of Belgium and Flanders in the precursor of the EDF, namely PADR and EDIDP (2017-2020), and in the EDF itself (2021-2024). The data for the analysis of Flemish and Belgian participation in projects of the European Defence Fund and its precursors were obtained via the Ministry of Defence, FPS Economy and the EDF website.
2. **International positioning of Flanders' participation (2021-2022).** To gain a better understanding of Flanders' position in an international perspective and thus of the Flemish position in the total EDF budget, we looked at the data from the [EU funding and tender portal](#) (FT-portal), with a data extraction in November 2024.

Of the nearly 8 billion euros EDF budget, 2,17 billion euros had already been allocated by the time of the data extraction (November 2024). More specifically, 975 million euros in 2021, 700 million euros in 2022, and 496 million euros in 2023. In total, this concerns about 121 projects with 1639 participations (1639 non-unique actors). The amounts are not yet final. Certainly, for 2023, there are still projects that need to be finally approved, which will further increase the amount. This currently involves seven calls in the context of **ASAP** – Act in Support of Ammunition Production. More than 500 million euros of EU support was granted, spread over projects in the various portfolios (i.e., explosives, powder, shells, missiles, and testing and reconditioning certification). No Flemish actors are participating in these projects (based on the available information in the FT-portal).

Since the data for 2023 is not yet complete, the international analysis concerns the period 2021-2022, the initial period of the EDF. We would like to note that we are focusing here on the EDF support and the share of Belgian and Flemish actors within this amount (and not on the total project budget).

8.3.3 Participation of Flanders and Belgium in the European Defence Fund and its precursors PADR and EDIDP

PADR (2017-2019) and EDIDP (2019-2020) are the precursors of the EDF. Belgium participated in 6 PADR projects and 13 EDIDP projects. Of these, 3 PADR projects and 6 EDIDP projects can be attributed to Flanders.

Table 1. Overview of PADR and EDIDP-projects with Flemish participation

Call	Project	Description
PADR 2017	OCEAN2020	Unmanned Systems - Open Cooperation for European maritime awareNess
PADR 2019	AIDED	Emerging Game Changers – Artificial Intelligence for the detection of explosives devices
PADR 2019	PILUM	Emerging Game Changers – Projectiles for increased Long-range effects Using Electro-Magnetic railgun
EDIDP 2019	iMUGS	Integrated Modular Unmanned Ground System – Multipurpose unmanned ground system
EDIDP 2019	LynKEUS	Upgrade of current and development of next generation ground-based precision strike capabilities (*)
EDIDP 2019	GEODE	Galileo for EU Defence - Development of European standardized and sovereign Galileo PRS navigation receiver capabilities compatible with GPS/PRS solution for military purposes (**)
EDIDP 2020	MIRACLE	Mine Risk Clearance for Europe – Solutions to detect, identify, counter and protect against mine threats (incl. those operating at very high depths)
EDIDP 2020	ODIN'S EYE	multinational Development Initiative for a Space-based missile early-warning architecture - Early warning against ballistic missile threats through initial detection and tracking of ballistic missiles before handing over to ground based radars
EDIDP 2020	MUSHER	Development of a generic European Manned unmanned Teaming (e-MUNT) system Upgrading or developing next generation combat helicopters

Source: SPF Economy and EDF webpage

(*) Related PESCO project: EU Beyond Line Of Sight (BLOS) Land Battlefield Missile Systems

(**) Related PESCO project: EURAS

In 2021, Belgium participated in 24 EDF projects, in 2022 in 18 projects, in 2023 in 27 projects and in 2024 in 24 projects. The projects with Flemish participants are shown in the table below. This concerns 8 projects for 2021, 9 projects for 2022, 14 projects in 2023 and 8 projects for 2024.

Table 2. Overview of EDF projects with Flemish participants (2021-2023)

Call	Project	Description
2021	EICACS	European Initiative for Collaborative Air Combat Standardisation - European interoperability standard for collaborative air combat
2021	NEUMANN	Noval Energy and propulsion systems for Air dominance - Alternative propulsion and energy systems for next generation air combat systems
2021	MARSEUS	Modular Architecture Solution for EU States - BLOS collaborative close combat architecture
2021	AGAML EURIGAMI	European Innovative GaN Advanced Microwave Integration - Advanced RF components
2021	ACHILE	Augmented capability for high end soldiers - Development of full-size demonstrators for soldier systems
2021	HEROIC	High Efficiency Read Out Circuits - Infrared detectors
2021	EPW	European Protected Waveform - European protected waveform and accompanying technologies for resilient satellite communications against jamming
2021	Navguard	Advanced Galileo PRS resilience for EU Defence - Space- and ground-based NAVWAR surveillance
2022	AIDEDex	Artificial Intelligence for Detection of Explosive Devices - Unmanned ground and aerial systems for hidden threats detection
2022	CONVOY	CIood iNtelligent explosive detection sYstem - Unmanned ground and aerial systems for hidden threats detection
2022	EUROGUARD	EUROpean Goal based mULTI mission Autonomous naval Reference platform Development - Medium-size semi-autonomous surface vessel
2022	iMedCap	Development of intelligent military capabilities for monitoring, medical care and evacuation for contagious, injured and contaminated personnel - Diagnostics, treatment, transport and monitoring of highly contagious, injured and/or contaminated personnel
2022	PROTEAS	DePLOYable Special OpeRations Forces MuLTI Environment CommAnd Post and C2 System
2022	RESILIENCE	European Strategic alliance for research, development and innovation on medical countermeasures against CBRN threats - Framework partnership agreement to support EU defence medical countermeasures Alliance
2022	SILENT	Studies and pre-design of next-generation quiet hypersonic wind tunnel facilities for European strategic autonomy - Non-thematic research actions targeting disruptive technologies for defence
2022	SPIDER	Space based Persistent ISR for Defence and Europe Reinforcement - Innovative multi-sensor space-based Earth observation capabilities towards persistent and reactive ISR
2022	THEMA	TecHnology for ElectroMagnetic Artillery - Electromagnetic artillery demonstrator
2023	ACTUS	Advanced capabilities and certification for Tactical UAV Systems - Tactical Remote Piloted Aerial Systems
2023	AIDA	AI Deployable Agent - Deployable autonomous AI agent
2023	AtLaS	AI-based Natural Language Processing of Low-Quality and Multilingual Data in Defence Applications with User Adaptation – Human Language technologies
2023	AVALON	UnderwAter optical wireless communication network architecture empowered by advanced optical materials for sea bOrder protection and deep-sea exploration - Non-thematic research actions by SMEs and research organisations
2023	BODYGUARD	Autonomous SSA Bodyguard Onboard Satellite - Threat surveillance and protection of space-based assets
2023	CALIPSO	Innovative propulsion solutions for land and naval defence applications) Innovative propulsion systems (spin-in)
2023	CATHERINA	Camouflage THERmal Intelligent and Adaptive - Non-thematic research actions by SMEs and research organisations
2023	E=MCM	European Extended Mine Countermeasures – Mine countermeasures
2023	ECOSYSTEM	European COmon SuPPLY chain for Sovereign T2SL and infrared Modules - Optronics detector
2023	GENIUS	Next Generation of IA and combat cloud systems for Neutralization of Unexploded threats – Defeating unexploded explosives ordnances and IEDs
2023	NG-MIMA	Next Generation Military Integrated Modular Avionics - Smart technologies for next generation fighter systems
2023	RESILIENCE-R-2023	First research action for Medical counter measures performed in the frame of the RESILIENCE FPA consortium – medical countermeasures
2023	Swarm-C3	Command, Control, and Communication for Multi-X-Swarms - Non-thematic research actions targeting disruptive technologies
2023	SWIFT	Sustainable Water Innovations for Fielded Troops - Non-thematic research actions targeting disruptive technologies
2024	ENGRT II	European Next Generation Rotorcraft Technologies Phase II
2024	PRECISE	Prediction and Response of Effectors on Critical Infrastructure and Structural Environments
2024	iMUGS2	Integrated Modular Unmanned Ground System 2
2024	ePERFECT	European High-Performance Processor for RF Defense Applications
2024	NEREUS	Naval systEm of systems and integrated sUrvivability of future EU platforms
2024	ORIGAMI	DrOne swaRm navigation in Gnss-degraded And non-perMissive environments
2024	EDF2024-EPW-Phase2	European Protected Waveform (Phase 2)
2024	ASTERION	Adaptive and Secure Technology-Enabling Reliable and Integrated Opto-acoustic underwater Networking

Source: Ministry of Defence, FPS economy and EDF-webpage

Flemish actors succeed in participating in follow-up projects

From the project data and participations, we observe that several actors manage to be present in successive projects:

- On the topic of Artificial Intelligence for the detection of explosive devices (AIDED and AIDEDex)
- On the topic of medical countermeasures (RESILIENCE and RESILIENCER-2023)
- On MineCounter-Measures (MIRICLE and E=MCM)
- On the topic of European protected waveform (EPW en EPW phase 2)
- On the topic of integrated modular unmanned ground system (iMUGS en iMUGS2)

8.3.4 International comparison of Belgium and Flanders' participation in the European Defence Fund 2021-2022

Since the data for 2023 is not yet complete, the following analysis continues for the period 2021-2022, the initial period of the EDF. This concerns about 92 projects, with 1596 participations (non-unique actors) for a total support of 1,675 billion euros. We would like to note that we are focusing here on the EDF support and the share of Belgium and Flanders within this amount (and not on the total project budget).

The 65 Belgian participations account for EDF support of 58,6 million euros. The 20 Flemish participations account for an amount of 24,4 million euros divided over 17 projects. It is important to note that we include the Von Karman Institute (VKI) in the following analysis as a Flemish actor (and not as a federal actor). The Flemish participations with budget are shown in the Table 3 below. Some clarifications regarding the table below:

- For the call EDF2022-LS-RA-CHALLENGE-DIGIT-HTDP, two consortia/projects, namely AIDEDex and CONVOY, signed up with Flemish partners.
- Two Flemish partners are participating in the RESILIENCE project.
- Three Flemish partners are participating in the EDF2021-EPW project.

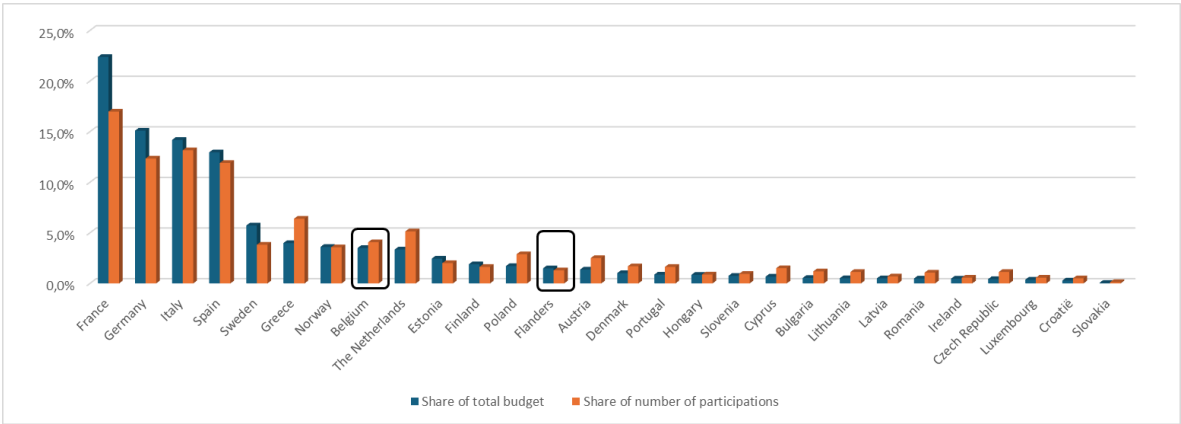
Table 3. Overview Flemish participation in the EDF (2021-2022)

EDF-Calls	Project	Topic	Flemish participation	Number of Flemish participants
2021-AIR-D-CAC-2	EICACS	Air combat	130000	1
2021-ENERENV-D-PES-2	NEUMANN	Energy and environment	3862825	1
2021-GROUND-D-3CA-2	MARSEUS	Ground combat	511028	1
2021-MATCOMP-R-RF-2	AGAMLEURIGAMI	Materials and components	1036186	1
2021-PROTMOB-D-SS-2	ACHILE	Force protection and mobility	497511	1
2021-SENS-R-IRD-2	HEROIC	Sensors	3793626	1
2021-SPACE-D-EPW-2	EDF-2021-EPW	Space	5061063	3
2021-SPACE-D-SGNS-2	NAVGUARD	Space	572000	1
2022-DA-C4ISR-SOFC2	PROTEAS	Information superiority	345960	1
2022-DA-NAVAL-MSAS	EUROGUARD	Naval	3598139	1
2022-DA-SPACE-ISR	SPIDER	Space	640168	1
2022-FPA-MCBRN-MCM	RESILIENCE	Medical resonce and CBRN	0	2
2022-LS-RA-CHALLENGE-DIGIT-HTDP	AIDEDex	Digital transformation	1677856	1
2022-LS-RA-CHALLENGE-DIGIT-HTDP	CONVOY	Digital transformation	300000	1
2022-LS-RA-DIS-EAD	THEMA	Disruptive technologies	648480	1
2022-LS-RA-DIS-NT	SILENT	Disruptive technologies	799974	1
2022-RA-MCBRN-HICP	iMEDCAP	Medical resonce and CBRN	999995	1
Total			24474809	20

Source: FT-portal – extraction November 2024

The data allows us to look at the share that Belgium and Flanders take in the EDF budget. France, Germany, Italy, and Spain together account for about 65% of the EDF budget. Belgium ranks 8th with a share of 3,5%. Flanders accounts for about 1,5% of the budget and represents 1,3% of the total number of participations (see Figure 2).

Figure 2. Share of Belgium and Flanders in EDF projects based on the budget and number of participants (2021-2022)



Source: FT-portal – extraction November 2024

The data also allows us to examine the share that Belgian and Flemish actors take in the projects they participate in, with a focus on the EDF budget. This share is shown in the Table 4 below. In some projects, this includes a share of more than 20% of the EDF budget. One of the projects, namely RESILIENCE, involves participation (in 2022) without a budget^[1].

[1] This concerns more an agreement to collaborate

Table 4. Overview of Belgian and Flemish project participation – share in the budget (2021-2022)

Project	Share Belgium EDF budget	Share Flanders EDF budget
AIDEDex	52.5%	33.6%
AMLTD	34.9%	
EDF-2021-EPW	21.5%	20.2%
HEROIC	21.1%	21.1%
TeChBioT	20.9%	
SILENT	20.1%	20.1%
CONVOY	19.8%	6.0%
MARSEUS	18.3%	2.0%
P2P-FSO	15.2%	
ALTISS	15.0%	
HEGAPS	10.0%	
FAMOUS2	9.2%	
NEUMANN	7.9%	7.9%
ACTING	7.0%	
NAVGUARD	6.7%	2.3%
LATACC	6.4%	
EUROGUARD	6.4%	5.5%
INDY	6.3%	
POWERPACK	6.1%	
POWERFLEX	5.8%	
IntSen2	5.2%	
ACHILE	4.8%	1.2%
THEMA	4.3%	4.3%
EDINAF	4.2%	
AGAMLEURIGAMI	4.2%	4.2%
PROTEAS	4.2%	1.7%
SWAT-SHOAL	4.0%	
IMEDCAP	4.0%	4.0%
COUNTERACT	2.6%	
FACT	2.0%	
EUCINF	2.0%	
dTHOR	1.8%	
SPIDER	1.6%	1.6%
FASETT	1.5%	
SCUALE	1.3%	
FaRADAI	1.2%	
ODINS EYE II	1.1%	
EICACS	0.2%	0.2%
RESILIENCE	0.0%	0.0%
Total share EDF budget	5.9%	5.3%

Source: FT-portal – extraction November 2024

Belgium is the coordinator of 3 projects, with Flanders taking responsibility for 2 of them. France is clearly the most dominant party, taking on a coordinator role in 34% of the projects. France is followed by Spain (17%), Germany (10%), and Greece (9%).

Table 5. Overview of coordinator role in EDF-projects per country

Country	Coordinator
France	33,7%
Spain	17,4%
Germany	9,8%
Greece	8,7%
Italy	5,4%
Slovenia	4,3%
Belgium	3,3%
Flanders	2,2%
Austria	2,2%
Estonia	2,2%
Norway	2,2%
Portugal	2,2%
Sweden	2,2%
Bulgaria	1,1%
Denmark	1,1%
Finland	1,1%
Latvia	1,1%
Netherlands	1,1%
Poland	1,1%

Source: FT-portal – extraction November 2024