

Special report

The Preparatory action on defence research

Some lessons learned, but value as a testbed for increasing EU defence spending reduced due to time constraints and limited results



EUROPEAN
COURT
OF AUDITORS

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Abbreviations

Glossary

Replies of the Commission

Replies of the European Defence Agency

Timeline

Audit team

Executive summary

I The Preparatory Action on Defence Research (PADR) is a precursor programme of the European Defence Fund (EDF) with a budget of €90 million for 2017-2019. We checked whether PADR properly prepared the EU to significantly increase its spending on defence through the EDF in the 2021-2027 multiannual financial framework. This was the first opportunity for us to audit EU defence spending where the projects financed were sufficiently advanced and to draw conclusions and recommendations aimed at improving EU spending through the EDF.

II Overall, we conclude that, while some lessons were learned, the value of the PADR as a testbed for increasing EU defence spending was reduced due to the time constraints and limited results.

III At the time the EDF Regulation was published in May 2021 and the first EDF calls for 2021 and 2022 were launched, most PADR projects were still ongoing. The results of completed projects were therefore not available in time to prepare the launch of the EDF.

IV When the first PADR annual work programmes were set up, the only tool available to analyse and set capability priorities in EU defence was the 2014 version of the Capability Development Plan. Several additional planning tools and initiatives for the EU's long-term planning for its spending on defence are now available and will need to be coordinated. We found that these tools had been used to a limited extent for the first EDF work programmes.

V The Treaty on European Union restricts the use of the EU budget for defence. EU action in the field of defence is limited to the common security and defence policy that is an external crisis management tool and not intended to be a collective European defence policy, encompassing for example a common definition of the threats. This constraint complicates the EU long-term planning for EU spending in the defence area.

VI The EU still lacks a longer-term strategy for the EDF. The Commission has not yet sufficiently addressed strategic issues in order for projects under the EDF to have their intended impact. PADR defence research projects do not, from the outset, include a plan specifying how research results will be dealt with at later stages, in terms of additional research, development, manufacturing, procurement, and other aspects.

VII Given the significant increase in workload in the defence area, the Commission continues to face considerable pressure and challenges in terms of human resources. By way of derogation from the principle of direct management, specific actions may be implemented in indirect management in substantiated cases, which requires fewer Commission staff. Ministries of defence, PADR project coordinators and participants reported positive experience with this management mode. Despite this, it remains the exception rather than the rule.

VIII Project coordinators and project participants were concentrated in member states that have large defence industries. We noted that the same combinations of companies participated in several projects. The vast majority of PADR consortia were a continuation of cooperation between entities that had already worked together before the programme.

IX Ministries of defence and PADR project coordinators and participants highlighted the need for a horizon longer than one year for EDF work programmes, to enable them to set their priorities over a longer period in order to better prepare themselves. A first step was the publication of an indicative multiannual perspective for the EDF in May 2022.

X PADR calls enabled the Commission to test different types of processes, which was one of its objectives and has proven useful for the first EDF annual calls in 2021 and 2022. Security requirements were sometimes considered too stringent and led to delays in the grant agreement process. They also caused project implementation difficulties, affecting communication between consortium members. PADR lessons-learned documents, which were prepared by both the Commission and the European Defence Agency, focused on processes and were discussed with key stakeholders. Some lessons learned from PADR were not taken on board for the EDF.

XI On the basis of these conclusions, we recommend that the Commission should work together with the European Defence Agency and member states in order to:

- use a planning horizon longer than one year for EDF work programmes;
- sequence existing EU defence planning and cooperation tools coherently and assess further developing EU defence funding;
- review processes in order to further facilitate participation in the EDF;
- assess the broader use of indirect management as an option for EDF projects;

- o design a long-term strategy for the EDF to increase the use of the technology developed by the fund in the EU defence sector.

Introduction

The Preparatory Action on Defence Research aimed to pave the way for the research window of the European Defence Fund

01 Following a small [Pilot project on defence research](#), the Commission in November 2016¹ announced its intention to launch a Preparatory Action on Defence Research (PADR) with a budget of €90 million for 2017-2019. The launch was presented as “a first step, limited in time and in budget, which will serve to test the added value of the EU budget supporting defence research”, aiming to “pave the way for [...] a European defence research programme”.

02 The legal basis for all pilot projects and preparatory actions, not only for defence, is Article 58 of the Financial Regulation². Preparatory actions are designed to prepare proposals with a view to the adoption of future actions. PADR has by far the highest budget among pilot projects and preparatory actions launched between 2014 and 2019³.

03 EU action in the field of defence industry cooperation is based in particular on the [Treaty on the Functioning of the European Union](#)⁴, which provides the legal basis for the EU’s industrial policy and sets out the aim of improving its scientific and technological base⁵.

04 In November 2016, the Commission produced the final version of a ‘Scoping Paper for Preparatory Action on Defence Research’ to be “used as guidance for developing the content of the Preparatory Action for Defence Research Work programmes”. It indicated that the preparatory action should support the development of key defence capabilities by acting as a catalyst for research and technology cooperation programmes in Europe. The EU added value should be clearly demonstrated using appropriate indicators. It also specified what EU added value

¹ Commission communication on the European Defence Action Plan, [COM\(2016\) 950](#).

² [Regulation \(EU, Euratom\) 2018/1046](#).

³ See, for instance: Ackermann, R., Blomeyer, R., Papi, J., et al., [Pilot projects and preparatory actions in the EU budget 2014-2019](#), European Parliament, 2020.

⁴ Article 173 [TFEU](#).

⁵ Article 179 [TFEU](#).

might encompass by giving a list of examples, one of which was “tackling important capability shortfalls”.

05 PADR had three objectives⁶:

- demonstrate and assess the added value of EU-supported defence research and technology;
- foster cooperation between member states and between EU defence industries, research and technology organisations and academia;
- prepare the research component (‘window’) of the EDF from 2021 onwards.

06 PADR was planned to last for three years, from 2017 to 2019, with a total budget of €90 million split as follows: €25 million in 2017, €40 million in 2018 and €25 million in 2019. Although not legally required to do so, the Commission established an expert group comprising representatives of member state authorities (mainly from ministries of defence, but also from other public bodies as observers by direct invitation), known as the “As-if” programme committee. This committee was consulted regarding annual work programme topics and requirements for calls for proposals. The requirements of calls for proposals were then adopted by the Commissioners together with the financing decision/work programme.

07 Following a Commission proposal in June 2018⁷, the EDF Regulation was adopted by the Council in March 2021 and by the European Parliament in April 2021⁸, and entered into force retroactively as of 1 January 2021. The allocation for the implementation of the European Defence Fund (EDF) for the 2021-2027 period is €7 953 million, with €2 651 million for research actions and €5 302 million for development actions. For an overview of the key steps and documents in the development of the EDF, see [Annex I](#).

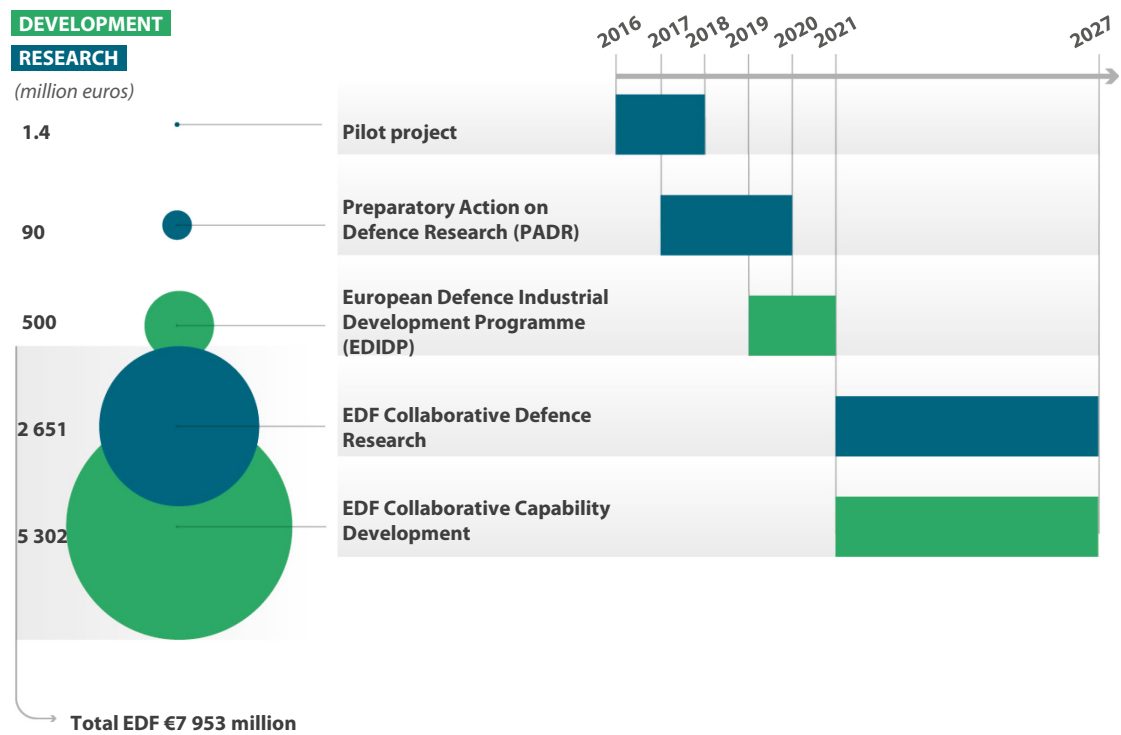
⁶ European Commission website on [Preparatory Action on Defence Research \(PADR\)](#).

⁷ Commission proposal for a regulation establishing the European Defence Fund, [COM\(2018\) 476](#).

⁸ [Regulation \(EU\) 2021/697](#) establishing the European Defence Fund.

08 The structure of the different programmes leading to the EDF is presented in *Figure 1*.

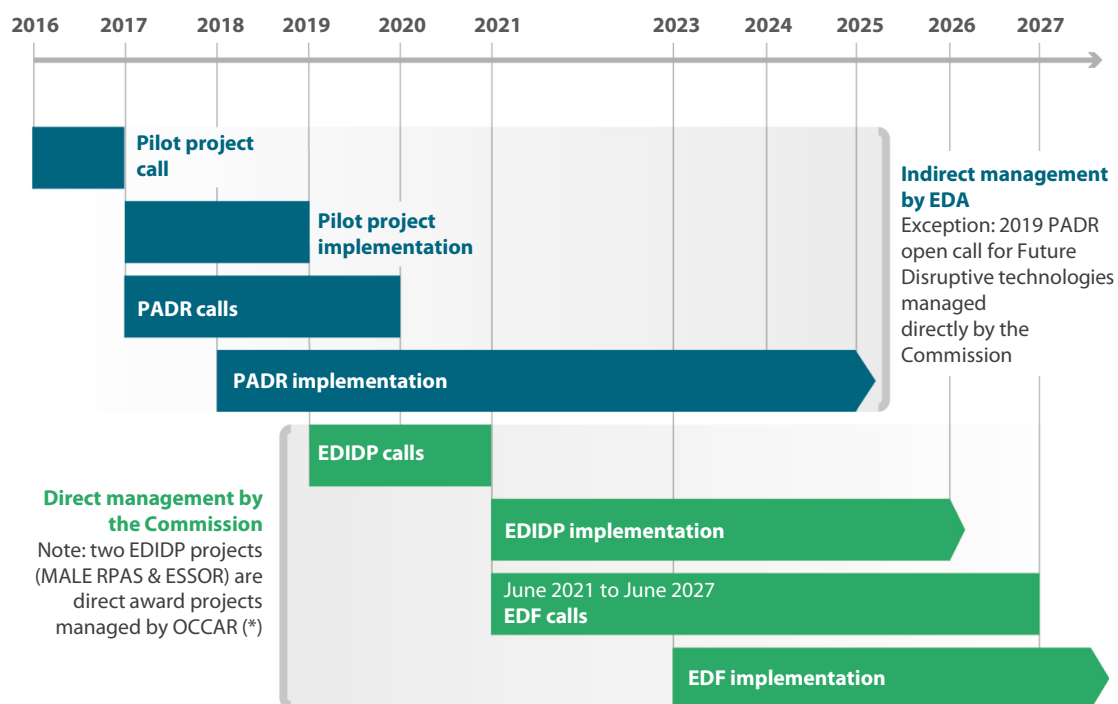
Figure 1 – PADR, a precursor programme of the EDF



Source: ECA.

09 Figure 2 shows the overlap between the timelines of the different programmes.

Figure 2 – Timelines for the pilot project, the PADR, the European Defence Industrial Development Programme (EDIDP) and the EDF



(*) The 'Organisation Conjointe de Coopération en matière d'Armement' (OCCAR) is an international organisation managing cooperative defence equipment programmes through their lifecycle. The current OCCAR member states are: Belgium, France, Germany, Italy, Spain and the UK.

Source: ECA.

10 Following on from the PADR and the European Defence Industrial Development Programme⁹, the start of the EDF marks a step change in the level of EU funding for defence research and development. However, it also needs to be put into perspective, for instance by comparing its budget to military spending around the world or to defence research and development expenditure in countries that invest heavily therein (where such data is available). The PADR budget of €90 million and EDF budget of €7 953 million are relatively minor when compared with both the EU member state

⁹ See [Regulation \(EU\) 2018/1092](#) establishing the European Defence Industrial Development Programme.

and the bigger players on the world stage defence budgets and defence research and development budgets¹⁰.

11 Overall, the estimated annual turnover of the EU defence sector amounts to almost €84 billion, estimated to support over 196 000 high-skilled jobs directly and over 315 000 jobs indirectly¹¹. The EU's defence sector comprises a limited number of major players in some countries (in particular France, Germany, Italy, Spain and Sweden) and up to 2 500 small and medium-sized enterprises. Major defence companies benefit from close relations with their own national governments. Demand comes almost exclusively from national ministries of defence.

The Commission and the European Defence Agency implemented the PADR

12 Prior to any EU budget spending on defence, the [European Defence Agency](#) (EDA) was established under a joint action of the Council of Ministers on 12 July 2004. Its mission was “to support the Member States and the Council in their effort to improve European defence capabilities in the field of crisis management and to sustain the European security and defence policy as it stands now and develops in the future”. For the implementation of the PADR programme, a delegation agreement was signed on 31 May 2017 between the Commission and EDA¹². The programme was generally implemented under indirect management (for the split of responsibilities, see [Box 1](#)). The Commission decided to manage the last PADR call, ‘Challenging the future’ disruptive technology, in order to test direct Commission management of research and technology defence projects and the usefulness of a two-stage evaluation procedure with the involvement of representatives of the national ministries of defence.

¹⁰ See, for instance: Commission joint communication on the defence investment gap analysis and way forward, [JOIN\(2022\) 24](#), p. 4 and Congressional Research Service fact sheet [Government expenditures on defense R&D by the USA and other OECD countries](#).

¹¹ See Commission joint communication on the defence investment gap analysis and way forward, [JOIN\(2022\) 24](#), p. 5.

¹² Amended on 29 January 2019, on 21 December 2020 and on 29 June 2021, see European Defence Agency [website](#).

Box 1

Commission and EDA responsibilities for PADR

The Commission was responsible for:

- managing PADR overall;
- preparing its work programmes and the related call for proposals texts;
- scrutinising the security aspects of proposals;
- managing the call 'Challenging the future' disruptive technology.

EDA was responsible for:

- publishing the approved calls for proposals;
- evaluating proposals;
- making award decisions;
- negotiating and signing grant agreements for the projects selected;
- monitoring the implementation of the projects funded.

13 Following the nine calls included in the annual work programmes (three in each year in 2017, 2018 and 2019), 18 PADR projects were selected (see [Annex II](#)). While the OCEAN 2020 project was by far the biggest project with a budget of €35.4 million, three other projects had budgets exceeding €5 million. The 14 other projects were much smaller, with a total overall budget of €22.2 million, or an average per project of €1.6 million.

Latest developments in the field of EU defence

14 Since PADR started, there have been many significant developments in the area of defence in the EU. For instance, as a result of the war in Ukraine, the EU now finances the purchase and delivery of lethal weapons for Ukraine with the European Peace Facility^{13 14}. In February 2022, the Commission also unveiled significant actions

¹³ Council of the European Union press release [EU adopts new set of measures to respond to Russia's military aggression against Ukraine](#), 28.2.2022.

¹⁴ Council of the European Union press release [EU support to Ukraine: Council agrees on third tranche of support under the European Peace Facility for total €1.5 billion](#), 13.4.2022.

to contribute to EU defence, boost innovation and address strategic dependencies¹⁵. In addition, the Commission issued several strategic documents in 2022 (see [Annex I](#)).

¹⁵ European Commission, [Defence: Commission unveils significant actions to contribute to European Defence, boost innovation and address strategic dependencies](#), 15.2.2022.

Audit scope and approach

15 The objective of the audit was to assess whether PADR properly prepared the EU to increase its spending on defence through the European Defence Fund. This was the first opportunity for us to audit EU defence spending where the projects financed were sufficiently advanced and to draw conclusions and recommendations aimed at improving EU spending through the EDF.

16 To answer the main audit question, we asked the following sub-questions:

- Did PADR work programmes take into account capability priorities?
- Did the Commission use PADR to test a wide range of processes to implement a defence programme?
- Did the Commission obtain broad participation in PADR projects?
- Did PADR projects achieve their expected results and disseminate them effectively?
- Did the Commission take into account lessons learned from PADR when launching the EDF, including in terms of the necessary resources for the implementation of the EDF?

17 The audit covers the PADR expenditure from 2018 until 2022 and the first two EDF calls for 2021 and 2022. As part of our audit work, we reviewed supporting documentation and interviewed representatives from the Commission and EDA. We also consulted experts and interviewed key stakeholders, remotely or during our visits to five EU member states (Belgium, Germany, Spain, France and Italy): eight PADR project coordinators, PADR “As-if” programme committee lead members and EDF programme committee delegates. Four of these five member states have important defence industries. The project coordinators visited were selected not only to cover a high percentage of the PADR budget (more than 80 %) but also to cover all types of calls used. We carried out a detailed analysis of 12 PADR projects out of the total of 18¹⁶, covering more than 87 % of PADR project funding.

¹⁶ AIDED, CROWN, EXCEED, GOSSRA, INTERACT, OCEAN 2020, PRIVILEGE, PYTHIA, QUANTAQUEST, SPINAR, TALOS, VESTLIFE.

18 We conducted four surveys: two of national authorities (mostly ministries of defence) in all EU member states (PADR “As-if” programme committee lead members and EDF programme committee delegates) and two with project consortium members (all project coordinators and a random sample of 34 project participants out of a total of around 200). Fourteen member states replied to the surveys for national authorities. The response rate for project coordinators was 100 % and for project participants 62 %. The purpose was to get opinions and information from key PADR stakeholders, but also EDF stakeholders, and to cross-check evidence.

19 Certain details and references are not disclosed in the report and some information is presented in an anonymised way because of its security classification.

Observations

Tools to inform the EDF funding priorities were developed after the PADR annual work programmes had started

20 According to the ‘comitology’ rules¹⁷, the Commission is to be assisted by the programme committee of member state representatives to prepare the work programme and calls for proposals. Tools are needed to enable member states to help determine what defence capabilities should be priorities for the PADR.

21 In this section, we therefore focus on how the Commission and EDA designed processes for preparing PADR work programmes and calls for proposals. We examined whether:

- key stakeholders participated in the preparation of the annual work programmes, and
- these programmes included capabilities considered to be priorities for defence.

All key stakeholders participated in preparing the PADR annual work programmes

22 The Commission decided that EDA was the most appropriate body to support the first EU-funded joint defence research cooperation programme between member states. This was due to:

- (1) its expertise and experience in organising and managing defence research projects;
- (2) its support for member states in defining research topics; and
- (3) its potential to support member states in exploiting the results of the research projects.

¹⁷ See [Regulation \(EU\) No 182/2011](#) laying down the rules and general principles concerning mechanisms for control by Member States of the Commission’s exercise of implementing powers.

23 PADR was implemented through competitive annual calls for proposals, based on annual work programmes¹⁸. While not required by the legal framework of the PADR, an “As-if” programme committee was set up.

24 The PADR “As-if” programme committee (see paragraph 06):

- enabled the Commission to develop a work programme related to defence research with the assistance of a programme committee;
- promoted the participation of the member states in defining and developing the programmes;
- promoted cooperation between member states, discussing topics on which research and technology projects could be funded and agreeing on its inputs by consensus.

For the European Defence Fund, however, a programme committee is required by [Regulation \(EU\) 2021/697](#) establishing the European Defence Fund.

25 One of EDA’s tasks is to promote EU defence cooperation projects and to serve as a forum for EU defence ministers. Therefore, despite only participating in “As-if” programme committee meetings as an observer¹⁹, the agency made its expertise available to the member states before these meetings. It provided inputs on possible research topics to be further discussed in the “As-if” programme committee, and helped to consolidate the member states’ views through dedicated ad hoc meetings²⁰.

26 The terms of reference and rules of procedure of the “As-if” programme committee for defence research included the possibility of establishing working sub-groups to examine specific subjects. Some (e.g. the sub-groups on systems on a chip and directed-energy systems) were established²¹ in order to draft PADR technical requirements. While these ad hoc sub-groups performed topical tasks related to the

¹⁸ See European Defence Agency website on [Preparatory Action on Defence Research](#).

¹⁹ Point 9 of the [terms of reference and rules of procedure](#) of the “As-if” programme committee for defence research.

²⁰ European Defence Agency Steering Board document, 12 December 2019.

²¹ Point 7 of the [terms of reference and rules of procedure](#) of the “As-if” programme committee for defence research.

PADR and had two or three meetings, they also took into account the input of existing EDA capability technology groups (Cap Techs).

27 The ministries of defence maintained regular contact with their respective national defence industries, of which they are major clients. This allowed them to find out about existing lines of research and to assess potential interest in them at EU level and whether to present them to the “As-if” programme committee as possible actions to be developed.

28 The Commission adopted the annual work programmes based on contributions on capability development and defence research priorities from the “As-if” programme committee by consensus without a formal vote. The work programmes contained a detailed description of the actions to be funded through the award of grants for project proposals submitted by consortia following these calls for proposals.

Annual work programmes took into account the defence capability priority actions agreed within the 2014 Capability Development Plan available at the time

29 In 2008, EDA produced the first version of its Capability Development Plan to address long-term security and defence challenges. It looked at future security scenarios and made recommendations about the capabilities European militaries would need to react to a variety of potential developments (‘capability priorities’). Updated versions were produced in 2010, 2014 and 2018. The European Council meeting on 19 and 20 December 2013 identified the importance of enhancing the development of EU military capabilities.

30 When the first PADR annual work programmes were set up, the only tool available to analyse and set capability priorities in EU defence was the 2014 version of the Capability Development Plan. The Commission did not consider the 2014 plan to be fully applicable for defence research because of its very broad coverage and the limited PADR budget²².

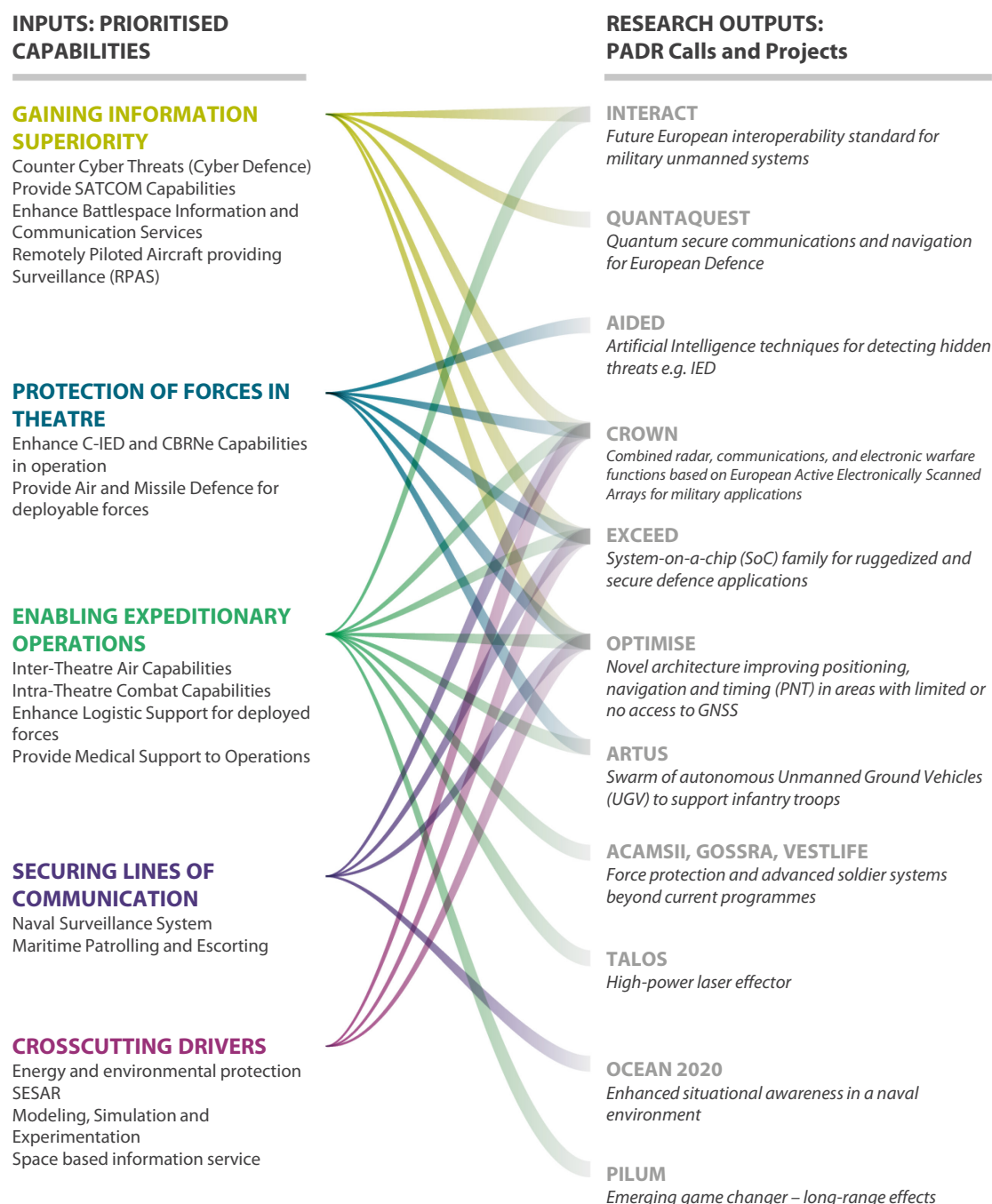
31 We found that, following some degree of involvement by all key stakeholders (the Commission, the member states, EDA and industry) in the preparation of the annual work programmes, more than two thirds of PADR’s topics and selected projects

²² European Defence Agency, [EDA outlines key priorities of the revised Capability Development Plan](#), 19.11.2014.

related to the capability priorities set out in the 2014 Capability Development Plan (see [Figure 3](#)). Continuous dialogue between industry and ministries (see paragraph [27](#)) has served to provide a valuable baseline for PADR work programmes, such as with the topics proposed by the Aerospace and Defence Industries Association of Europe (ASD) in its position papers on PADR²³.

²³ See, for instance: Aerospace, Security and Defence Industries Association of Europe, [Technology priorities for the EU Preparatory Action on CSDP-related research](#), 14.10.2015.

Figure 3 – Examples of links between the 2014 Capability Development Plan priority actions and PADR topics and projects



Source: ECA, based on the Capability Development Plan 2014.

32 The surveys we addressed to national authorities (members of the “As-if” programme committee and the EDF programme committee), as well as to PADR project coordinators and the sample of PADR project participants, included questions on capability priorities (see the results in [Box 2](#)).

Box 2

PADR stakeholders' feedback on addressing relevant defence capabilities

More than 88 % of all PADR project coordinators and more than 80 % (17) of the project participants replying to our survey agreed that the PADR work programmes and calls addressed the most relevant EU defence capability priorities.

Opinions among national authorities varied, however, with 50 % of respondents neither agreeing nor disagreeing. According to two of the five ministries of defence we visited, this question was considered not to be so relevant since PADR was a procedural 'testbed' for the EDF and its budget was insufficient to address key capability priorities.

33 EDA and member states participating in PADR have identified the need for a more systematic approach to EU defence research after PADR. To this end, the [Overarching Strategic Research Agenda](#), developed by EDA together with participating member states and endorsed in December 2018, is intended to provide a harmonised view of relevant EU defence research priorities and possible paths to achieving them (see [Annex I](#)).

34 There have also been other initiatives to analyse and set capability priorities in EU defence, which could be used in the preparation of the EDF's annual work programmes (see [Box 3](#)):

Box 3

EU defence priority-setting tool and initiatives launched after the start of PADR

The **2018 Capability Development Plan** and the capability priorities identified therein: approved by the member states on 28 June 2018. As well as capability priorities, the 2018 plan identifies activities on which member states can cooperate under various frameworks including the Permanent Structured Cooperation, using EU programmes such as the European Defence Industrial Development Programme and the EDF where appropriate. The 2018 plan revision adds a new tool known as ‘strategic context cases’ to guide the collaborative implementation of the priorities identified.

The **Coordinated Annual Review on Defence**: provides a picture of existing defence capabilities in the EU and identifies potential cooperation areas. Following a trial run in 2017/2018, the first full annual review cycle was launched in autumn 2019 and completed in November 2020 with a final report to EDA’s Steering Board, comprising national defence ministers.

Permanent Structured Cooperation (PESCO): established by a Council decision on 11 December 2017, with 25 EU member states, it offers a legal framework for jointly planning, developing and investing in shared capability projects, and enhancing the operational readiness and contribution of armed forces.

The Commission used PADR to test different types of processes to manage defence projects and identify best practices and problems in implementation

35 According to the Commission decisions on the financing of the PADR²⁴, the purpose of the PADR is to prepare and test mechanisms to deliver a variety of EU-funded cooperative defence research and technology activities. As PADR consists of calls for proposals, whereas the defence industry generally uses procurement, all stakeholders need to be convinced that the call evaluation process is fair and transparent. The period until project implementation can actually start should be efficiently managed and project monitoring should be effective and useful.

²⁴ See Commission financial decision on PADR 2017, [C\(2017\) 2262](#); financial decision on PADR 2018 and work programme for 2018, [C\(2018\) 1383](#); financial decision on PADR 2019 and work programme for 2019, [C\(2019\) 1873](#).

36 In this section, we therefore focus on PADR as a ‘testbed’ for the EDF. We examined whether:

- the Commission used PADR calls to test different types of processes;
- the evaluation and award processes assessed proposals in a consistent way;
- the preparation of grant agreements did not delay implementation;
- EDA and the Commission closely monitored the implementation of PADR.

The PADR calls enabled the Commission to test different types of processes to manage defence research projects

37 The PADR tested the political will for an EU defence research and technology programme, the response of the EU’s defence technological and industrial base to the programme and the processes. The PADR calls enabled the Commission to test different types of processes, which was one of its objectives (see [Annex III](#)):

- call with a specific topic versus open call, for the ‘Challenging the future’ disruptive technology call (the open call);
- research action versus coordination and support action²⁵;
- cost reimbursement versus lump-sum calls for the open call;
- one-stage evaluation versus two-stage evaluation in the case of the open call;
- indirect management (by EDA) versus direct management by the Commission, for the open call; all direct management was performed by the same Commission unit, which became part of the Directorate-General for Defence Industry and Space (DG DEFIS) after it was established in January 2020;
- calls with higher budget versus ones with lower budget;
- different research and technology [technology readiness levels](#) (TRLs): calls covered almost the entire spectrum;
- different evaluation approaches (see [Table 1](#)).

²⁵ For definitions, see European Defence Agency, [PADR 2018 calls](#) – Annex D. Types of action: specific provisions and funding rates, p. 31.

38 The two-step submission process for the open call was designed to simplify submission for small and medium-sized enterprises and new entrants; in the first stage, they only had to submit a limited number of pages outlining their proposals (thus reducing time and investment at that stage).

39 The Commission launched the 'Challenging the future' PADR open call in 2019 to test future disruptive defence technologies (see [Annex II](#)). It was intended to give access to newcomers and encourage "out-of-the-box" ideas. Of the 52 proposals received, three projects were awarded grants. The 12 entities participating in these three projects include one large company which is participating in all three projects, this in addition to seven other PADR projects. One large research centre is participating in six other PADR projects. Six entities are new entrants, including universities that have participated in numerous other EU research programmes (such as FP7, Horizon 2020 or Horizon Europe).

The evaluation and award process was comprehensive but highlighted difficulties in recruiting defence experts for assessing proposals

40 PADR used many features of the EU's research and innovation programme, Horizon 2020, in particular its proposal evaluation and award process. For instance, the three PADR evaluation and award criteria (excellence, impact, quality and efficiency of the implementation) came from those used for Horizon 2020.

41 Independent experts were selected via specialised calls, which detailed their tasks²⁶. This was a difficult process because few experts were available on the market and they had to have personnel security clearance from their national authorities. Stage 1 of the 'Challenging the future' open call included a military evaluation involving national military experts. Although the issue of contracting experts was resolved in the case of PADR, it may pose a problem for the EDF, where the number of projects will be much higher.

42 As detailed in [Table 1](#), PADR's evaluation and award processes were comprehensive.

²⁶ European Defence Agency, [Call for experts to assist the European Defence Agency \(EDA\) with tasks in connection with the Preparatory Action on Defence Research 2017-2019](#).

Table 1 – PADR evaluation and award process: key steps

Key steps for the 15 projects under indirect management by EDA	
o	Individual assessment by three independent experts
o	Consensus report by the three experts following a meeting moderated by EDA
o	Panel chaired by EDA, with representatives from EDA and the Commission, meets with the independent experts to calibrate the assessment scores and produce an evaluation summary report
o	Independent observer involved throughout the evaluation process, providing a report on the way the evaluation has been carried out and making recommendations
o	Ethical, legal and societal aspects review, performed by independent experts and moderated by EDA
o	Security scrutiny of proposals eligible for funding by the Commission, assisted by a group of governmental experts appointed by the national security authorities of the EU member states and Norway
Key steps for the three projects under direct management by the Commission	
o	Stage 1: individual assessment of proposal outlines by three independent experts; consensus report by the three experts following a meeting moderated by the Commission
o	Military impact assessment by military experts from all member states' ministries of defence, the two scores being added together as explained in the call text (*)
o	Stage 2: individual assessment of full proposals of the 12 top-rated proposals in the first stage by three independent experts following a meeting moderated by Commission
o	Panel chaired by the Commission, meets with the independent experts to calibrate the assessment scores and produce an evaluation summary report
o	Independent observer involved throughout the evaluation process, providing a report on the way the evaluation has been carried out and making recommendations
o	Ethical, legal and societal aspects review, performed by independent experts and moderated by the Commission
o	Security scrutiny of proposals eligible for funding by the Commission, assisted by a group of governmental experts appointed by the national security authorities of the EU member states and Norway

(*) The first stage evaluation came to a weighted sum of points (classical weighting of award criteria for the scientific part and for the military relevance part, each member state had a fixed number of points to distribute for all the applications received).

Source: ECA.

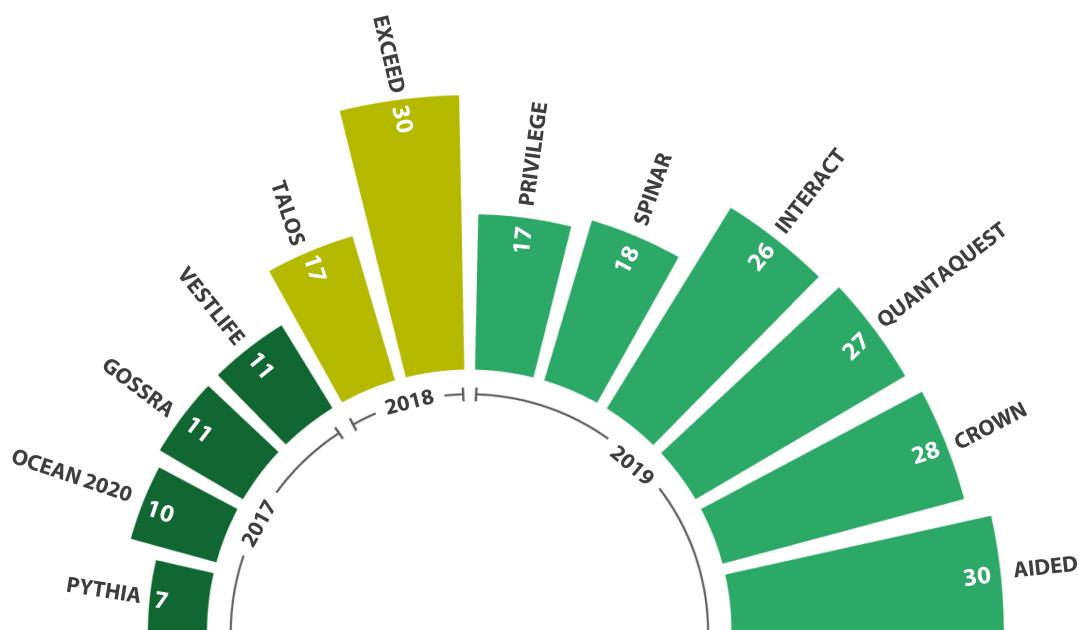
For 5 of the 12 projects analysed, the time taken between launching calls and signing grant agreements exceeded two years

43 Following the award decision and notification of results, the process of preparing grant agreements with the consortia started. EDA was the granting authority for 15 of the 18 PADR projects, and the Commission for the other three.

44 *Annex IV* provides an overview of the process used by EDA until the grant agreement signature.

45 The overall time taken between launching the calls and signing grant agreements (i.e. before work on the actual projects could start) varied significantly among the 12 PADR projects analysed in more detail, ranging from 7 to 30 months and averaging slightly more than a year and a half (see [Figure 4](#)). Four out of eight private companies coordinating PADR consortia interviewed told us that this time lag was too long. This was echoed by two ministries out of five interviewed while two others considered it normal for defence. In any case, if the time needed to evaluate projects and to finalise grant agreements for the PADR is repeated in the recently launched EDF, there is a risk that implementation of the programme may be significantly delayed.

Figure 4 – Time taken between launching calls and signing grant agreements in months



Source: ECA.

Project monitoring by the Commission and EDA was effective

46 Once grant agreements had been prepared, EDA was in charge of implementing the 15 indirectly managed projects throughout their lifecycle. This included monitoring, assessing their progress and their final reports, conducting on-the-spot and *ex post* checks and paying the final balances and closing operations.

47 The delegation agreement between the EU and EDA on the implementation of the PADR (see paragraph 12) describes EDA's role and includes a full list of reports²⁷ to be submitted to DG DEFIS, which were delivered on time. One of these, an annual implementation report, mainly describes the projects' state of play, monitoring of their deadlines by EDA, and the main issues and difficulties arising from their implementation. It also describes the lessons learned from closed or ongoing projects and the main achievements expected in the next six months. The delegation agreement between the Commission and EDA describes EDA's role and, as implementing agency, the tasks entrusted to the agency and defines the mechanisms to review the implementation of these entrusted tasks, including but not limited to financial control.

48 EDA only issued the first version of its project monitoring procedure on 30 November 2021, almost three years after the start of the first PADR project. However, even before this procedure was issued, there was regular project monitoring of PADR projects by both EDA (for indirect management) and by the Commission's DG DEFIS (direct management) for all projects. Such monitoring took the form of desk checks and on-site technical checks (including reviews of deliverables and other documents related to the management of the grant agreements).

49 As the three 'Challenging the future' disruptive technologies projects managed directly by the Commission are funded with lump-sum grants (SPINAR, PRIVILEGE, METAMASK projects), there are no financial reporting requirements while the projects are ongoing. After each project receives 65 % pre-financing, which is standard practice for EU civilian research projects, there is no intermediate reporting for these three projects, which only last two years. There is, however, continuous reporting on the achievement of the project deliverables specified in their respective grant agreements. At the end of the project, the outstanding balance will be paid on the basis of the work packages/outputs actually produced.

²⁷ Technical Synthesis Reports, Mid-Year Implementation Reports.

50 Overall, according to project coordinators and participants, the monitoring of PADR projects has been effective. Our survey questions on whether project monitoring by EDA or the European Commission had been effective and useful were answered positively by 94 % of all project coordinators and 71 % (15) of the project participants who replied. We did, however, receive comments on the administrative complexity of participating in EU defence projects, especially for small and medium-sized enterprises (see paragraph 38). 53 % of all project coordinators and 48 % (10) of project participants who expressed an opinion considered that submitting a PADR project proposal was a complex process, whereas 12 % and 10 % (2) respectively considered this was not the case. Examples given included the complexity to organise a consortium and the documentation required.

51 Moreover, feedback from project coordinators and participants on the quality of their interactions with both EDA and the Commission has been positive overall. In particular, they described the support provided by EDA project officers on technical and managerial issues as continuous, active and helpful.

52 This positive perception of EDA support stems in particular from the assignment of a sole EDA project officer to each project for its entire duration. We found that project officers had changed in some cases, but that this was not due to project complexity or to financial reasons, but rather to normal staff turnover at EDA. Each of the three PADR projects managed directly by the Commission likewise had a dedicated project officer with extensive experience in managing EU projects. Projects under both direct and indirect management benefitted from other support staff, such as legal and financial officers and assistants.

Security requirements complicated project implementation

53 We received survey comments from 11 project coordinators and participants, as well as interviewed ministries of defence, about the stringent, sometimes even considered excessive, security requirements, which are based on a two-stage procedure. It involves both the Commission Security Authority²⁸ and the grant agreement's beneficiary National Security Authority, which is responsible for ensuring that the contractor under their jurisdiction complies with the applicable security provisions for the protection of EU classified information. All entities participating in PADR projects involving the creation or access to classified information at their

²⁸ Responsible for assuring compliance with [Commission Decision \(EU, Euratom\) 2015/444](#) on the security rules for protecting EU classified information.

premises shall ensure that a valid ‘facility security clearance’ at the appropriate level is available, where requested by national rules. This ‘facility security clearance’ must be granted by the competent National Security Authority. As ‘personnel security clearance’ requirements apply in addition for all participating staff²⁹, these prerequisites led to delays in the grant agreement process (sometimes requiring amendments which delayed the project) and caused difficulties in project implementation, including in terms of communication between the consortium members (see also paragraph 67).

54 For three PADR projects, deliverables were reclassified (downgraded, upgraded or divided in parts with different classification levels). These reclassifications were based on well-founded requests submitted by project coordinators (via EDA) and followed a thorough assessment by the Commission, in accordance with the security rules³⁰. Where deliverable classification was downgraded, this simplified project implementation.

Responses to some PADR competitive calls were limited and concentrated in a few member states

55 The Commission decisions on the financing of the PADR³¹ underline the programme’s focus on stimulating cooperation amongst all types of research and technology actors in all member states. PADR calls should be designed to attract different competitive proposals by consortia including participants from all member states and all types of organisations, including SMEs.

56 In this section, we therefore analyse the types of entities that participated in PADR. We examined whether there was:

- o broad competition for PADR calls,
- o an adequate number of entities in PADR consortia,

²⁹ For PADR projects, there were 29 different National Security Authorities which the Commission Security Authority had to liaise with.

³⁰ General Secretariat of the Council, [Protection of European Union Classified Information \(EUCI\)](#), 6.4.2022.

³¹ See Commission financial decision on PADR 2017, [C\(2017\) 2262](#); financial decision on PADR 2018 and work programme for 2018, [C\(2018\) 1383](#); financial decision on PADR 2019 and work programme for 2019, [C\(2019\) 1873](#).

- o broad geographic origin of PADR project coordinators and participants, as well as independent experts.

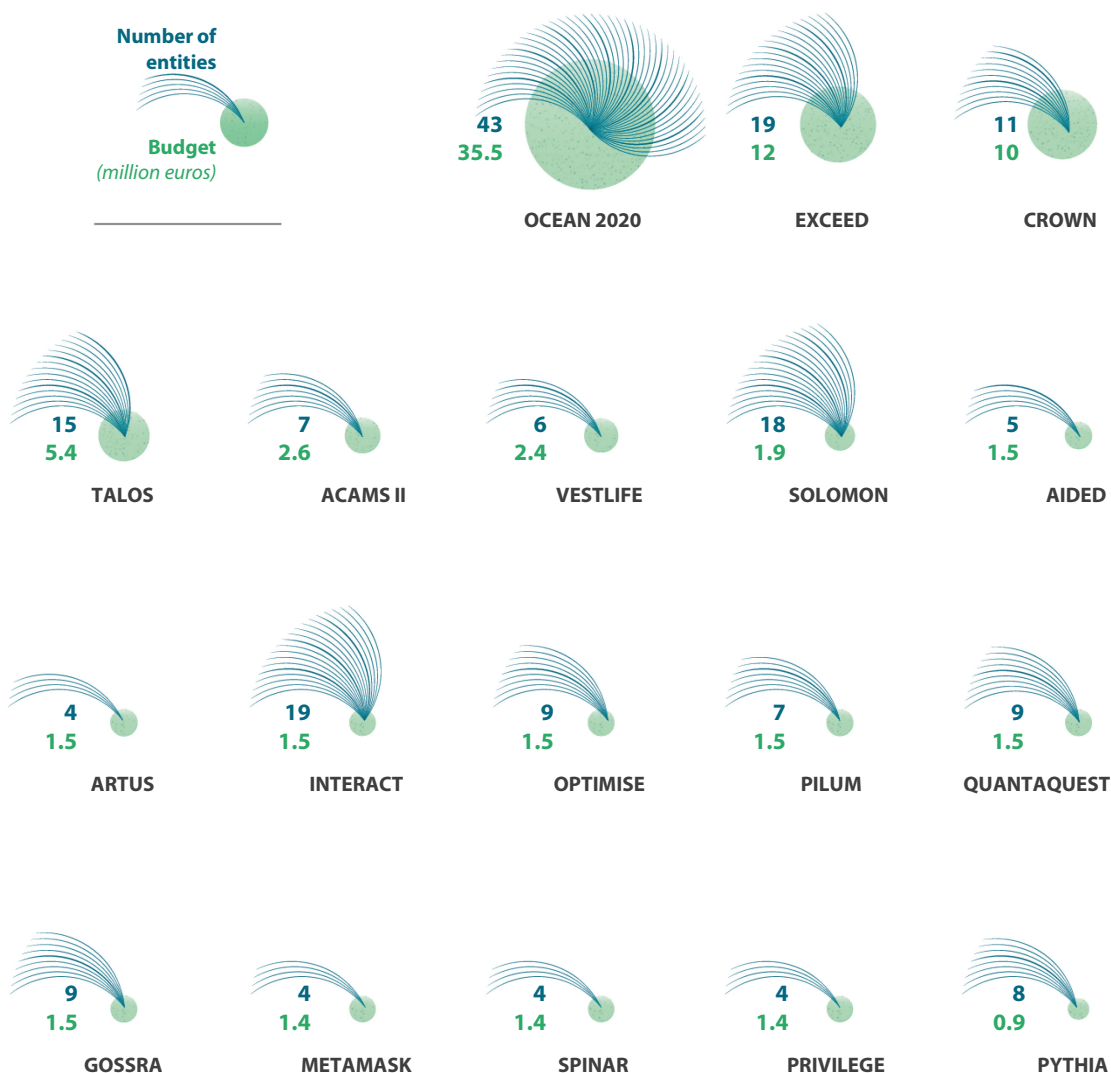
Applications were limited for some PADR competitive calls

57 For some of the nine PADR calls, there was limited competition, sometimes due to the small number of companies in the EU able to respond to a call for proposals for the required technology. For example, for two calls only one consortium applied and for three other calls three applied. According to the Commission, defence research entails an inherent ‘tension’ between the principle of competition for projects (like for Horizon 2020) and the priority topics selected by national ministries of defence, which may limit competition. The level of competition for any given call also depends on the precision with which the call text is formulated and the extent to which it refers to a specific technology.

The number of entities in some project consortia was high

58 A high number of consortium members meant greater need for resources for coordination purposes. Therefore, only bigger organisations could afford to be coordinators for consortia with a high number of participating entities. We noted that in some consortia, one member was a consulting company assisting the project coordinator with project management, administration and communication. Both ministries of defence and project coordinators informed us that for some projects, the number of consortium members was high because those members expected this would increase the chances of their project proposals being selected. *Figure 5* compares the number of entities in each project consortium (the total number being around 200 entities) with that project’s budget. While high-budget projects have more consortium members, some lower-value projects also have many consortium members.

Figure 5 – High-budget projects have more consortium members than most lower-value projects



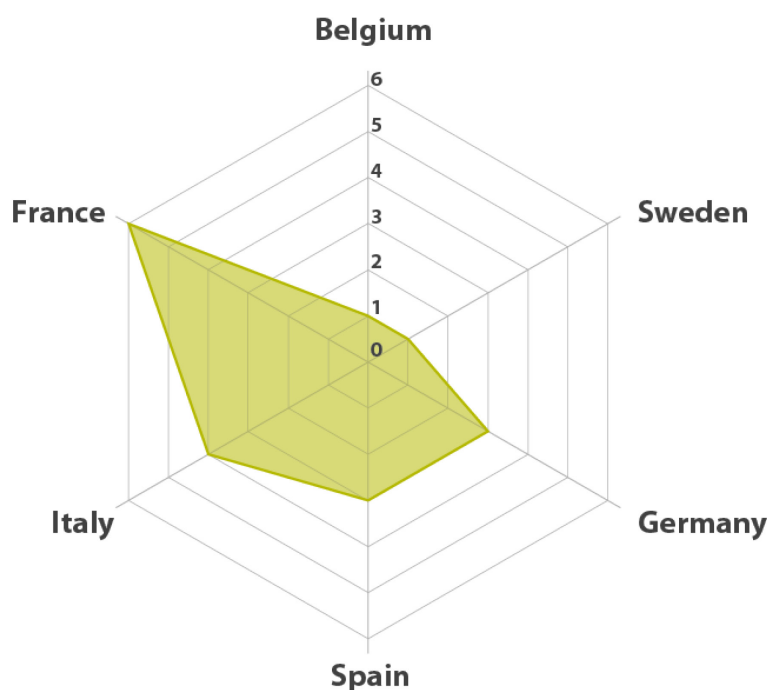
Source: ECA.

PADR coordinators, participants and independent experts were concentrated in member states with large defence industries

59 Statistics on PADR project coordinators and project participants show they are concentrated in member states with large existing defence industries, such as France, Germany, Italy, Spain and Sweden³² (see [Figure 6](#) and [Figure 7](#)).

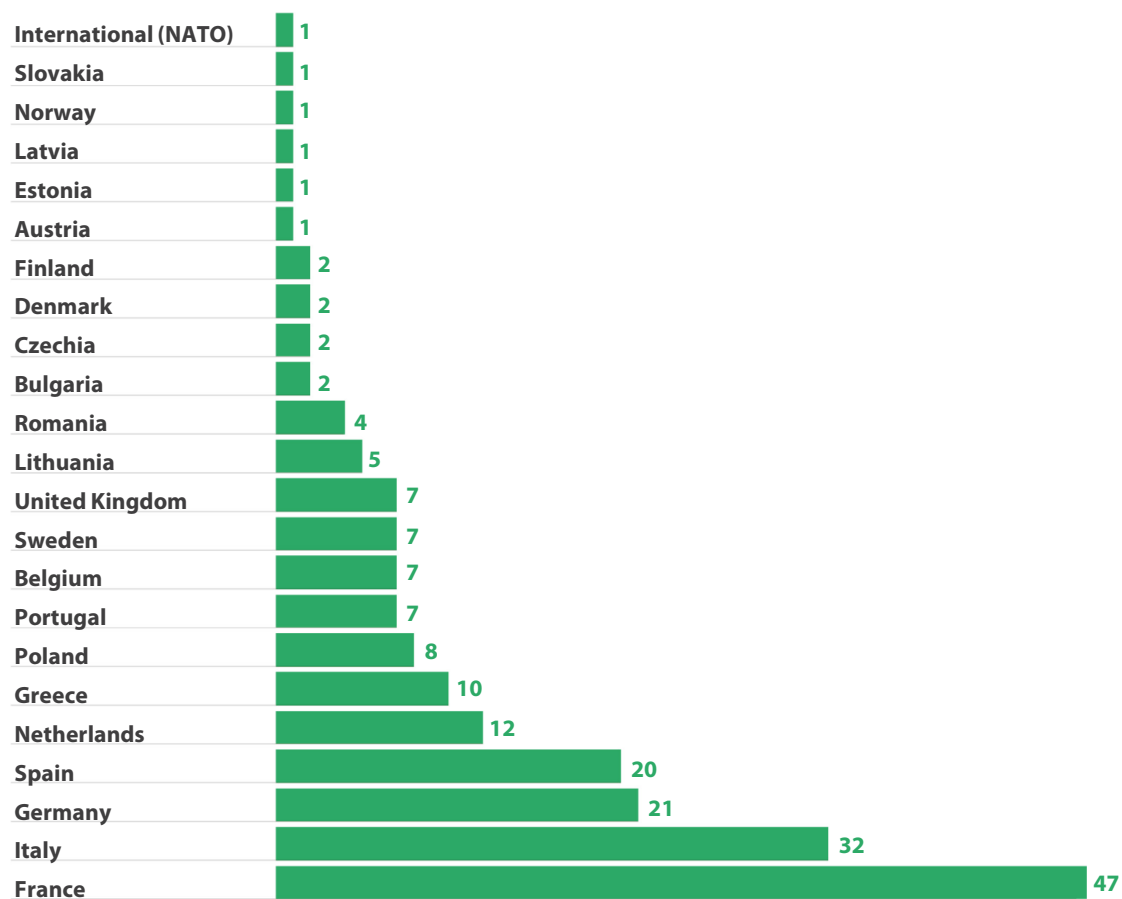
³² For information on the EU member states with the largest defence industries, see Roth, A., [The size and location of Europe's defence industry](#), Bruegel blog, 22.6.2017.

Figure 6 – Countries of origin of all PADR project coordinators



Source: ECA.

Figure 7 – Countries of origin of PADR project participants



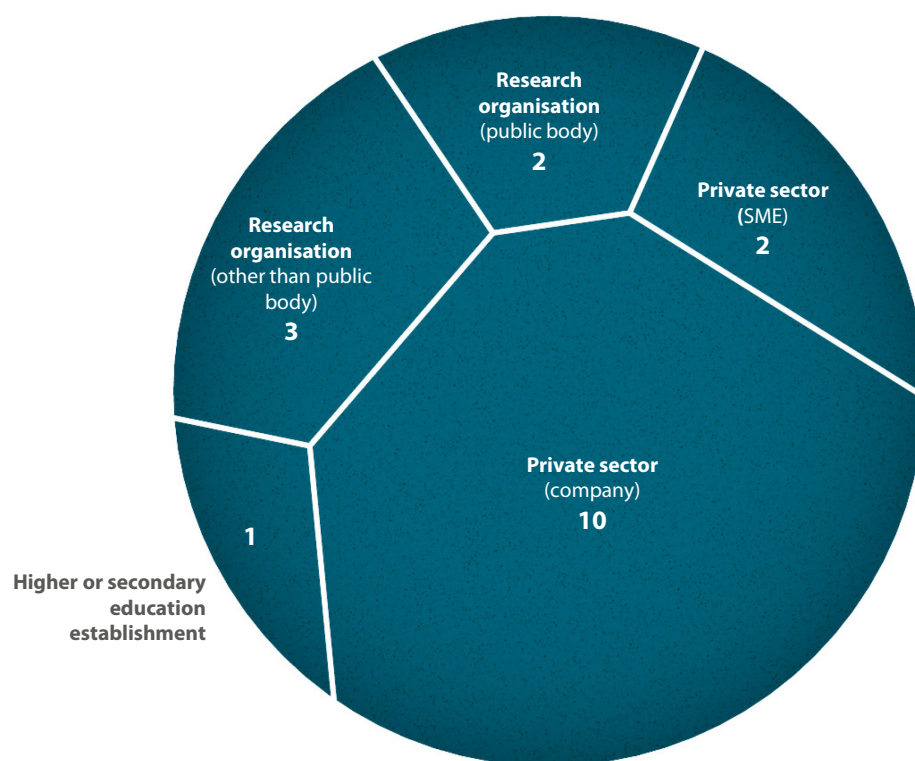
Source: ECA.

60 The independent experts used for the evaluation and award process are similarly concentrated in these countries. More than 50 % of the experts come from four member states. More than 85 % of the experts came from nine member states.

61 We noted that a number of companies were involved in several PADR projects and that the same combinations of companies also occurred in several projects. Statistics show that 31 organisations represent almost half of the project participants (49.3 %); eight organisations represent a quarter of project participants. A number of beneficiaries can be considered EU funding ‘experts’ as they have participated in many EU projects³³ (see also paragraph 39). Moreover, independent small and medium-sized enterprises account for 20 % of all participants (see [Figure 8](#) and [Figure 9](#), which show the number of PADR coordinators and participants by type of entity). The replies to our survey indicate that the vast majority of PADR consortia were a continuation of cooperation between entities that had already worked together before the PADR programme. More than 82 % of all project coordinators, and almost 86 % (18) of project participants who responded to the survey, had previously worked with members of their PADR project consortium. According to the entities we interviewed, the benefit of working with known partners was that they were already familiar with their way of working and with the differences in legal and financial frameworks between the member states concerned. Building a relationship with a new partner from scratch represents an additional burden for a project.

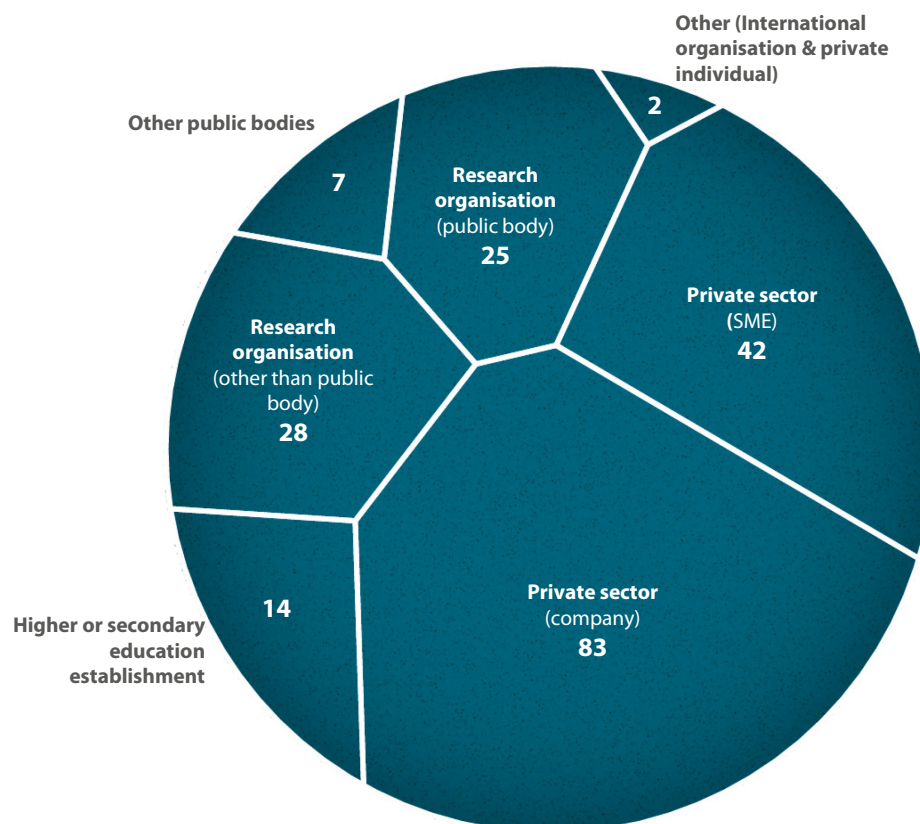
³³ The database of [EU Funding & tender opportunities](#) enables a search of registered organisations.

Figure 8 – PADR project coordinators by type of entity



Source: ECA.

Figure 9 – PADR participants by type of entity



Source: ECA.

62 Two member states that do not have big defence industries told us that more should have been done, both at national and EU level, to increase participation by all member states and to avoid most support going to a limited number of big defence companies. We received similar feedback from smaller companies.

63 Although cross-border cooperation between established players and new market entrants, mostly small and medium-sized enterprises, was difficult in some cases, we also received a lot of positive feedback from project coordinators and participants, as well as ministries of defence, on the general level of interest in international defence research cooperation. Ninety-four per cent of all project coordinators and 95 % (20) of project participants responding to the survey replied that they would like to participate in future EDF calls and projects.

PADR projects yielded limited results so far

64 In its November 2016 'Scoping paper for Preparatory Action on Defence Research', the Commission emphasised that PADR needs to produce visible and timely results for decision-making in view of more substantial expenditure on defence

research in the next multiannual financial framework (2021-2027). PADR projects should have produced timely, meaningful and useful results, as well as tangible achievements, successfully paving the way for the launch of the EDF. Adequate project results communication and dissemination should have taken place.

65 In this section, we therefore examined whether:

- the finished projects achieved on time their planned results;
- the Commission and EDA set up relevant tools to disseminate project results and encourage their exploitation.

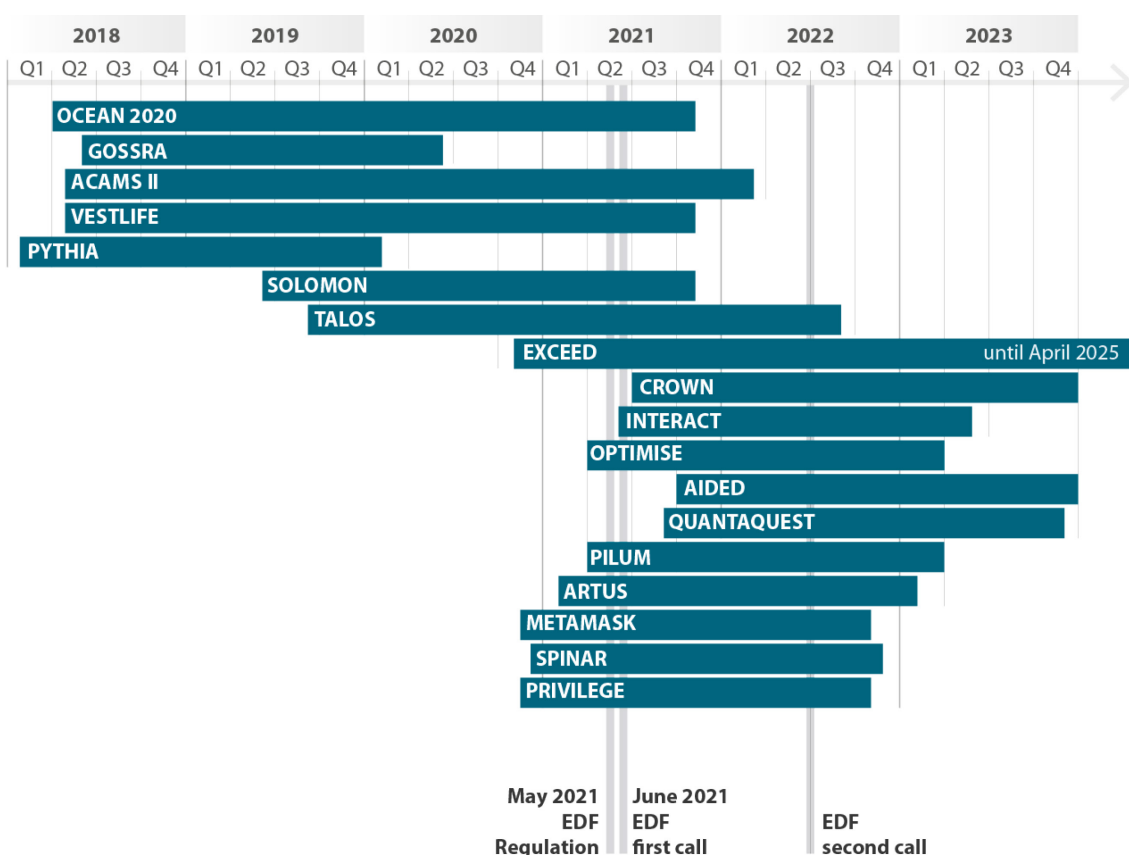
Limited progress of PADR projects

66 At the time the EDF Regulation was published in May 2021, and the first EDF calls for years 2021³⁴ and 2022³⁵ were launched, most PADR projects were still ongoing (see [Figure 10](#)). In June 2021, more than half of PADR projects had either just started or had not started yet, notably due to the length of time taken until grant agreement signature (see [Figure 4](#)). At the end of 2022, four out of the 12 projects analysed were closed (see [Annex V](#)). With the November 2016 ‘European Defence Action Plan’ (see [Annex I](#)), including the reference to launching a Preparatory Action on Defence Research in 2017, and the political decision to launch the EDF in 2021, the Commission had little room for manoeuvre but to launch PADR as quickly as possible in 2017.

³⁴ Published on 30 June 2021.

³⁵ Published on 10 June 2022 with an opening date of 21 June 2022.

Figure 10 – When the first EDF calls were published in June 2021, most PADR projects were ongoing



Source: ECA.

67 There have been delays in the delivery of PADR projects. At the end of 2022, 6 of the 12 projects we analysed in detail had had their timelines extended. One project end date was extended from January 2022 (according to the first version of the grant agreement) until April 2025. The main reasons for the delays were:

- The time taken to complete the ‘facility security clearance’ process³⁶, which was something new and administratively complex especially for companies entering the defence sector, in particular small and medium-sized enterprises (see paragraph 53). Such clearance is only needed for certain levels of classification.
- For some grant agreements, there were also many different versions of the document, often because of requests for additional information.
- The COVID-19 pandemic led to project extensions to cope with a more complex management of meetings or difficulties in exchanging EU Classified Information.

³⁶ For further information: [Commission Decision \(EU, Euratom 2019/1963\)](#) laying down implementing rules on industrial security with regard to classified procurement contracts.

Some participating entities also switched to manufacturing personal protective equipment.

68 The limited progress of PADR projects is also demonstrated by the amounts spent by the end of 2021: although 71 % of the combined budget for all projects had been spent by that time, pre-financing (payments in advance not dependent on progress) accounted for 45 % of this expenditure (see [Annex VI](#)).

69 The November 2016 scoping paper underlined the need for visible and timely PADR results. However, while many lessons have been learned from PADR for the EDF in terms of the development of PADR annual work programmes and calls, the proposal evaluation and grant award and (to some extent) project implementation, this results dimension is lacking to date.

70 Given the nature of defence research, at this stage it is not possible to say how the results of most PADR projects may be used in the future. The timeframe set for PADR was not conducive to providing sufficient information on the outcomes of the projects funded in time to inform the launch of the EDF. However, at the end of 2022, there is planned to be a continuation for four PADR projects through the EDF 2021³⁷ and 2022 calls³⁸.

71 By the time the EDF Regulation was adopted and the first EDF call launched in June 2021, only two PADR projects had been closed. However, one of these two projects (a coordination and support action to devise a methodology for strategic technology foresight) was closed without having achieved all its objectives (PYTHIA). Some funds have been de-committed for this project. External experts were involved in assessing how far this project had met its deliverables, milestones and impacts, which provided feedback on the positive and negative aspects of the project.

³⁷ 2021: the ACHILE ('Augmented capability for high end soldiers') as well as the LODESTAR ('Live operational data enhancement for situational awareness through augmented reality') and ECOBALLIFE ('Eco-designed ballistic systems for durable lightweight protections against current and new threats') projects following on directly from the GOSSRA and VESTLIFE PADR projects respectively.

³⁸ 2022: the UWW-UTS ('Underwater manned-unmanned teaming and swarms') and DIS-AC ('Innovative technologies for adaptive camouflage') calls following on directly from the OCEAN 2020 and ACAMS II PADR projects.

72 Some closed projects have produced positive results with future potential, for instance:

- GOSSRA has contributed to developing a NATO standard³⁹. The consortium maintained regular contact with the related NATO Land Capability Group⁴⁰. The project resulted in a NATO standard recommendation (STANREC 4845⁴¹ published in May 2022), distributed by NATO to all member countries, thereby initiating the NATO standardisation process. The topic of soldier open architecture addressed by GOSSRA will be continued under the EDF (see paragraph **70**).
- OCEAN 2020, through field trials in the Mediterranean and Baltic seas, provided proof of concept for the Maritime Operations Centre (MOC).
- The VESTLIFE trademark paved the way for Italian and Dutch patents of the protective technology developed.

73 One good practice, noted in three closed projects⁴² that contributed to achieving positive results, was the involvement of ‘end-user advisory boards’ to ensure that projects would meet the needs of potential customers, i.e. ministries of defence. These boards included panels of servicemen and of representatives of end-user industries.

74 In some successful projects, end users were involved through field trials. For instance, OCEAN 2020 reference and target architectures were validated in two live naval operations. These on-sea trials enabled the project coordinator to verify that OCEAN 2020 addressed a broad range of interoperability capabilities. The VESTLIFE project also involved 10 military users.

75 As few PADR projects have been closed, no concrete problems related to the risks associated with intellectual property rights have been observed yet. The EDF Regulation defines rules on ownership of results of research (Article 20(1)) and development actions (Article 23(1)). However, given the different interpretations of

³⁹ Reference: Special Report 2 (Final Special Report), July 2020 “4.1 Standardisation of the GOSSRA Architecture at NATO”.

⁴⁰ Dismounted Soldier System, Command Control Communications Computers Intelligence sub-group.

⁴¹ Among NATO Standardization Documents, a **STANREC** is a NATO non-binding document which aims at recommending useful practices. It is employed on a voluntary basis and does not require commitment of the nations to implement the standards which are listed in it.

⁴² GOSSRA, OCEAN 2020 and VESTLIFE.

the EDF Regulation by different stakeholders, there is scope to further clarify the issue of IP rights with all EDF stakeholders. The risk related to this issue was raised by project coordinators, participants and ministries of defence.

76 *Annex V* summarises the results of the 12 PADR projects we analysed in detail.

Project communication plans were drawn up but dissemination of project results was not adequate for all stakeholders

77 Most projects had communication plans. For example, in the last 16 months of the project, information on the largest PADR project OCEAN 2020 (in terms of budget and number of consortium members) was disseminated through four webinars, 25 project presentations and more than 14 000 project website visits (an average of 800 visits per month), as well as 193 Twitter posts (559 followers) and 57 LinkedIn posts (585 followers).

78 As the three PADR projects under direct management are classified due to their confidential nature, dissemination of their results to the public or the scientific community was therefore limited.

79 There was some dissemination of project results via ‘special reports’. Special reports are intended to allow beneficiaries to provide information to national authorities on the research performed. This can then be used by all EU member states for the following objectives:

- to provide an understanding of the purpose, outcome and potential applicability of the research;
- to assess the work performed by the beneficiaries;
- to draw up specifications for follow-on research or procurement programmes, thereby encouraging uptake of EU-sponsored research.

80 The 2017, 2018 and 2019 PADR calls for proposals included an annex with a template for special reports⁴³. The annex stated that the general content of special reports should be specified in the calls for proposals. It also indicated that, because of the sensitivity of defence projects, “as a general principle, Member States should

⁴³ See, for instance: European Defence Agency, [PADR 2019 Calls for proposals and General Annexes](#), p. 48.

ensure that information will only be disclosed within the national administrations on a need to know basis.”

81 Interested member state authorities can request access to special reports provided they ensure that information will only be disclosed within the national administrations on a ‘need-to-know’ basis. However, three of the five interviewed ministries of defence informed us that obtaining access to special reports was complicated and needed to be justified thereby discouraging wider dissemination of results. They also expressed reservations about the possibility of using the information contained in these reports in practice to help deciding to invest in further developments. As of the end of September 2022, the Commission had received requests from five member states regarding eight PADR projects.

82 The PADR project grant agreements do not only include articles dealing with project communication and dissemination but also with the exploitation of project results. With a very general wording of the relevant grant agreement articles, PADR defence research projects do not, from the outset, include a plan specifying how research results will be dealt with at later stages. This may include additional research and technology, research and development, manufacturing, procurement, etc. We have however noted a continuation for four PADR projects through projects selected in the EDF 2021 and 2022 calls (see paragraph 70). The nature of research projects means that not all will lead to concrete results and a certain number of unsuccessful projects are expected.

Not all PADR lessons learned were taken on board and there is still a lack of a longer-term strategy for the EDF

83 According to the Commission decisions on the financing of the PADR⁴⁴, the programme should improve the competitiveness and innovation in the European Defence industry. Thereby, PADR lessons learned should have been taken into account for the EDF Regulation and the launch of the fund for this purpose. Dedicated human resources of the Commission should be sufficient to enable the EDF to achieve its intended impacts and goals. The EDF should also be part of a broader long-term perspective for EU defence spending.

⁴⁴ See Commission financial decision on PADR 2017, [C\(2017\) 2262](#); financial decision on PADR 2018 and work programme for 2018, [C\(2018\) 1383](#); financial decision on PADR 2019 and work programme for 2019, [C\(2019\) 1873](#).

84 In this respect, we examined whether:

- annual work programmes were relevant for EU defence stakeholders;
- the Commission and EDA duly produced and analysed lessons-learned documents in a timely manner;
- the EDF Regulation took on board lessons learned from testing under PADR;
- the processes tested with PADR were useful for the first EDF calls;
- the Commission had allocated sufficient resources both in terms of staff numbers and appropriate skill and experience to implement the EDF;
- the EDF procedures include a perspective on what could be achieved in the future in terms of capability development.

A multiannual perspective brings advantages for EU defence programmes

85 While the PADR work programmes were annual, those for Horizon 2020 and European Defence Industrial Development Programme were biennial. The European Parliament favours annuality in the area of defence for the purposes of budgetary scrutiny⁴⁵. However, the different sources we contacted during our audit work (ministries of defence, project coordinators and participants) highlighted the need for a multiannual horizon.

86 A one-year horizon gives potential call applicants and ministries of defence only a short-term view of EU-funded research and technology topics. It does not allow them to set their priorities over a longer period in order to better prepare themselves, for instance avoiding duplication with national research activities. A multiannual horizon means companies likely to participate in research projects can plan their activities in the longer term, which improves their objective-setting and management of human and physical resources. It increases their chances of finding new project partners and helps to diversify participants in EU programmes (see paragraph **61**).

⁴⁵ Fiott, D., *The scrutiny of the European Defence Fund by the European Parliament and national parliaments study*, European Parliament, 2019.

Lessons-learned documents on PADR processes were produced and reviewed

87 PADR lessons-learned documents were prepared by EDA, adopted by its Steering Board and made available to the Commission. The Commission also analysed lessons learned and held a meeting to discuss these with the member states, EDA and the European External Action Service on 26 November 2020 (see [Box 4](#)).

Box 4

PADR lessons-learned documents prepared by EDA and the Commission

Lessons learned focused on processes and concerned, for example:

- types of calls and proposal evaluation methods;
- using prioritisation mechanisms when preparing programmes;
- avoiding duplication of structures;
- harmonising requirements and topic descriptions;
- using the same suite of tools to monitor grants for all projects;
- definition of beneficiaries and intellectual property rights;
- security classification levels for project deliverables or levels of personnel security clearance for experts involved in evaluating proposals;
- efficient exploitation of results generated by PADR projects.

88 The PADR “As-if” programme committee enabled the Commission to learn about working with programme committees in the defence sector. In addition, PADR underlined the need for specific tools to provide a harmonised view of EU defence research priorities to meet the long-term capability needs agreed by the member states. The Overarching Strategic Research Agenda (see paragraph [34](#)) and its [Technology Building Blocks](#) identify common defence research objectives.

89 According to the Commission, the tools developed to set capability priorities while implementing PADR (the Capability Development Plan identifying capability development priorities, Coordinated Annual Review on Defence identifying opportunities for cooperation, PESCO for intergovernmental cooperation, see

paragraph [34](#) and [Box 3](#)) were used to inform the EDF annual work programme⁴⁶ and identify synergies and complementarities with other EU programmes. Indeed, a multiplicity of tools for EU defence are now available but are not yet coordinated⁴⁷.

90 The five ministries of defence we interviewed told us that these tools had been used only to a limited extent for the first EDF work programmes. Ministries of defence recognise EDA's expertise on capability needs in research and technology, and were interested in taking Cap Techs (see paragraph [26](#)) and the Overarching Strategic Research Agenda (OSRA)⁴⁸ into consideration for future EDF work programmes. The role of EDA in the programme committee includes informing the programme committee with an in-depth analysis about compliance with common security and defence policy tools mentioned.

Certain lessons learned were taken on board in the EDF Regulation, but not all

91 There are differences between the arrangements provided for in the EDF Regulation and those trialled with PADR. Some of these differences are the result of lessons learned from PADR, but others are not (see [Annex VII](#)).

92 One important aspect that has not changed as compared to PADR is that the EDF will still be implemented through annual work programmes⁴⁹ (see paragraphs [30-31](#) and [85-86](#)). The Commission did, however, publish an 'indicative multiannual perspective' for the EDF on 25 May 2022, which includes indicative planning for each category of action for the 2021-2027⁵⁰ period.

⁴⁶ European Commission, [EDF Info Day 2021 presentation](#), 20.9.2021.

⁴⁷ European Defence Agency, [Ensuring coherence among EU defence tools](#), 25.10.2019.

⁴⁸ European Defence Agency, [OSRA – Overarching Strategic Research Agenda and CapTech SRAs harmonisation](#), 16.1.2018.

⁴⁹ See Article 24(1) of the [EDF Regulation](#).

⁵⁰ Idem.

The processes tested with PADR were useful for the first EDF calls

93 The 2021 and 2022 EDF calls took into account experience gained from the different processes tested for PADR, for instance by:

- including open calls, about whose potential we received positive feedback from all the ministries of defence we consulted;
- not including foresight calls, which did not achieve all their deliverables under PADR;
- introducing the [EDF network of focal points](#), which may have the potential to increase small and medium-sized enterprises participation as compared to PADR;
- including both cost-reimbursement and lump-sum calls;
- not including two-stage evaluations because this approach is resource-intensive, particularly for a new DG still building up its resources like DG DEFIS;
- using different weightings for the evaluation criteria.

94 The Commission also took into account lessons learned from European Defence Industrial Development Programme calls for the first two EDF calls in 2021 and 2022. For example, the EDF calls take into account some of the programme's proposal evaluation and award criteria, and include specific calls and a bonus for small and medium-sized enterprises participation.

95 On the other hand, despite positive feedback from all the five ministries of defence we interviewed and all project coordinators on indirect management under PADR, indirect management is the exception rather than the rule for the EDF 2021 calls. This is set out in the EDF Regulation, which allows a derogation for indirect management. DG DEFIS intends to implement four projects in indirect management in EDF 2021: two would be implemented by OCCAR and two by EDA. In addition, even where indirect management is used under the EDF, it is not as comprehensive as it was for PADR, where the tasks delegated to EDA included publishing calls, evaluating proposals and making award decisions. The use of indirect management, e.g. by EDA and OCCAR, which has already been tested, could help alleviate the resource constraints faced by DG DEFIS.

96 Other lessons learned from PADR did not lead to changes for the launch of the EDF. For example:

- EDF 2021 calls were not open for submission any longer than PADR calls were, whilst the EDF 2022 calls were open longer including the summer period. This means that this barrier to entry for smaller organisations remained for the first EDF call.
- The relatively lengthy time taken to evaluate proposals and award grants under the EDF is no less than it was under PADR.
- The difficulty in contracting independent experts remains just as acute for the EDF as it was under its precursor programmes, and can be considered heightened given that it is on a considerably larger scale than those programmes (see paragraph 41).

97 As implementation of the first EDF projects started in January 2023, lessons learned in terms of project results will be available and usable from only a limited number of PADR projects. The Commission also used different processes not tested previously with PADR for the 2021 and 2022 EDF calls. For example, it makes use of lump-sum grants not only for open calls, or for calls requiring at least two entities from two member states only.

The limited availability of human resources at the Commission poses risks for the EDF

98 Although EDA and DG DEFIS did not have a system in place to track the actual time spent by its staff on PADR projects, PADR enabled the Commission to obtain a better idea of the resources needed to manage the EDF. DG DEFIS has noted that staff numbers needed to manage defence projects is higher than for other projects, due in particular to security issues. Based on its experience with PADR and the European Defence Industrial Development Programme, DG DEFIS prepared an analysis of its staffing needs for 2021-2027 to implement the European Defence Fund. The analysis showed that 55 staff members would be needed to implement the EDF in 2021, rising to 139 in 2027. The main drivers for the estimate of EDF staff needs were the predicted number of proposals each year, which affects the number of staff needed for the evaluation stage, and the annual portfolio of ongoing projects, which affects the number of staff needed for project management.

99 At the beginning of 2022, DG DEFIS had 18 open posts from 2021 in the units managing the EDF. Over the course of 2022, the staffing situation improved and the vacancy rate decreased. By 1 October 2022, 67 posts in these units had been filled and the number of vacant posts had fallen to five.

100 Given the anticipated significant increase in the number of proposals to evaluate and projects to manage, DG DEFIS is striving to streamline its procedures. As an example: at the end of 2022, DG DEFIS managed around 60 projects. This number doubles at the beginning of 2023 with the projects for the 2021 EDF call to be managed in addition. However, it continues to face considerable pressure and challenges in terms of human resources. The availability of qualified and suitably experienced personnel has been identified as one of the DG's risk factors. In addition, there are a number of tasks that its many seconded national experts cannot perform for security reasons, such as the role of project officer. As at end October 2022, almost half of DG DEFIS Directorate A staff are seconded national experts. For each project, there is one statutory staff member and one seconded national expert. Seconded national experts are mostly involved in programming and preparing call texts, but also assist project officers by monitoring the technical implementation of projects.

101 The Commission is aware that it is under a high degree of scrutiny in relation to the launch of the EDF. Any difficulties in managing the EDF efficiently because of a lack of skilled human resources therefore pose a risk for the Commission. In its analysis of staffing needs for 2021-2027 to implement the EDF, DG DEFIS underlined the risk of a lack of capacity to evaluate proposals properly and manage projects soundly if it does not obtain the needed posts.

The Treaty limits EU action on defence and the EDF could benefit from a long-term strategy

102 The [Treaty on European Union](#), as highlighted in our review on European defence⁵¹, restricts the use of the EU budget for defence. In particular, the EU budget cannot fund "expenditure arising from operations having military or defence implications"⁵². In addition, member states make civilian and military capabilities available to the EU for implementing the common security and defence policy, but the EU cannot itself own military assets. The Treaty explicitly limits the scope of the policy to "missions outside the Union". The policy's operational focus is therefore on external

⁵¹ See [review 09/2019: "European defence"](#), paragraphs 11-18.

⁵² See Article 41(2) of the [Treaty on European Union](#).

crises and conflicts, rather than on the territorial defence of Europe, which is the responsibility of the member states together with NATO.

103 Because the common security and defence policy is a crisis management tool, which is not intended to be a collective European defence policy, it is not a comprehensive basis on which to develop the EU's defence technological edge. There are different analyses and positions in different member states of key issues, such as the relevant importance of security threats. The EU budget therefore has restrictions in dealing with defence issues, which complicates matters regarding common defence capabilities and needs.

104 The EDF is a new major EU programme for funding cooperative defence research and development projects. However, it does not cover the future use of the capabilities developed under the programme. Defence research projects are generally long-term, up to 20 years or more for major capabilities, before they can be used by ministries of defence. It is unknown at this stage how EDF projects from the current multiannual financial framework may be continued in the next multiannual financial frameworks. For example, some PADR projects from the 2014-2020 multiannual financial framework have been continued into the 2021-2027 period with EDF projects under the 2021 and 2022 calls (see paragraph [70](#)).

105 The capabilities to be developed under the EDF are still a long way off being used by the military, as implementation of the first EDF projects started as recently as January 2023. Research and technology represents only a fraction of the total cost and timeline of any armament programme across its lifecycle⁵³.

106 The EU still lacks a longer-term EU defence strategy. The existence of such a strategy is essential for the future of the EDF. The Commission has not yet sufficiently addressed some key issues in order for projects under the EDF to have their intended

⁵³ See, for instance: Mauro, F., Simon, E., Xavier, A., [Review of the Preparatory Action on Defence Research \(PADR\) and European Defence Industrial Development Programme \(EDIDP\): lessons for the implementation of the European Defence Fund \(EDF\)](#), European Parliament, 2021, Figure 15, p. 21.

impact. The Commission has so far not determined in advance the focus of EDF projects, for instance:

- to what extent the EDF should support a small number of large, potentially globally competitive projects rather than a larger number of smaller projects with more beneficiaries;
- how manufacturing of the defence capabilities developed by the projects will be organised;
- whether ministries of defence have the necessary interest in and commitment to purchasing them.

107 The Strategic Compass⁵⁴ issued by the Council in March 2022 highlighted the need to further incentivise joint procurement of defence capabilities that are developed in a collaborative way within the EU. One such proposed incentive is a VAT exemption for collaborative projects⁵⁵.

⁵⁴ Council of the European Union, [A Strategic Compass for a stronger EU security and defence in the next decade](#), p. 33.

⁵⁵ Commission joint communication on the defence investment gaps analysis and way forward, [JOIN\(2022\) 24](#).

Conclusions and recommendations

108 Overall, we conclude that while some lessons were learned, the value of the Preparatory Action on Defence Research (PADR) as a testbed for increasing EU defence spending was reduced due to time constraints and limited results. At the time the EDF Regulation was published in May 2021 and the first EDF calls for 2021 and 2022 were launched, most PADR projects were still ongoing. The results of completed projects were not available in time to inform the launch of the EDF. However, PADR was useful in enabling the Commission to test different working procedures for EU spending in relation to future defence research.

109 PADR has been implemented through competitive annual calls for proposals, based on annual work programmes. Ministries of defence, PADR project coordinators and participants highlighted the need for a multiannual perspective. A one-year horizon only gives potential call applicants and ministries of defence a short-term view of EU-funded research and technology topics. It does not enable them to set their priorities over a longer period in order to better prepare themselves. The Commission published an indicative ‘multiannual perspective’ for the EDF for the 2021-2027 period, which will be revised annually (paragraphs [22-28](#) and [85-86](#)).

Recommendation 1 – Use a horizon longer than one year for EDF work programmes

In order to enable stakeholders to better plan their participation in the EDF, as part of the mid-term evaluation of the EDF Regulation, the Commission should assess the opportunity to propose a horizon longer than one year for EDF work programmes, including:

- (a) The introduction of a short-term perspective with two-year work programmes for the EDF;
- (b) The use of a binding ‘multiannual perspective’ setting out plans for each category of action to be covered over the remainder of the current multiannual financial framework.

Target implementation date: 2025

110 When the first PADR annual work programmes were set up, the only tool available to analyse and set capability priorities in EU defence was the 2014 version of

the Capability Development Plan. We found that more than two thirds of PADR's topics and selected projects related to the capability priorities identified in the plan. Many additional planning tools and initiatives for EU defence are now available (the Overarching Strategic Research Agenda, the Coordinated Annual Review on Defence and Permanent Structured Cooperation) but are not yet coordinated. The ministries of defence we interviewed told us that these tools had been used to a limited extent for the first EDF work programmes (paragraphs [29-34](#) and [89-90](#)).

Recommendation 2 – Sequence existing EU defence planning and cooperation tools coherently and assess how to further develop planning for EU defence funding

For the EDF to have its intended impact, the Commission should work together with the European Defence Agency, the European External Action Service and the member states to:

- (a) Use the EU defence planning and cooperation tools in a coherent way as an input to better prepare the work programmes;
- (b) Assess how to further develop the planning process for EU defence funding.

Target implementation date: 2026

111 PADR calls enabled the Commission to test different types of processes, which was one of its objectives, for instance calls with a specific topic versus open calls, cost-reimbursement calls versus lump-sum calls and, for the open call, one-stage evaluation versus two-stage evaluation. The different processes tested for PADR have proven useful for the first EDF annual calls in 2021 and 2022 (for instance, by enabling them to include open calls or specific calls for small and medium-sized enterprises). However, not all lessons learned were taken on board for the EDF (paragraphs [37-39](#) and [93-97](#)).

112 For some PADR competitive calls, there was a limited response, sometimes due to the small number of EU companies able to respond to a call for proposals for the required technology. Project coordinators and project participants are concentrated in member states that have large defence industries. The independent experts used for the evaluation and award process are similarly concentrated in these countries. We noted that the same combinations of companies occurred in several projects. The vast majority of PADR consortia were a continuation of cooperation between entities that

had already worked together before the PADR programme (paragraphs 37-39 and 57-63).

113 Security requirements were sometimes considered excessive and led to delays in the grant agreement process, mainly due to the time taken to obtain facility security clearance and sometimes personnel security clearance. They also caused project implementation difficulties, affecting communication between consortium members. Recruiting independent experts for project evaluation was also a difficult process because few experts were available on the market and they had to have personnel security clearance from their national authorities (paragraphs 40-42, 53-54 and 67).

114 The overall time taken between launching the calls and signing grant agreements (i.e. before work on the actual projects could start) varied significantly, averaging slightly more than a year and a half. PADR stakeholders, in particular interviewed project coordinators, considered that the time from launching calls to signing grant agreements was too long (paragraphs 43-45).

Recommendation 3 – Review processes in order to further facilitate participation in the EDF

The Commission should review processes in order to facilitate access to calls and make their implementation easier, including:

- (a) The Commission should promote and support member states in organising additional activities in order to facilitate diversification of participation in the EDF;
- (b) The Commission should, in comparison to PADR, reduce the time taken from the moment calls for EDF are closed until grant agreement signature;
- (c) The Commission, in consultation with member states, where the Commission security rules apply, should provide further assistance and share best practices on facility security clearance, personnel security clearance and handling classified information, with a view to reducing as far as possible the burden on project participants.

Target implementation date: 2024

115 There was regular monitoring of all PADR projects by both the European Defence Agency in the case of indirect management and the Directorate-General for Defence, Industry and Space in the case of direct management (paragraphs 46-52).

116 Given the anticipated significant increase in the number of proposals to evaluate and projects to manage, DG DEFIS is striving to streamline its procedures. However, it continues to face considerable pressure and challenges in terms of human resources. The availability of qualified personnel has been identified as one of the Directorate-General for Defence, Industry and Space's risk factors. We received positive feedback from ministries of defence, PADR project coordinators and project participants on indirect management, which requires less Commission staff. Indirect management, which is the exception rather than the rule in the EDF Regulation, is now not as broadly used as for PADR (paragraphs [51-52](#), [95](#) and [98-101](#)).

Recommendation 4 – Assess the broader use of indirect management as an option for EDF projects

The Commission should assess the opportunity and feasibility of the broader use of indirect management for EDF projects, for example in case risks linked to the limited availability of adequate resources at the Commission materialise or due to the nature of the project.

Target implementation date: 2024

117 PADR lessons-learned documents were prepared by the European Defence Agency, adopted by its Steering Board and made available to the Commission. The Commission also analysed lessons learned and shared them with the member states, the European Defence Agency and the European Union External Action Service. These lessons learned focused on processes (paragraphs [73](#) and [87](#)).

118 The Treaty on European Union restricts the use of the EU budget for defence. EU action in the field of defence is limited to the common security and defence policy, which is an external crisis management tool and not intended to be a collective European defence policy, encompassing for example a common definition of threats. This constraint complicates the long-term planning for EU spending in the defence area (paragraphs [102-103](#)).

119 The EU still lacks a longer-term strategy for the EDF. The existence of such a strategy is essential for the future of the EDF. The Commission has not yet sufficiently addressed some key issues in order for projects under the EDF to have their intended impact (paragraphs [102-107](#)).

Recommendation 5 – Design a long-term strategy for the EDF to increase the presence of the developed technology in the EU defence sector

At the time of the mid-term review, the Commission, working together with the member states and taking the EDF multiannual perspective as a basis, should develop a longer-term strategy for the EDF. The strategy should:

- (a) Aim to ensure that the capabilities developed with EU funds address needs of European member states armed forces while reinforcing the EU's defence technological and industrial base. It should address issues such as whether the EDF should focus on a smaller number of large projects;
- (b) Include inter-connected components with different timeframes (two-year work programmes, a strategy covering each multiannual financial framework together with a longer-term strategy, regularly updated to reflect changing security threats);
- (c) Include measurable indicators to be evaluated regularly, leading to corrections in annual work programmes' priorities when targets are not met.

Target implementation date: 2026

This report was adopted by Chamber III, headed by Mrs Bettina Jakobsen, Member of the Court of Auditors, in Luxembourg at its meeting of 28 February 2023.

For the Court of Auditors

Tony Murphy
President

Annexes

Annex I – Overview of the key steps and documents for the development of the EDF

What?	Who?	When?
Treaty on European Union – Articles 42-46 – Provisions on the common security and defence policy		26 October 2012
Thematic debate on defence	European Council	19 and 20 December 2013
Report ‘European Defence Research – The case for an EU-funded defence R&T programme’	European Union Institute for Security Studies	February 2016
Calls for proposals for the pilot project on defence research	European Defence Agency	13 May 2016
‘Shared vision, common action: a stronger Europe: a global strategy for the European Union’s foreign and security policy’	European External Action Service	June 2016
State of the Union Address ‘Towards a better Europe – a Europe that protects, empowers and defends’	President of the Commission, Jean-Claude Juncker	September 2016
Pilot project grant agreement signature	European Commission and European Defence Agency	28 October 2016
‘European Defence Action Plan’, including the reference to launching a Preparatory Action on Defence Research in 2017	European Commission	30 November 2016
PADR scoping paper	European Commission	November 2016

What?	Who?	When?
Resolution on constitutional, legal and institutional implications of a common security and defence policy, calling for the full implementation of the preparatory action for defence research	European Parliament	16 March 2017
Decision on the financing of the 'Preparatory action on Defence research' and the use of unit costs for the year 2017	European Commission	11 April 2017
EU member states Coordinated Annual Review on Defence (CARD)	Developed by the European Defence Agency and then approved by the Council of the European Union	18 May 2017
Delegation agreement between the European Union, represented by the European Commission, and the European Defence Agency, on the implementation of a Preparatory Action on Defence Research (PADR)	Signature by the European Commission and the European Defence Agency	31 May 2017
'PADR 2017 calls for proposals and general annexes' publication	European Commission and European Defence Agency	7 June 2017
Communication on launching the European Defence Fund	European Commission	7 June 2017
Proposal for a regulation aiming at supporting the competitiveness and innovative capacity of the EU defence industry	European Commission	7 June 2017
Decision on establishing permanent structured cooperation (PESCO) at member states level	Council of the European Union	11 December 2017
Decision on the financing of the 'Preparatory action on Defence research' and the use of unit costs for the year 2018	European Commission	9 March 2018

What?	Who?	When?
'PADR 2018 calls for proposals and general annexes' publication	European Commission and European Defence Agency	15 March 2018
Capability Development Plan (CDP) last edition (2018)	European Defence Agency (Steering Board endorsement)	June 2018
Proposal for a regulation establishing the European Defence Fund	European Commission	13 June 2018
Regulation (EU) 2018/1092 establishing the European Industrial Development Programme aiming at supporting the competitiveness and innovation capacity of the Union's defence industry	European Parliament and Council of the European Union	18 July 2018
Coordinated Annual Review on Defence (CARD) trial run 2017/2018 report submitted	European Defence Agency Ministerial Steering Board (i.e. defence ministers)	20 November 2018
Overarching Strategic Research Agenda (OSRA) endorsement	European Defence Agency (Steering Board In Research & Technology Directors' composition)	12 December 2018
Decision on the financing of the 'Preparatory action on Defence research' and the adoption of the work programme for 2019	European Commission	19 March 2019
'PADR 2019 calls for proposals and general annexes' publication	European Commission and European Defence Agency	19 March 2019
'European Defence Industrial Development Programme (EDIDP) 2019 calls for proposals, conditions for the calls and annexes' publication	European Commission	22 July 2019

What?	Who?	When?
'European Defence Industrial Development Programme (EDIDP) 2020 calls for proposals, conditions for the calls and annexes' publication	European Commission	23 July 2020
First Coordinated Annual Review on Defence report submitted to EDA Ministerial Steering Board	European Defence Agency	20 November 2020
Regulation (EU) 2021/697 establishing the European Defence Fund and repealing Regulation (EU) 2018/1092	European Parliament and Council of the European Union	Publication: 12 May 2021 Retroactive entry into force: 1 January 2021
26 new European Defence Industrial Development Programme projects with a budget of more than €158 million are selected for funding and two major capability development projects received a directly awarded grant of €137 million under the programme	European Commission	30 June 2021
2021 European Defence Fund annual work programme adoption and launch of 23 calls for proposals worth €1.2 billion	European Commission	30 June 2021
Significant actions to contribute to European Defence, boost innovation and address strategic dependencies unveiled	European Commission	15 February 2022
EU Strategic Compass for security and defence issued	Council of the European Union	21 March 2022
Joint communication on defence investment gaps	European Commission	18 May 2022
2022 European Defence Fund annual work programme (part I and II) and launch of calls for proposals	European Commission	21 June 2022 and 25 May 2022

What?	Who?	When?
NATO Defence Planning Process (NDPP) – End of cycle and start of new cycle	North Atlantic Treaty Organisation (NATO)	End 2023 plan

Annex II – The 18 PADR projects selected for funding between 2017 and 2019

Call	Project(s) selected	Countries of participants	Project budget (million euros)
PADR-US-01-2017: Technological demonstrator for enhanced situational awareness in a naval environment	OCEAN 2020 – Open Cooperation for European mAritime awareNess (completed)	IT, ES, DE, SE, PL, FR, EL, NL, UK, LT, PT, DE, FI, EE, NATO	35.5
PADR-FPSS-01-2017: Force protection and advanced soldier systems beyond current programmes	ACAMS II – Adaptive Camouflage for the Soldier II (completed and under administrative closure)	SE, PT, DE, LT, NL, FR	2.6
	GOSSRA – Generic Open Soldier System Reference Architecture (completed)	DE, ES, PL, PT, IT	1.5
	VESTLIFE – Ultralight Modular Bullet Proof Integral Solution for Dismounted Soldier Protection (completed)	ES, PT, NL, IT, FI	2.4
PADR-STF-01-2017: The European Defence Research Runway – Strategic Technology Foresight	PYTHIA – Predictive methodology for TecHnology Intelligence Analysis (completed)	IT, FR, UK, PL, BG, RO	0.9
PADR-EDT-02-2018: European high-performance, trustable (re)configurable system-on-a-chip or system-in-package components for defence applications	EXCEED – trusEd and fleXible system-on-Chip for EuropEan Defense applications (ongoing)	FR, PL, IT, ES, DE, EL, NO	12.0
PADR-EF-02-2018: Toward a European high-power laser effector	TALOS – Tactical Advanced Laser Optical System (ongoing)	FR, NL, IT, DE, CZ, BE, PL, UK, ES	5.4

Call	Project(s) selected	Countries of participants	Project budget (million euros)
PADR-STF-02-2018: The European Defence Research Runway 2 – Strategic Technology Foresight	SOLOMON – Strategy Oriented anaLysis Of the Market fOrces in EU defence (terminated and under administrative closure)	IT, FR, UK, BG, RO, PL, BE, EL, ES	1.9
PADR-EMS-03-2019: Combined radar, communications, and electronic warfare functions based on European Active Electronically Scanned Arrays for military applications	CROWN – European active electronically scanned array with Combined Radar, cOmmunications, and electronic Warfare fuNctions for military applications (ongoing)	ES, FR, DE, SE, NL, IT, LT	10.0
PADR-FDDT-OPEN-03-2019: Challenging the future	METAMASK – Metasurfaces for time-domain adaptive masking (ongoing)	IT, FR, NL	1.4
	SPINAR – Spin-based hardware artificial neural network for embedded RF processing (ongoing)	FR, PT, BE	1.4
	PRIVILEGE – PRIVacy and homomorphlc encryption for artificial intElligence	FR, CZ, EL	1.5
PADR-FDDT-EMERGING-03-2019: Emerging game changers – Autonomous positioning, navigation and timing	OPTIMISE – Innovative Positioning system for defence in GNSS-denied areas (ongoing)	ES, IT, FR, SK	1.5
PADR-FDDT-EMERGING-03-2019: Emerging game changers – Artificial Intelligence for defence	AIDED – Artificial Intelligence for the detection of explosive devices	BE, UK, NL, LV	1.5

Call	Project(s) selected	Countries of participants	Project budget (million euros)
PADR-FDDT-EMERGING-03-2019: Emerging game changers – Quantum Technologies for defence applications	QUANTAQUEST – Quantum Secure Communication and Navigation for European Defence (ongoing)	IT, NL, FR	1.5
PADR-FDDT-EMERGING-03-2019: Emerging game changers – Long-range effects	PILUM – Projectiles for Increased Long-range effects Using Electro-Magnetic railgun (ongoing)	FR, DE, PL, IT, BE	1.5
PADR-FDDT-EMERGING-03-2019: Emerging game changers – Augmenting soldier capacity	ARTUS – Autonomous Rough-terrain Transport UGV Swarm (ongoing)	AT, DE, FR	1.5
PADR-US-EMERGING-03-2019: Interoperability standards for military unmanned systems	INTERACT – INTERoperability Standards for Unmanned Armed ForCes SysTems (ongoing)	DE, NL, ES, SE, IT, FR, DK, LT, RO, PL	1.5

Note: AT – Austria, BE – Belgium, BG – Bulgaria, CZ – Czechia, DE – Germany, DK – Denmark, EE – Estonia, EL – Greece, ES – Spain, FI – Finland, FR – France, IT – Italy, LT – Lithuania, NL – Netherlands, NO – Norway, PL – Poland, PT – Portugal, RO – Romania, SE – Sweden, UK – United Kingdom, NATO – North Atlantic Treaty Organisation.

Source: ECA, based on Commission

(https://ec.europa.eu/commission/presscorner/detail/en/fs_20_1077) and EDA data.

Annex III – Different processes tested with PADR calls

Call name Call reference and topic Call duration in days	Type of call Call budget (million euros)	Type of action Technology readiness level (TRL)	Type of grant	1 / 2 stage evaluation	Weighting of evaluation criteria (excellence, impact, and quality and efficiency of implementation)	Direct / Indirect management	PADR projects
Unmanned systems PADR-US-01-2017: Technological demonstrator for enhanced situational awareness in a naval environment 120 days	Defined topic €15.48 million + €20 million in 2020	Research action Intended to start at TRL 4 and target TRL not lower than 6 and not higher than 7	Cost reimbursement	1 stage	Weight of 1.5 for the criterion "Impact". Weight of 1 for the two other criteria	Indirect	OCEAN 2020
Force protection and soldier system PADR-FPSS-01-2017: Force protection and advanced soldier systems beyond current programmes 106 days	Defined topic €6.78 million	Research action For one topic: expected to focus on TRL 1 to 3 – for the two other topics: expected to focus on TRL 2 to 4-5	Cost reimbursement	1 stage	No different weighting for the 3 evaluation criteria	Indirect	ACAMS II, GOSSRA, VESTLIFE

Call name Call reference and topic Call duration in days	Type of call Call budget (million euros)	Type of action Technology readiness level (TRL)	Type of grant	1 / 2 stage evaluation	Weighting of evaluation criteria (excellence, impact, and quality and efficiency of implementation)	Direct / Indirect management	PADR projects
Strategic technology foresight PADR-STF-01-2017: The European Defence Research Runway 106 days	Defined topic €0.948 million	Coordination and support action TRL not applicable (N/A)	Cost reimbursement	1 stage	No different weighting for the 3 evaluation criteria	Indirect	PYTHIA
Electronic design technologies for defence applications PADR-EDT-02-2018: European high-performance, trustable (re)configurable system-on-a-chip or system-in-package components for defence applications 105 days	Defined topic €11.98 million	Research action Intended to start at TRL 2 to 3 and target TRL 5	Cost reimbursement	1 stage	No different weighting for the 3 evaluation criteria	Indirect	EXCEED
Effects PADR-EF-02-2018: Toward a European high-power laser effector 105 days	Defined topic €5.4 million	Research action Intended to target TRL 5	Cost reimbursement	1 stage	No different weighting for the 3 evaluation criteria	Indirect	TALOS

Call name Call reference and topic Call duration in days	Type of call Call budget (million euros)	Type of action Technology readiness level (TRL)	Type of grant	1 / 2 stage evaluation	Weighting of evaluation criteria (excellence, impact, and quality and efficiency of implementation)	Direct / Indirect management	PADR projects
Strategic technology foresight PADR-STF-02-2018: The European Defence Research Runway 2 – Strategic Technology Foresight 105 days	Defined topic €1.9 million	Coordination and support action TRL N/A	Cost reimbursement	1 stage	No different weighting for the 3 evaluation criteria	Indirect	SOLOMON
Electromagnetic spectrum dominance PADR-EMS-03-2019: Combined radar, communications, and electronic warfare functions based on European Active Electronically Scanned Arrays for military applications 160 days	Defined topic €10 million	Research action Intended to target at least TRL 4	Cost reimbursement	1 stage	No different weighting for the 3 evaluation criteria	Indirect	CROWN

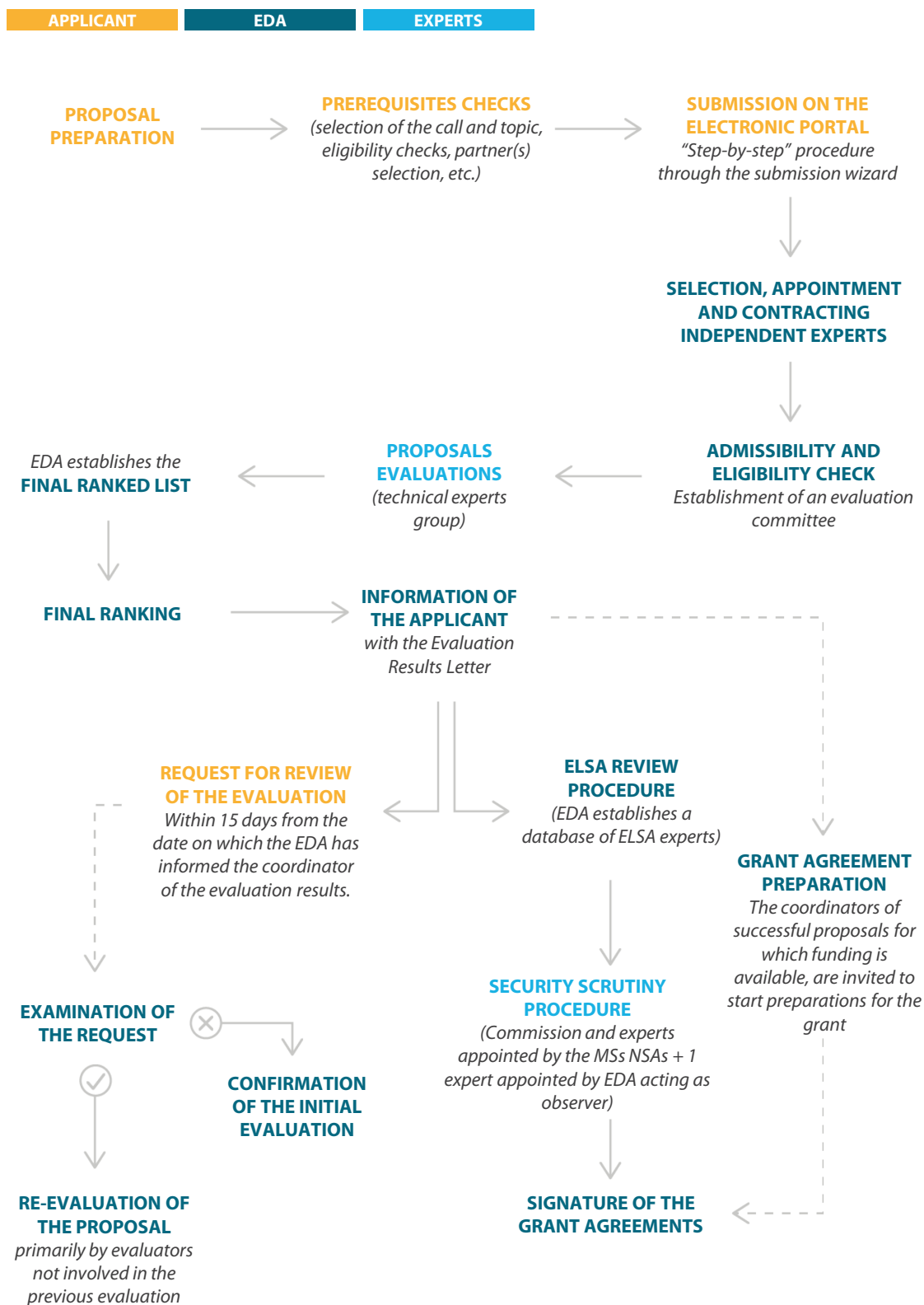
Call name Call reference and topic Call duration in days	Type of call Call budget (million euros)	Type of action Technology readiness level (TRL)	Type of grant	1 / 2 stage evaluation	Weighting of evaluation criteria (excellence, impact, and quality and efficiency of implementation)	Direct / Indirect management	PADR projects
Future Disruptive Defence Technologies (FDDT) PADR-FDDT-OPEN-03-2019: Challenging the future First stage: 91 days	Open call €4.3 million	Research action 'Not go beyond the delivery of a convincing experimental proof of concept', i.e. not beyond TRL 3	Lump sum	2 stage	2 nd stage evaluation: <ul style="list-style-type: none"> 50 % weight for "Excellence" 30 % weight for "Impact" 20 % weight for "Quality and efficiency of implementation" 	Direct	METAMASK, SPINAR, PRIVILEGE
FDDT PADR-FDDT-EMERGING-03-2019: Emerging game changers – Autonomous positioning, navigation and timing 160 days	Defined topic €1.5 million	Research action Intended to target TRL 3-4	Cost reimbursement	1 stage	<ul style="list-style-type: none"> 50 % weight for "Excellence" 30 % weight for "Impact" 20 % weight for "Quality and efficiency of implementation" 	Indirect	OPTIMISE
FDDT PADR-FDDT-EMERGING-03-2019: Emerging game changers – Artificial Intelligence for defence 160 days	Defined topic €1.5 million	Research action Intended to target TRL 3-4	Cost reimbursement	1 stage	50 %, 30 % and 20 % like for all PADR-FDDT-EMERGING-03-2019 calls	Indirect	AIDED

Call name Call reference and topic Call duration in days	Type of call Call budget (million euros)	Type of action Technology readiness level (TRL)	Type of grant	1 / 2 stage evaluation	Weighting of evaluation criteria (excellence, impact, and quality and efficiency of implementation)	Direct / Indirect management	PADR projects
FDDT PADR-FDDT-EMERGING-03-2019: Emerging game changers – Quantum Technologies for defence applications 160 days	Defined topic €1.5 million	Research action Intended to target TRL 3-4	Cost reimbursement	1 stage	50 %, 30 % and 20 % like for all PADR-FDDT-EMERGING-03-2019 calls	Indirect	QUANTA-QUEST
FDDT PADR-FDDT-EMERGING-03-2019: Emerging game changers – Long-range effects 160 days	Defined topic €1.5 million	Research action Intended to target TRL 3-4	Cost reimbursement	1 stage	50 %, 30 % and 20 % like for all PADR-FDDT-EMERGING-03-2019 calls	Indirect	PILUM
FDDT PADR-FDDT-EMERGING-03-2019: Emerging game changers – Augmenting soldier capacity 160 days	Defined topic €1.5 million	Research action Intended to target TRL 3-4	Cost reimbursement	1 stage	50 %, 30 % and 20 % like for all PADR-FDDT-EMERGING-03-2019 calls	Indirect	ARTUS

Call name Call reference and topic Call duration in days	Type of call Call budget (million euros)	Type of action Technology readiness level (TRL)	Type of grant	1 / 2 stage evaluation	Weighting of evaluation criteria (excellence, impact, and quality and efficiency of implementation)	Direct / Indirect management	PADR projects
Unmanned systems PADR-US-03-2019: Interoperability standards for military unmanned systems 160 days	Defined topic €1.5 million	Research action TRL N/A	Cost reimbursement	1 stage	No different weighting for the 3 evaluation criteria	Indirect	INTERACT

Source: ECA.

Annex IV – Overview of the process used by EDA until the grant agreement signature



Note: Ethical, legal and societal aspects (ELSA), member states (MSs), National Security Authority (NSA).

Source: ECA, based on Commission and EDA data.

Annex V – Summary results of the 12 PADR projects analysed

	Project summary results
OCEAN 2020	<p>Closed project.</p> <p>OCEAN 2020, with the field trials in the Mediterranean and Baltic seas, notably provided the proof of concept of the Maritime Operations Centre (MOC), a demonstrator of data integration and operational facilities enabling the commanders' situational awareness.</p>
GOSSRA	<p>Closed project.</p> <p>GOSSRA has the potential to become a NATO standard. The consortium maintained regular contacts with the related NATO Land Capability Group. The project resulted in a NATO standard recommendation (STANREC 4845 published in May 2022), distributed by NATO to all NATO nations and initiating the NATO standardisation process.</p>
VESTLIFE	<p>Closed project.</p> <p>The VESTLIFE trademark paved the way for Italian and Dutch patents.</p>
PYTHIA	<p>Project closed without achieving all its deliverables. Funds have been de-committed. External experts were involved in the assessment of project deliverables, milestones and impacts.</p>
EXCEED	<p>Project ongoing.</p> <p>According to the visit on the spot, the project has been granted an extension to continue until April 2025. The amendment was approved in July 2022. EXCEED is seen as a demonstrator that the targeted performance can be achieved. It is not a prototype.</p>
TALOS	<p>Project ongoing.</p> <p>According to the assessment report for the first reporting period, "the project has achieved most of its objectives and milestones for the period, with relatively minor deviations."</p>

	Project summary results
CROWN	<p>Project ongoing.</p> <p>According to the visit on the spot, the project coordinator does at this stage not know if the project will be able to go to a prototype. A gate review “to check how the project will be done with EU components” was not foreseen in the call text but was included in the grant agreement signed by the parties. The review is a major concern. The project coordinator is checking all the components and all the risks.</p>
SPINAR	<p>Project ongoing, started in December 2020.</p> <p>According to the visit on the spot, the SPINAR project was classified too high (EU-restricted). There was at one point in time, because of the classification level, the question how partners within the consortia could exchange. A too high-level classification has a cost. Lump-sum grant with no intermediate project reporting.</p>
PRIVILEGE	<p>Project ongoing, started in November 2020.</p> <p>Lump-sum grant with no intermediate project reporting.</p>
AIDED	Project ongoing, started in October 2021.
QUANTAQUEST	Project ongoing, started in September 2021.
INTERACT	Project ongoing, started in June 2021.

Annex VI – PADR project amounts spent at the end of 2021

Call	Call name	Project selected	Project budget (million euros)	Pre-financing %	Amount spent end of 2021 %
PADR-US-01-2017	Technological demonstrator for enhanced situational awareness in a naval environment	OCEAN 2020	35.5	40 %	90 %
PADR-FPSS-01-2017	Force protection and advanced soldier systems beyond current programmes	ACAMS II	2.6	50 %	83 %
		GOSSRA	1.5	50 %	100 %
		VESTLIFE	2.4	50 %	90 %
PADR-STF-01-2017	The European Defence Research Runway – Strategic Technology Foresight	PYTHIA	0.9	80 %	91 %
PADR-EDT-02-2018	European high-performance, trustable (re)configurable system-on-a-chip or system-in-package components for defence applications	EXCEED	12.0	50 %	50 %
PADR-EF-02-2018	Toward a European high-power laser effector	TALOS	5.4	50 %	90 %
PADR-STF-02-2018	The European Defence Research Runway 2 – Strategic Technology Foresight	SOLOMON	1.9	60 %	60 %
PADR-EMS-03-2019	Combined radar, communications, and electronic warfare functions based on European Active Electronically Scanned Arrays for military applications	CROWN	10.0	30 %	30 %

Call	Call name	Project selected	Project budget (million euros)	Pre-financing %	Amount spent end of 2021 %
PADR-FDDT-OPEN-03-2019	Challenging the future	METAMASK	1.4	65 %	65 %
		SPINAR	1.4	65 %	65 %
		PRIVILEGE	1.4	65 %	65 %
PADR-FDDT-EMERGING-03-2019	Emerging game changers – Autonomous positioning, navigation and timing	OPTIMISE	1.5	50 %	50 %
PADR-FDDT-EMERGING-03-2019	Emerging game changers – Artificial Intelligence for defence	AIDED	1.5	50 %	50 %
PADR-FDDT-EMERGING-03-2019	Emerging game changers – Quantum Technologies for defence applications	QUANTAQUEST	1.5	50 %	50 %
PADR-FDDT-EMERGING-03-2019	Emerging game changers – Long-range effects	PILUM	1.5	50 %	50 %
PADR-FDDT-EMERGING-03-2019	Emerging game changers – Augmenting soldier capacity	ARTUS	1.5	50 %	50 %
PADR-US-03-2019	Interoperability standards for military unmanned systems	INTERACT	1.5	50 %	50 %
TOTAL PROJECT AMOUNTS (Not including expert costs and EDA remuneration)			85.5		71 %

Source: ECA.

Annex VII – PADR lessons learned and the EDF Regulation

EDF Regulation Article	EDF Regulation	Difference with PADR and comments
8(1)	<p>The article stipulates that “the Fund shall be implemented under direct management in accordance with the Financial Regulation” while Article 8(2) adds that “by way of derogation from paragraph 1 of this Article, specific actions may, in substantiated cases, be carried out under indirect management...”.</p>	<p>PADR confirmed the relevance of EU defence grants management in an indirect mode by EDA (EDA is managing in indirect mode 15 out of 18 PADR projects). According to the Commission, with the use of double comitology (the EDF Programme Committee gives an opinion 1) on the annual work programme before its adoption by the Commission and 2) on the award decision after the selection of the projects and before its adoption by the Commission), direct management would have major advantages to stick to the budgetary annuality favoured by the European Parliament for scrutiny purposes.</p>
9(1)	<p>The article stipulates that “recipients and subcontractors involved in an action shall be established in the Union or in an associated country”. Articles 9(4) to 9(8) allow for derogations.</p>	<p>There were no such derogations for PADR. The PADR 2017, 2018 and 2019 Commission decisions on the financing of the PADR specify that “Entities from all EU Member States and Norway shall be eligible to apply”. PADR projects did not show the need for such derogations.</p>

EDF Regulation Article	EDF Regulation	Difference with PADR and comments
10(4)	Regarding eligible actions, “the action shall be carried out by legal entities cooperating within a consortium of at least three eligible legal entities which are established in at least three different Member States or associated countries”. However, Article 10(5) adds that this principle “shall not apply to actions relating to disruptive technologies for defence...”, that could therefore be carried out by one entity only, without any cooperation with another entity.	For PADR, there was only one exception to the principle of “legal entities cooperating within a consortium of at least three eligible entities established in at least three Member States” for the call PADR-US-01-2017 requiring the participation of at least five legal entities.
12, 22	The articles, dealing with award criteria detail the six criteria to be used in common for research and development for the EDF, and the two additional ones for development actions. They can contribute to enabling a better documentation of proposal evaluation.	It is a lesson learned from PADR to have more award criteria.
15(2)	For indirect costs, this article allows for an alternative to “the flat rate of 25 % of the total direct eligible costs of the action”: “indirect eligible costs may be determined in accordance with the recipient’s usual cost accounting practices...”.	For PADR, a number of the organisations that we consulted complained about insufficient indirect cost coverage by the EU with the 25 % flat rate. It is a lesson learned from PADR.
34(1)	This article specifies that “the Commission shall be assisted by a committee”.	While this is a difference with PADR, the Commission has anticipated the legal requirement to have a programme committee for the EDF with the PADR “As-if” programme committee that it has set up.

Source: ECA.

Abbreviations

Cap Tech: Capability technology group

DG DEFIS: Directorate-General for Defence Industry and Space

EDA: European Defence Agency

EDF: European Defence Fund

PADR: Preparatory Action on Defence Research

TRL: Technology readiness level

Glossary

“As-if” programme committee: Ad hoc consultative body set up by the Commission, comprising representatives of the EU member states, to assist the Commission in preparing and implementing the PADR.

Capability technology: A body set up by EDA to undertake specific research and technology activities in response to agreed defence capability needs or priorities.

Common security and defence policy: The part of EU foreign policy that focuses on security and defence capacity.

Disruptive technology: Emerging technology with the potential to make fundamental changes and radically improve performance in a given sector.

Interoperability: Ability of a system to communicate and work with other systems, including by exchanging data.

Standardization Recommendation: NATO document listing one or more non-binding operational standards to be applied by member countries engaged in a NATO activity.

Technology readiness level: Metric used to state the maturity of a technology and allow different technologies in a given system or environment to be reliably compared.

Replies of the Commission

<https://www.eca.europa.eu/en/publications/sr-2023-10>

Replies of the European Defence Agency

<https://www.eca.europa.eu/en/publications/sr-2023-10>

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This performance audit was carried out by Audit Chamber III External action, security and justice, headed by ECA Member Bettina Jakobsen. The audit was initially led by ECA Member Juhan Parts, supported by Ken-Marti Vaher, Head of Private Office and Margus Kurm, Private Office Attaché.

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PDF	ISBN 978-92-847-9678-6	ISSN 1977-5679	doi:10.2865/51144	QJ-AB-23-009-EN-N
HTML	ISBN 978-92-847-9709-7	ISSN 1977-5679	doi:10.2865/924664	QJ-AB-23-009-EN-Q

The Preparatory Action on Defence Research (PADR) was designed as a precursor programme of the European Defence Fund (EDF). This is the ECA's first audit in the defence area and assessed whether the PADR properly prepared the EU to significantly increase its defence spending through the EDF. We conclude that, while some lessons were learned, the value of the PADR as a testbed for increasing EU defence spending was reduced due to the time constraints and limited results available. When the EDF was launched, most PADR projects were still ongoing. We make several recommendations to help the EDF reach its objectives, in particular to design a long-term strategy to increase the use of the technology developed in the EU defence sector.

ECA special report pursuant to Article 287(4), second subparagraph, TFEU.



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